

## **Measuring the Size of Bryant's Ecological Footprint**

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### **Abstract**

Since the beginning of the industrial age, people have been leaving a significant footprint on the Earth's environment. Currently, the environment has become a notable issue all over the world. Many countries, institutions, and people, in general, have taken steps toward slowing down the effect we are leaving on Earth. In this research paper, we are researching national trends of sustainability and a specific institution, Bryant University, overtime Bryant University has developed many integrated methods of sustainability. Various methods of sustainability are explored throughout the text. Bryant's sustainability efforts can be reviewed and monitored, with methods such as Life-Cycle Assessments, Food and Waste Management strategies, composting, and through the exploration of sustainability practices at other institutions. With a campus-like Bryant playing a large sustainable role, in turn, it can create more jobs that focus on environmentally safe-production and consumption. These opportunities show a possible change in the way humans have been leaving their footprint on Earth.

### **Key Words**

Source reduction, Life-Cycle Assessment, Sustainability, Green Jobs, Compost

## Introduction

Bryant University's ecological footprint can be criticized through sustainability strategies like Life-Cycle Assessments, recycling, composting, food waste management, energy, and water consumption methods, land usage, and community involvement, we explore the effects of these strategies on the environment.

Sustainability is the idea of ensuring the development and advancement of human culture with awareness along with action regarding the future generations of not only people, but the entire environment.<sup>1</sup> Dr. Susan A. Crate, explains how the idea first became popular in 1987, formally introduced as the need for development that meets the needs of the present without compromising the ability of future generations to meet their own needs.<sup>2</sup> This idea has been consistent throughout the years and is displayed at Bryant University today.

Bryant's sustainability efforts are mainly represented through their food waste management system. The food waste management at Bryant has two main sustainability methods that restrict the use of landfills in the Rhode Island area, the two methods include partnerships with local farms and Newport Diesel. After exploring the methods of other Universities like Bentley and Brown University, we will critique and give insight into how Bryant can improve their overall effect on the environment. Participating in these sustainability methods, students at the business-focused institution can change the way business affects the environment by entering the path of green jobs. Green jobs are jobs that focus on ensuring the consumption and business operations are environmentally friendly, which will be essential to keep the future environment sustainable.

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<sup>1</sup> Crate, Susan A. "Investigating Local Definitions of Sustainability in the Arctic: Insights from Post-Soviet Sakha Villages." *Arctic*, December 16, 2009. Date Accessed: October 31, 2019, <http://web.b.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=10&sid=d1ed3a4a-662a-421f-9650-df27ea9fab51@sessionmgr101>.

Bryant University's community consists of students and faculty who have taken steps to ensure the campus is sustainable and has a positive effect on the environment. From food-waste management to energy and water consumption, to land usage, to being involved in the community, Bryant has taken various steps to give students the steps it takes to be sustainable. The University continues to strive towards becoming more sustainable and has many set goals based from previous years to be achieved by next year, 2020.

In Anderson and Burnham's article, the overall analyzation of a Life-Cycle Assessment is explored. Anderson and Burnham define an LCA as a system that helps establishments manage and control their environmental decisions.<sup>2</sup> The authors use the idea of an LCA to compare various sustainability strategies. Anderson is the vice president of Environmental Quality for the Procter & Gamble Company, and Burnham is a consultant on energy and environmental issues based in St. Paul, Minnesota. The authors' experience with environmental issues is used to instruct the reader about sustainability strategies.

Composting is investigated through the text of "Composting: The Way for a Sustainable Agriculture" The authors define composting as stabilized organic matter used to fertilize degraded soil.<sup>3</sup> Throughout the text, the authors explore and criticize the various composting methods. The text is a part of the literature platform: Science Direct. Science Direct is a leading platform of peer-reviewed literature. The research in the article provides accurate and credible information regarding composting.

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<sup>2</sup> Anderson, Deborah D., and Laurie Burnham. 1992. "Toward Sustainable Waste Management." *Issues in Science & Technology* 9 (1): 65. Date Accessed: October 31, 2019

<sup>3</sup> Pergola, Maria, Alessandro Persiani, Assunta Maria Palese, Vincenzo Di Meo, Vittoria Pastore, Adamo, Carmine D, and Giuseppe Celano. "Composting: The Way for a Sustainable Agriculture." *Applied Soil Ecology* 123 (February 2018): 744–50. doi:10.1016/j.apsoil.2017.10.016.

Bryant's food waste management system is the most student involved step towards sustainability. Every day students participate in these steps and do not even realize they are acting in a sustainable nature. Pre-consumer and post-consumer food waste at Bryant is taken to a pig farm about 12 miles away from campus. Bryant is also partnered with Newport Diesel, who takes burned vegetable oil and turns it into clean-burning fuel.<sup>4</sup> These two acts ultimately restrict the amount of landfill usage Bryant participates in, which in turn helps the environment. Other schools like Bentley University and Brown University have taken similar steps, and Bryant can look up to institutions like them to continue to strive toward sustainability.

According to the United States Department of Labor Bureau of Labor Statistics, green jobs are the jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources or jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources.<sup>5</sup> With students taking steps with Bryant to ensure a sustainable community, it builds a mindset to remain environmentally friendly in future operations. Considering the direction, the environment is heading because of the economy, these jobs will be essential in the future to ensure the Earth will be safe and ecologically friendly for the future generations of all life on Earth.

### **Sustainable Development**

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<sup>4</sup> Tomasetti, Brooke M. " Black, Gold, and Green: Food Waste Management at Bryant University " DigitalCommons@Bryant University, April 2015. Accessed: November 14, 2019 [https://digitalcommons.bryant.edu/honors\\_science/3/](https://digitalcommons.bryant.edu/honors_science/3/)

<sup>5</sup> "Overview of the BLS Green Jobs Initiative." U.S. Bureau of Labor Statistics. U.S. Bureau of Labor Statistics. Accessed October 31, 2019. <https://www.bls.gov/green/>.

Bryant's Sustainable Development goals plays a huge role in their development of an environmentally friendly campus. According to Susan A. Crate, sustainable development first became popular in 1987 when the Brundtland Commission introduced that the need was for "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987:43).<sup>6</sup> This introduction to the idea of sustainability has been the building ground of the topic itself for over thirty years now, Bryant's idea of sustainability is extremely similar, just mainly focused on the actions taken upon today and how they will affect future generations. The steps taken by Bryant to ensure the campus is sustainable are through actions including food waste management, energy and water consumption, land usage, and involvement in the community.

There are many various steps and opportunities to help ensure a community is sustainable. Some of these can include food waste management, energy and water consumption, land usage, and ensuring there is an involvement within the surrounding communities to give and receive more knowledge on how to become sustainable.

Bryant University is a community of college students and faculty that has efforts to ensure their community, and other communities, are sustainable. Bryant's Ten Domains of Sustainability on Campus include terms like Academics and Research, Energy, Buildings and Land Use, Health and Wellness, Transportation, Waste Reduction and Recycling, Water, Community Engagement, Food and Dining, and Supply Chain Management.<sup>7</sup>

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<sup>6</sup> Crate, 294

<sup>7</sup> "Sustainability." Bryant University. Accessed October 31, 2019. <https://www.bryant.edu/about-bryant/sustainability>.

The University has many plans, goals, and resources to ensure the campus is sustainable. The energy procedures include using geothermal and renewable energy, continuing to strive to ensure energy consumption is sustainable and environmentally friendly. The university also intends to develop a campus-wide study on green buildings and increase the use of green cleaning products and organic fertilizers. The fuel use on campus is expected to be reduced by 10% between 2010 and 2020. Recycling habits include sending food waste to farms, proper disposal of electronics, promoting recycling habits within residence halls, and properly managing discarded materials from move out day. The water usage plans to be cut by 10% from 2013 to 2020. Student and faculty groups plan to engage in the community in and out of Bryant that will help benefit the environment.

### Life-Cycle Assessments



*Figure 1: Life-Cycle Assessment Diagram. Carbon Footprint<sup>8</sup>*

<sup>8</sup> Life-Cycle Assessment Diagram. Carbon Footprint. Accessed November 14, 2019. Figure 1 [https://www.carbonfootprint.com/images/product\\_lifecycle\\_infographic.png](https://www.carbonfootprint.com/images/product_lifecycle_infographic.png).

Life-Cycle Assessments are significant to the concept of sustainability. In the article, written by Anderson and Burnham, the concept of Life-Cycle Assessments or (LCAs) is introduced. The authors define LCAs as a system that helps establishments manage and control their environmental decisions.<sup>9</sup> Anderson and Burnham further develop the concept of LCAs as a three-step process.

This three-step concept consists of a "product's energy and resource demands and emission; the impact of these factors on the environment; and a systematic evaluation of the ways to improve a product's environmental performance. LCAs allow companies to measure tradeoffs in areas such as energy use and waste production and provide baseline data for evaluating strategies such as light-weighting versus material substitution. They thus help ensure that again in one area (solid waste reduction, for example) is not offset by a loss in another (such as increased energy use)."<sup>2</sup>

Anderson and Burnham credit LCAs as “valuable analytic tools”<sup>2</sup>, since they address the quantitative aspect of waste reduction. Anderson and Burnham claim the use of LCAs leads to less costly procedures for waste production. Their analyzation of LCAs expresses the benefits and needs with the use of this procedure.

In the Life-Cycle Assessment Diagram, (see fig.1) the various steps of a product's carbon footprint can be observed. The product starts off by obtaining the raw materials required. Next, the product is manufactured and transported for distribution. The product is then used and recycled, which transitions the cycle to the beginning. The raw materials gained from recycling will be used to manufacture another product.

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<sup>9</sup> Anderson and Burnham,69

LCAs can be used to determine and outline Bryant's sustainability efforts. Bryant's system of recycling can be criticized and tracked with the use of an LCA. After the manufacturing process, goods are transported to Bryant University for consumption. After consumption, Bryant's food waste management strategies come into effect.

### **Food Waste Management at Bryant**

Bryant University's food waste management has had success and failure throughout the years. Tomasetti's text includes examination of the food waste management of Bryant University along with feasible, sustainable, and cost-effective solutions to the campus's environmental issues. With these solutions, it will help Bryant's effect on the landfill's speed of filling up to its capacity. Also includes the advantages and disadvantages of sending food waste to pig farms versus alternative options. Research written in the source includes surveys of local food recycling and composting experts and key stakeholders, a ranking system to display the different paths Bryant can take environmentally and comparing Bryant's environmental communities with those of other Colleges and Universities.<sup>4</sup>

The main problem with food waste production is that students and faculty occasionally will not follow the instructions given on where to properly dispose food and trash. Bryant generates 13,410 pounds of food waste a month, 113,982 pounds a year (subtract summer and vacations).<sup>4</sup> The food and services at Bryant University have given instructions that would bring the food to the farms to feed animals.

Another step toward a clean environment taken by Bryant is through the partnership with Newport Biodiesel, who takes the used vegetable oil from the kitchen and turns it into clean-burning fuel. This partnership is considered industrial.<sup>4</sup>

### Bryant Compared to Other Schools

When comparing Bryant University to Bentley University in relation to sustainability, it can be concluded that there is an effort towards sustainable practices. Both Massachusetts and Rhode Island have food waste bans in place today (different at the time written, Rhode Island was still implementing a ban). Bentley University partakes in similar action with their food services, bringing extra food to farms, increasing the purchases from local vendors, and partnering with a company using the used vegetable oil to partner with a company that burns it for fuel use.<sup>10</sup> Bryant University and Bentley University both bring their pre and post consumed food waste to animal farms to be reused to feed the farm animals like pigs. Both schools also have partnerships with companies that take used vegetable oil and turn into burning fuel. Brown University seems to be the leader in sustainability in the Rhode Island area, involved in programs like purchasing food from local vendors, formed a process of ensuring the food is local, ecological, fair, and humane, feeding people in need, and many more initiatives that bring Brown's food waste away from the landfills that are quickly reaching their capacity. Bryant University compared to a school like Brown University. Bryant has not yet made a significant effort to buy locally sourced food from local vendors or fed the community as much as Brown University has. Ultimately both schools have made efforts to create a sustainable campus, but Bryant should continue to look up to Brown University and follow their practices

### **Composting**

Composting is a major component to Bryant's recycling strategies. According to the authors of "Composting: The Way for a Sustainable Agriculture", Composting can be described "as stabilized organic matter, can be virtuously used for the recovery of degraded soils and their fertility restoring, carbon sequestration in the soil and the reduction in the use of chemical inputs

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<sup>10</sup> Tomasetti, 8

(fertilizers, pesticides, fuel) resulting in the decrease of production costs and negative environmental impacts."<sup>11</sup>

In the text, the authors use the definition of compost to display the benefits of composting. The authors also expand the definition of compost, to demonstrate a more focused view on the various methods and processes used through composting.

The authors explore the various steps of the composting process. Composting is developed through the decomposition of organic matter. Compost is applied to degraded soil, which recover soil fertility. This method limits the inputs of fertilizers, pesticides, and fuel from agricultural activities.

The concept of composting relates to the final steps of Bryant's recycling strategy. The pre-consumed and post-consumed food waste is then brought to a nearby farm. The waste is then used for food and compost in those farms.

### **Green Jobs**

According to the United States Department of Labor Bureau of Labor Statistics, green jobs are the jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources or jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources.<sup>12</sup>

The Bureau of Labor Statistics "Green Job Initiative" is to develop the number of and trend over time in green jobs, the industrial, occupational, and geographic distribution of the jobs, and the wages of the workers in these jobs. The Bureau of Labor Statistics is concerned

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<sup>11</sup> Pergola, Maria, Alessandro Persiani, Assunta Maria Palese, Vincenzo Di Meo, Vittoria Pastore, Adamo, Carmine D, and Giuseppe Celano, 744

<sup>12</sup> "'Overview of the BLS Green Jobs Initiative." U.S. Bureau of Labor Statistics

about the occupations and companies that are not concerned about the environmental impact of the production of their product or service.<sup>5</sup> Developing green jobs must contain two components, being consistent with the output and the approach taken on the process.

These jobs are occupations that may come with being sustainable at Bryant. With that being said, with no doubt, the main reason for being a sustainable community at Bryant is to truly help the environment and culture around campus and throughout the world, but there is another; green jobs. These jobs are going to play a huge role in our future, whether it be energy and/or water consumption, recycling, fuel usage, and many other environmental factors, with the direction the global economy is heading these jobs will be essential.

### **Life Cycle Assessments in the World of Business**

The business industry has become one of the leading factors to the Earth becoming unsustainable, and the people are beginning to realize this. Customers are increasingly demanding that businesses produce products that are not just eco-friendly but are produced in eco-friendly manufacturing processes with safe materials for the future's environment and supply of resources.<sup>8</sup> With this uprising demand, businesses must learn new ways to incorporate sustainability into their business models and marketing efforts to meet this new demand from consumers.

Many companies' traditional management focuses mainly on their customers, competitors, internal processes, and relationships with suppliers. Once the idea of sustainability with products and processing comes into the question, the ideas are very narrow because they are outside of the focuses with classic supplier, competitor, and consumer relationships. Methods of production such as mining, transportation, storage processes, and final disposal are the critical

impacts of the environment. These methods are outside of companies' management focus. This is when the Life-Cycle Assessment comes into play.

When companies use the Life-Cycle Assessment, they become aware of the critical life cycle steps of their products and services and enables management to make evaluations on improvement measures to ensure sustainability in the future. Life-Cycle Assessments will bring improvements to areas such as strategy development, product management, sourcing and production, marketing and sales, and information and training.<sup>13</sup> Meeting these new demands by consumers, companies will ultimately improve their production and consumption methods, which will help grow their business' success for the future, leaving a healthier ecological footprint on Earth.

## **Conclusion**

Bryant is consistently taking efforts to ensure the University remains sustainable today and in the future. Through efforts including food waste management, energy and water preservation, land usage, and community service, Bryant's efforts have been successful but are still improving. With goals set for the year 2020, the University has a vision to continue the safe environment. Students can participate and focus on these sustainability efforts and turn those into successful and environmentally orientated occupations to ensure the future is an environmentally safe economic world. Overall Bryant has taken strides to create a positive ecological footprint and will continue to do so in the future with their students bringing environmentally safe business to the economy.

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<sup>13</sup> Buxel, Holger, Gökçe Esenduran, and Scott Griffin. "Strategic Sustainability: Creating Business Value with Life Cycle Analysis." *Business Horizons* 58, no. 1 (2015): 109–22. <https://doi.org/10.1016/j.bushor.2014.09.004>.

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