**Sustainability Report:**
**Comparison Between New Belgium and Budweiser Beer**

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## Introduction

The process of making—and of course consuming—fermented beverages goes back thousands of years in human history. Today, this craft has been refined to a scientific art of precision practiced by giant corporations and small-scale, basement home brewers alike. Beer is now ubiquitous in societies all across the globe. In the United States, the rituals surrounding beer drinking are numerous and varied. From illegal teenage binges, to consuming one's first legal drink in a bar, to yearly Super Bowl parties, to celebrations of birthdays and weddings, Beer is undeniably a part of the culture of the United States.

As criticism of the consumption levels of the global North only grow, it has become important to thoroughly assess the impact of our consumption patterns in order to understand the actual affect they have on the planet and our society. As college students, beer is something that we not only encounter often, but also aggregately consume large quantities of. In light of this, the following report will compare two beers: New Belgium's Fat Tire Ale, and Budweiser. New Belgium is a smaller scale brewery with an industry reputation of both social and environmental sustainability. Budweiser is of course, the industry giant of beer production in the United States. A comparison of these two beers will not only shed light on the general impact—both social and environmental—of consuming beer, but also determine how large-scale beer production compares to smaller scales in terms of long-term sustainability.

## Materials

New Belgium Brewing Company (NBB), a regional craft brewery with national distribution, is considered to be the brewery industry ideal for environmentally and socially sustainable practices. The company is renowned for innovative, open, and inclusive corporate practices, as well as for its efforts to reduce greenhouse gases and waste materials in the production and distribution of their beer. New Belgium embraces this sustainable image, as evidenced by a recent Life Cycle Assessment, performed in cooperation with the Climate Conservancy (TCC), of its flagship Fat Tire Amber Ale; TCC stated that the goal of the assessment was to "…help [NBB] manage greenhouse gas emissions throughout the supply chain of [the beer]" (Climate Conservancy, 2008 p. 4). Utilizing information from TCC's report, we present a list of the raw materials in a six-pack of Fat Tire, the locations they originate, and their associated greenhouse gas emissions (Table 1). GHG emissions are presented in grams of carbon dioxide equivalents (g $CO_2e$), "…a unit of GHG emissions including non-$CO_2$ gasses that have been converted to an equivalent mass of $CO_2$ based on their global warming potential" (Climate Conservancy, 2008 p. 2). Global warming potential is a "…measure of the warming caused by non- $CO_2$ GHG relative to an equivalent mass of $CO_2$, defined over a specific period of time…" in this case 100 years, as determined by the International

Programme on Climate Change (ibid).

**Table 1**: Names, GHG emissions in grams of CO2 equivalent (g CO2e), locations of the raw materials in a six-pack of NBB Fat Tire beer, and Budweiser raw materials (TCC: 2008; Budweiser: 2010)

| **Fat Tire Materials** | **GHG** (g $CO_2e$) | **Location** | **Budweiser Materials** |
|---|---|---|---|
| Non-consumable material: | 853.3 | | Non-consumable material: |
| Plastic | 0.5 | Denver, Colorado | Plastic |
| Adhesive | 7.6 | Sacramento, California; Eden Prairie, Minnesota | Adhesive |
| Wood | 16 | Fort Collins, Colorado | Wood |
| Cardboard | 47.7 | Wheat Ridge, Colorado | Cardboard |
| Paper | 74 | LaCrosse, Wisconsin | Paper |
| Steel | 17.4 | Atessa, Italy | Steel |
| Glass | 690 | Windsor, Colorado | Glass |
| production | 688.2 | | Consumable material: |
| transportation | 1.8 | | Carbon dioxide |
| | | | Malt barley |
| Consumable material: | 678 | | Hops |
| Carbon dioxide | 72.5 | Cheyenne, Wyoming | Rice |
| production | 72.3 | | Yeast |
| transportation | 0.2 | | Water |
| Malt barley | 593.9 | | |
| Barley agriculture | 394.1 | North Dakota, Montana, Washington, Idaho, Minnesota, Colorado | |
| Barley transportation | 8 | | |
| Malt production | 166.8 | multiple sources, Colorado | |
| Malt transportation | 25 | | |
| Hops | 5.7 | Yakima Valley, Washington; Willamette Valley, Oregon; United Kingdom | |
| agriculture | 5.4 | Fort Collins, Colorado | |
| transportation | 0.3 | | |
| Water | 3.2 | | |
| Total | 1531.3 | | |

As a comparison, our material assessment provides a list of the raw materials in the production of Anheuser-Busch's Budweiser brand. Unfortunately, no information exists on the GHG emissions associated with the production and transportation of each material. However, the impact of the non-consumable materials is likely similar given that only minor differences exist between the physical structure of six-packs of Budweiser and Fat Tire. Any differences that do exist would likely be due to the average distance these materials travel. The consumable materials differ in that Budweiser

includes rice with the hops and malt barley (Anheuser-Busch, 2010). Due to this extra material, a detailed study of the consumable materials utilized in Budweiser would likely reveal higher total GHG emissions than Fat Tire.

## Environmental Impact: Analysis of Material and Energy Flows

From grain to glass every step of the brewing process is measured at New Belgium Brewery. As an alternatively empowered company they are constantly measuring the consumption of primary inputs such as, water, electricity and natural gas. Many of their business decisions are based on minimizing environmental impact, a fact they take great pride in.

### *Energy and GHG Emissions*

They begin with the premise that they must first reduce their need for electricity. In collaboration with the green city of Fort Collins, New Belgium installed smart grid technology throughout their business. At the water treatment plant microbes are used to clean all of the production wastewater through several aerobic and anaerobic basins. The byproduct of this system, methane gas, is harvested and piped back into the brewery where it powers an engine which produces up to 15% of their heat and electrical needs, a closed loop system that turns waste into energy (New Belgium, 2009).

Atop the packaging site, an array of solar panels produces almost 264,000 kwh each year and contributes to roughly 3% of their annual electricity. Recognizing the biggest emitter of GHG emissions is from electricity provided by coal burning power

plants the company chose to purchase 100% of their power from wind in 1999. Coworkers all voted on the shift to wind power even at a premium of 2.5 cents more, which required them to dip into their bonus pools (New Belgium, 2009).

Even with these alternative energy sources natural gas is needed for thermal energy. However, New Belgium uses an energy efficient "Merlin" brew kettle, which enables them to cut the boil time in half. Instead of boiling from the outside in, the Merlin has a cone shaped boilerplate that flash boils the wort. This accelerated boiling process reduces natural gas consumption and cuts back on water lost to evaporation (ibid).

Efforts to cut greenhouse gas emissions have led to a proposed target for 2015 to reduce GHG emissions per barrel by 25% from 2006 levels. As stated on their website, "New Belgium recognizes that human caused carbon emissions are contributing to global warming," and are committed to reducing their carbon footprint (New Belgium, 2009).

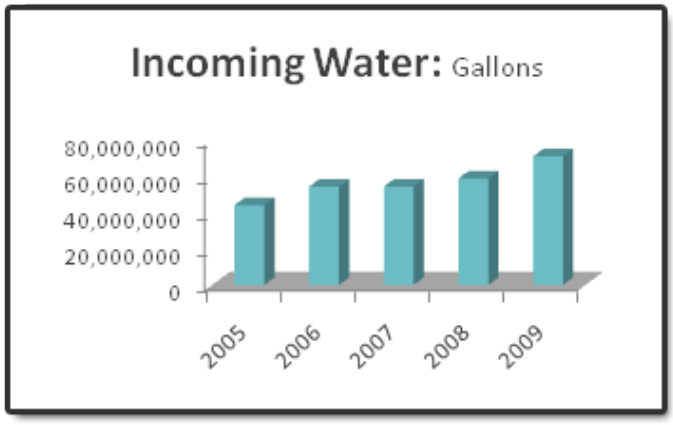
*Water*

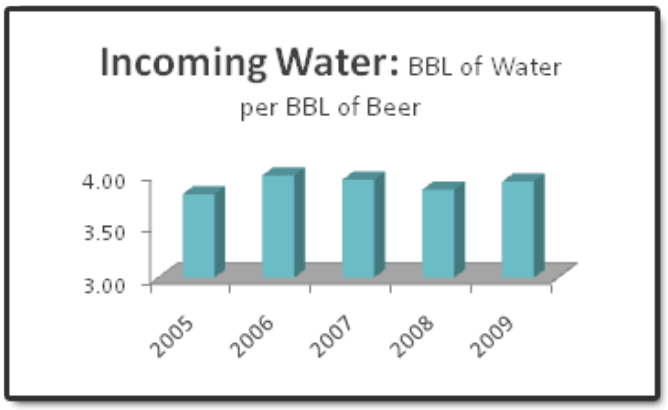
Aside from energy inputs New Belgium recognizes the need for conserving water, a critical part of the brewing process. Multiple beer companies report that water usage among breweries often exceeds a 5:1 ratio. Meaning it takes 5 gallons of water to make one gallon of beer. New Belgium found their average in 2009 was roughly 4:1. The conservation of water is an important regional issue especially in the arid west. With the effects of climate change exacerbating the aridity of the west, New Belgium takes the role of stewards of local rivers sincerely. This means returning excess water as clean as it

arrived, reducing consumption, avoiding toxic cleaning agents and the like (New Belgium, 2009).

This is done in many ways, for example, in the packaging hall the water used to first rinse the inside of the bottles is recovered and reused on the final exterior rinse. Hot water recovery tanks are also used to recover heat for sanitation in subsequent cleaning cycles. Additionally, the landscape surrounding the brewery is modeled after a xeriscape approach specially designed for arid climates using native plants that require little watering and soil amendments to retain water (New Belgium, 2009).

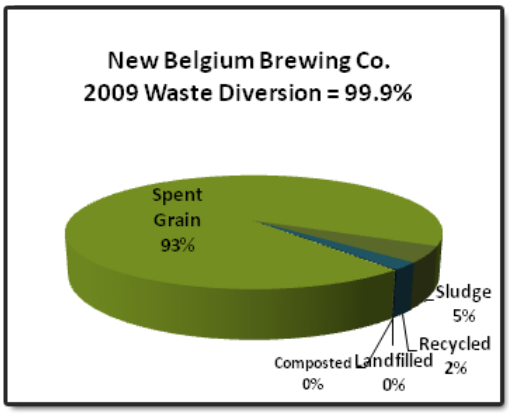
As New Belgium brewery continues to grow they recognize total gallons of water used will also increase. Ever conscious of this fact they monitor barrel usage and aim to lower the overall ratio to a targeted goal of 3.5:1, a 10% reduction. When reading the charts below consider that BBL stands for barrels. A barrel of beer is 31 gallons and the standard size for a keg is a half-barrel. Most breweries brew in 7 or 10-barrel batches (New Belgium, 2009).

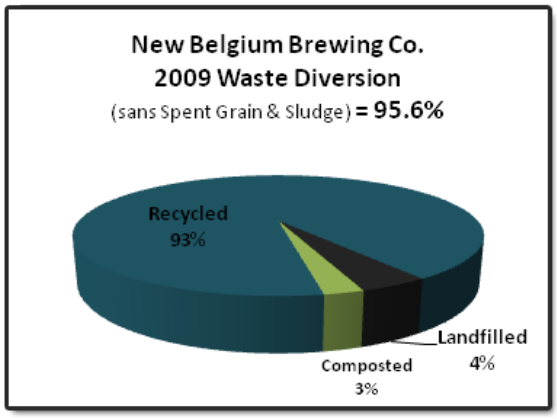


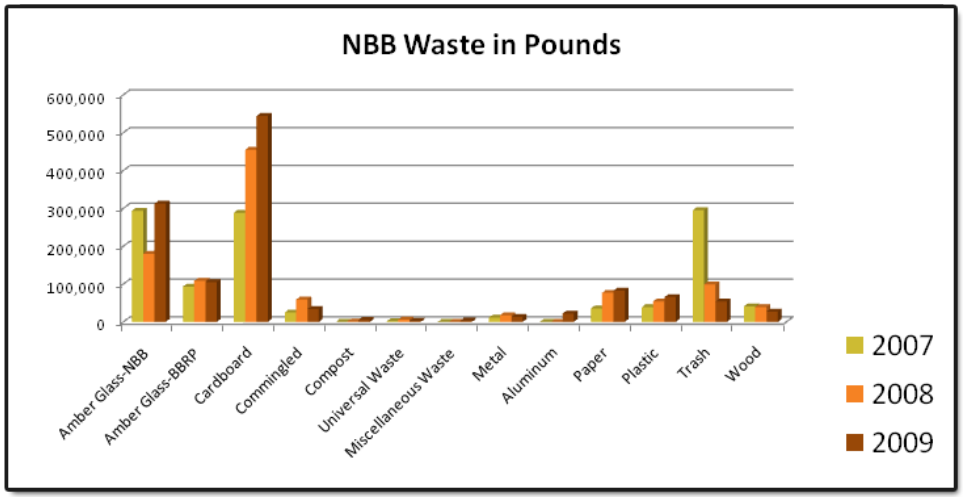



*Waste*

New Belgium's approach to waste is to reduce it through a continual process of improvements. Their target was to increase the waste diversion rate from 73% in 2007 to 95%, which they achieved in 2010. However, when reducing and reusing is no longer possible they must turn to recycling. In 2009 New Belgium recycled 99.9% of its waste. It is important to note that spent grain and sludge volumes are so high that if they threw everything else in the landfill they would still have a diversion rate of 98%. So in order to gain a more balanced perspective on the rest of the waste stream they remove those two materials from their calculations. From that perspective the diversion rate is still impressive at 95%. While New Belgium has not come out and said what they do with the spent grains we can assume they are given to farmers for animal feed, a common practice among breweries (New Belgium, 2009).




The majority of the impressive 1 million pounds of recycling is comprised of glass and cardboard, a result of the packaging operations. Since New Belgium created a new packaging hall they have been able to keep the intensive packaging process on site, instead of contracting out to another company. While cardboard waste has appeared to increase it has actually only moved from one location to another (New Belgium, 2009).

Glass recycling is complex and wrought with much inefficiency. Of all the glass sent to be recycled in the U.S. only 40% is recycled into new glass. Due to single stream recycling of all the varying colors and types of glass it loses its value. Crushed mixed glass is often used as a stratifying layer in landfills. Ideally glass bottles should be collected and sorted out by color. New Belgium has been able to do this but

unfortunately due to infrastructure issues they struggled to keep them from the landfill. In 2003 they partnered with the city of Fort Collins waste management and a bicycle courier service to create the Brown Bottle Recycling Program (BBRP). BBRP provides participating bars and restaurants with an amber glass bin. The bicycle courier picks up the full bins and delivers them to the glass roll off site (New Belgium, 2009).

*Budweiser*

In comparison Anheuser-Busch also claim to be environment stewards. Dating back to the 1800's the company's founder Adolphus Busch began recycling spent grain using it for cattle feed, a practice that continues today (Anheuser-Busch, 2010). They have also been recycling 99% of their solid waste for more than 30 years. Conservation of water and energy are demonstrated through Bio-Energy Recovery Systems (BERS). BERS technology uses nutrient rich wastewater to create and capture a renewable fuel, likely methane, which provides up to 15% of fuel for 10 brewing facilities (Anheuser-Busch, 2010).

Interestingly the Budweiser brewery in Fort Collins is recognized for their high standards in recycling. Stating that ideas and suggestions from employees have helped reduce, reuse and recycle nearly all the materials generated in the production process (Anheuser-Busch, 2010). This may say more about the communities these breweries reside in than the corporate ethic of Anheuser Busch as a whole.

In regards to energy Anheuser-Busch see themselves as climate leaders partnering with the Environmental Protection Agency and pledging to reduce greenhouse gas emissions by 5% from 2005 to 2010 (note New Belgium aims for 25%). Through use of

renewable energy technology they have met their goal of 5% and aim to increase it to 15% by 2013 (Anheuser-Busch, 2010).

Water conservation is also said to be a high priority of Anheuser Busch saying they are actively looking for ways to reduce the amount of water used in their facilities. One can infer that if they are only in the process of looking for water conservation opportunities that in actuality not much is being done. To make up for this short fall they work with various environmental groups to fund watershed protection around the country (Anheuser Busch, 2009).

Where Anheuser Busch is lacking in sustainable operations they appear to attempt to make up for it in other philanthropy based campaigns. Looking back over the company's historical time line a strong presence in preserving wildlife heritage programs stands out. Beginning with Busch Gardens in 1970, over the years they have received recognition for the successful breeding of countless rare species. In 1987 funding was provided to the Rocky Mountain Elk Foundation, which helped preserve 1.8 million acres of wildlife habitat. In 1997 the company received the National Wildlife Federations conservation achievement award, and the list goes on to such endeavors as rescuing sea turtles and gray whales (Anheuser-Busch, 2010).

While this is all well and good it seems Anheuser Busch has gotten a bit off track. New Belgium is a rare model of sustainable beer making setting a strong example of environmental stewardship and leading the way for others to follow. By contrast, many of Anheuser-Busch's environmental philanthropy efforts have little or nothing to do with improving their own performance or impact on the environment.

## Social Sustainability of Beer Consumption

The method of consumption of our chosen research subject, beer, is ingestion into the human body to achieve one of many desired effects. Since the active ingredient alcohol is in fact a drug, it is imperative that beer's effects on both human bodies and lives are assessed as a part of a life-cycle analysis of the product. Findings on the effects of alcohol consumption are important in considering social sustainability both for individuals and society as a whole when assessing whether it is a sustainable product. Variables such as frequency and volume of consumption over time are imperative to consider, and this investigation will compare moderate versus excessive consumption. It is our goal to showcase both positive and negative effects on human health and productivity as a result of beer consumption.

It is essential to distinguish between different levels of alcohol ingestion. For purposes of comparing, it is to be understood that moderate consumption constitutes one alcoholic drink per day for a woman, and two drinks per day for a man (NIAAA, 2004). The standard for one alcoholic drink is 1⁄2 ounce (oz.) of absolute alcohol, as in one 12 oz. beer, one 5 oz. glass of wine or one 1.5 oz. shot of spirits (Wechsler & Austin, 2008). Ingestion exceeding those numbers is considered excessive consumption. We choose to ignore the term *binge drinking* because the definition is controversial and not universally agreed upon. Indicators of social sustainability include assessments of human health and absence of disease or disorder as a result of alcohol intake. We can assume that the healthier a population as a whole over a period of time, the more productive and

contributive to society as a whole, while less financially wasteful and exhaustive on common resources.

In general, although not necessarily encouraged, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) indicates, “the state of current science does not advocate drinking; these findings simply point out what the research says about the health-related effects of moderate drinking. In short, except for those individuals at identifiable risk, consuming two drinks per day for men and one drink per day for women is unlikely to cause problems" (2004). The significance is to dispel the notion that alcohol is fundamentally beneficial or harmful to humans. Essentially, patterns of consumption are the most important variables deciding whether it is socially sustainable or not. The NIAAA also shares, “Drinking patterns are at least as important as total consumption in terms of alcohol's harms and benefits” (2004). Thus, it is not the total amount of drinks ingested that are important to measure, but contrarily, the amount consumed in one session. J.M. Gaziano concluded, “those who drink alcohol in moderation tend to live longer than those who either abstain or drink heavily” (2000). This broad statement is not false, however, other positive activities such as exercise and abstaining from drugs and smoking must also be taken into account when determining the benefits of moderate consumption of alcohol. Similarly, those with a predisposition to addiction or alcoholism or those with weakened liver functioning, for example, would not be advised to follow a moderate consumption regimen. Although there are some activities such as cigarette smoking that are universally agreed upon as detrimental, whether drinking alcohol for your health is a positive decision requires an individualized assessment.

Research has concluded a number of benefits resulting from moderate alcohol consumption that have been observed over the lifetimes of subjects. According to the NIAAA, moderate drinking appears to be associated with a reduced risk of diabetes and metabolic syndrome, while the connection with weight gain, body mass index, and/or obesity still remains unclear (2004). However, the association also found that "one exception is the finding of an increased risk of breast cancer when alcohol is combined with postmenopausal use of estrogen replacement (ER) – an increase not found in moderate-drinking women who do not use ER" (2004). Other benefits include those surrounding heart health and slowing down the effects of aging. According to Maraldi (2006) "The risks of cardiac events (myocardial infarction, angina, or heart failure) and of all-cause mortality were significantly lower in light to moderate drinkers than in abstainers or occasional drinkers (those who drank less than 1 drink per week)" (p.1494). The reduced rate of heart attacks and circulatory problems as a result of alcohol consumption can be observed through an improved blood lipid profile with increased HDL cholesterol and decreased LDL cholesterol. Decreased thrombosis results from reduced platelet aggregating, reduced fibrinogen and increased fibinolysis. Reduced blood pressure, blood insulin levels and increased coronary blood flow also improve heart health (Hanson, 2009).

Although a number of benefits have been observed from moderate alcohol consumption, it is a fact that a number of those who drink do so in excessive amounts. The unsustainable aspect of alcohol can be concluded by reports of economic expenditures on those suffering from alcoholism, crimes committed, lost jobs, etc. The Substance Abuse and Mental Health Services Administration (SAMHSA) estimated that

a combined $276 billion was spent or lost in 2005 on health care, lost productivity, premature death, auto accidents and crime relating to drug and alcohol abuse. The administration also found that approximately three-quarters of that money came from public sources (Riper, 2006). Riper (2006) also concluded that $18 billion of the total expenditure went towards treatment, even though fewer than 15% of the estimated 22 million Americans who engage in substance abuse actually seek treatment. Clearly, alcoholism is an expensive addiction for both the sufferer and society as a whole. The costs borne by the public sector to make up for lost time working, healthcare, accidents, and so forth render alcohol consumption, in excessive and detrimental levels, as an unsustainable human activity, for the expenditures exceed the economic benefits.

Alcohol consumption can be both sustainable and unsustainable for society depending on the context; it is important to note that it is unlikely that an age old tradition of drinking to reduce stress, improve mood, and relax will come to an end at any time soon. In assessing the sustainability of alcohol in a social context, it is helpful to compare it with other similar activities, both beneficial and harmful. Attempts at improving one's health through drinking a moderate amount of alcohol a few times a week may be helpful, however, improving one's nutrition and exercise regimen while reducing stress may be more beneficial and less risky. Leisure activities such as reading, watching films and playing music may have the same positive stress-reducing effects of alcohol. The social sustainability of alcohol is incredibly contextual and individualized for the particular consumer.

## Sustainability of Corporate Practices

Budweiser's/Anheuser-Busch's most notable corporate activities are highlighted on their "Beeresponsible" webpage. Their emphasis is on social responsibility and instilling proper drinking attitudes in today's drinkers. As the site reports, Anheuser-Busch has invested more than $830 million since 1982 in community-based programs and advertising campaigns aimed at curbing alcohol abuse. This attitude can be witnessed in the company's ethos since the early 1900s, when a series of print ads bearing the tagline "Budweiser Means Moderation" were put into circulation. Their programs are divided into several categories: underage drinking, drunk driving, college issues, and responsible drinking (Anheuser-Busch, 2010).

Anheuser-Busch and its distributors combat underage drinking in several ways. They have launched *Family Talk Online*, a guide for parents to speak to their children effectively about alcohol use and abuse. They offer their retailers training and resources on recognizing fake identification, available in several languages. They have also invested in initiatives such as *Prevent. Don't Provide*, which provide support and remind adults of the implications and consequences of providing alcohol to minors (Anheuser-Busch, 2010).

To reduce the prevalence of alcohol-related driving incidents, Anheuser-Busch promotes designated driving as a primary deterrent of accidents. They have also partnered with cab companies and retail establishments to provide free or reduced-fare cab rides to drinkers. More than 204,000 safe rides were provided in this manner in 2008, contributing to the total of more than 1.4 million safe rides provided since 1989. The

company has even partnered with the American Automobile Association (AAA) for its *Tow To Go* program, which provides free towing for intoxicated drivers (Anheuser-Busch, 2010).

Anheuser-Busch has been particularly active on college campuses, promoting responsible drinking through contributions to various schools for social norms marketing programs. To date, they have invested more than $8.3 million in college programs to this effect. This includes a 2006 gift of $2.5 million to the University of Virginia to help establish the National Social Norms Institute (NSNI). In 2008, Anheuser-Busch distributors participated in National Collegiate Alcohol Awareness Week (NCAAW) on 56 campuses nationwide, promoting responsible drinking attitudes on campus (Anheuser-Busch, 2010).

By contrast, New Belgium Brewing Company has a more holistic approach to their corporate practice. Without the weight of multi-national distribution inherent to Anheuser-Busch's needs as a business, NBB has focused on sustainable business since its inception in 1988. When compared to Budweiser, NBB is far less concerned with the social implications of its alcoholic products, and far more concerned with environmental sustainability and entrepreneurial transparency. Using the High Involvement Culture (HIC) model, NBB has based its business structure on employee engagement. Their vision stems from a belief that harnessing the unique perspectives of their 300+ employees can only result in a more intelligent and well-rounded enterprise. To this effect, 43% of NBB is owned by coworkers through an "Employee Stock Ownership Plan" (ESOP). NBB engages in "Open Book Management", in which all financial details of the business are made available to its employees. This allows employees to learn

business practices and remain informed and empowered about the direction of the company. Ultimately, NBB treats its employees as family, in hopes that they will protect and nourish the company with similar commitment (New Belgium, 2009).

In addition to their environmental stewardship and open business practices, NBB is committed to philanthropy and alcohol responsibility. In 1995, the company created a Philanthropy Committee and began donating one dollar for every barrel of beer produced to non-profit organizations in communities local to the company's business activities. To date, NBB has donated more than $2.5 million to these organizations. In 2007, NBB joined 1% For The Planet, "an alliance of businesses committed to leveraging their resources to create a healthier planet" (NBB, 2009). As the name suggests, NBB donates 1% of its revenues to environmental causes. NBB emphasizes "quality over quantity" as a brewer of finely crafted beers, and has always promoted education and responsibility. A portion of their substantial philanthropy funds go toward financial aid for drug and alcohol awareness programs, and they make a point of not advertising on college campuses or in collegiate newspapers (NBB, 2009).

A unique piece of the NBB experience is their Wellness program, designed along the notion that "happier employees are more productive employees." A Wellness committee within the company, provided with its own budget and resources, supports employee activities such as bike races, triathlons and athletic teams, as well as smoking cessation plans and weight loss programs. The brewery houses yoga classes twice a week, and their climbing wall and sand volleyball courts are available to all employees (NBB, 2009).

## Conclusion

Ultimately, when comparing the corporate practices of New Belgium brewery to Budweiser the most important thing to keep in mind is the scale of business in which each is participating in. Anheuser-Busch spends more on philanthropic efforts because they make more. As a mega-corporation and a larger controller of the overall market for alcohol however, they also have a much larger portion of the accountability to consider. Thus, their main priority is to deflect those opponents who would point to them as "merchants of addiction" etc. New Belgium recognizes the need to encourage responsible drinking, but it can be taken for granted to a certain point that those who seek out a craft brew like theirs drink more for pleasure and quality than for alcohol.

This is reflected in New Belgium's more direct focus on environmental and social sustainability as a business. Their open book management and High Involvement Culture are very successful attempts to improve the well-being of their employees. While the actual social cost of alcohol consumption can be very high, it would be somewhat backward to lay the blame for this completely at the feet of the producers of alcohol. When used properly, alcohol can be benign and even beneficial.

Though New Belgium has made great strides to reduce the environmental impact of producing their beer, there are undeniable costs associated with the production of the ingredients and the packaging the finished product is presented in. Interestingly, however, the highest environmental impact of beer consumption most likely comes during the "use" phase. "That is how the beer is kept chilled, how it is served, how the drinker gets to the beer and how they get home" (Watson, 2008). Because of our large dependence on

fossil fuels for transportation and energy, the reductions in greenhouse gases during the production phase for beer are likely the least of our worries. In the end, drinking responsibly will come down to more than just the brand one chooses to partake in; it will require a larger societal shift both in infrastructure and home energy sources.

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