A report of the sustainability of Askham Bryan College Wildlife and Conservation Park

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The purpose of this research was to analyse the needs of sustainability within the current climate and proposing further enhancements within the industry. Research also includes the history of sustainability, and an analysis of some of the sustainable practices such as harvesting solar energy and water. The project was to appraise current sustainable practices and recommend further improvements in these practices. The result of this research is that Askham Bryan Wildlife and Conservation Park has multiple sustainable practices in place and further plans for future sustainability enhancement. Certain sustainable practices that were not implemented yet, were suggested and analysed for the park. To conclude, although sustainable practices have been included in recent years, there are still, further enhancements required everywhere. There may be a need for additional research into how to provide sustainable practices more widely and economically.

Introduction

Sustainability is important for the wellbeing of the earth and its inhabitants, where its goal is to avoid the depletion of natural resources and maintain ecological balance (Gollan *et al*., 2001). Sustainability is defined as the meeting of our present needs without compromising the needs of the futures (Bruangart and Mcdonough, 2002). It has been challenging to find a global definition for sustainability as its goals can be seen to be subjective. However, most definitions describe the production of tangible benefits through clinical invention and behaviour changes over a set period of time, whereby 33% of the definitions under consideration mentioned processes of evolution and adaption (Masarenhas *et al.,* 2017). A study by Costanza and Patten (1995) suggests that one of the reasons it has been a challenge to find a coherent definition of sustainability is that measuring success in sustainability is difficult. As the assessment of sustainability happens after the launch of any process, project or institution, any definition of its success therein would need to incorporate an element of prediction, so the definition is a predictio rather than a definition. Constanza and Pattern (1995) suggest, there can be no clear-cut definition of sustainability in any given context until it has been achieved.

Historically, Rachel Carson played a significant part of the in-drawing attention to the issue of sustainability, most notably through her 1962 publication silent spring which outlines dangers of using chemicals for the environment, such as loss of animal life and how it may affect human life (Kraemer, 2016). This had a big impact on the foundation of the US environmental protection agency in 1970 (EPA, 2001). Several significant events compounded towards the end of the 20th century, to increase awareness of sustainability

issues. In 1969 the US first implemented a policy for environmental sustainability called the National Environmental Policy Act (NEPA) (Anderson, 2013) Later, the Stockholme conference was organised in 1972 to discuss the state of human environment, due to reasons such as fighting wars (Sohn, 1973). In December 1983, Harlem Brundtland chaired. The World Commission on Environment and Development (WCED), also called the Brundtland commission, which examined critical environmental problems around the world with a view of creating realistic solutions (Marien, 1992). In Rio 1992, world leaders discussed environmental issues, this was called UN conference on environment and development (UNCED) (Sand, 1992). The United Nations environmental program (UNEP) launched the International environmental education program (IEEP) in 1975 and then established the world conservation strategy in 1980. Agenda 21 was discussed as an action plan for sustainable development for the present and the future. This had a global impact and is reviewed every 5 years (Baldwin, 2007).

In 2000 th Millennium Developments Goals (MDGs) were confirmed by world leaders, which include plans to ensure environmental sustainability and to develop global partnerships. After MDGs, these goals were changed to Sustainable Development Goals (SDGs) and this included ending poverty, achieving equality, the conservation of oceans, seas and marine resources and the protection of ecosystems (Kumar *et al*., 2016). Since early 2000s more businesses and people are inclined to improve their sustainability, driven by presenters such as David Attenborough and Greta Thunberg. The coronavirus pandemic (Jefferson, 2019) has also directed people's thought processes and reflection.

The world's population increases by 1.05% per year, and currently has 7.7 billion people in 2021. The population from 1800 at 1 billion to now (Ortiz-Ospina *et al.,* 2013). Therefore, if the population is increasing this quickly, availability of resources would need to increase at the same rate, but this is not sustainable (Ritchie *et al*., 2013). The United Nations meet up annually to discuss the progress over the last year of the sustainable development goals (SDGs). Visually this can be seen in charts, shown in figure 2,3 and 4, that there is moderate distance from target but in the last year there has been limited progress on worldwide.

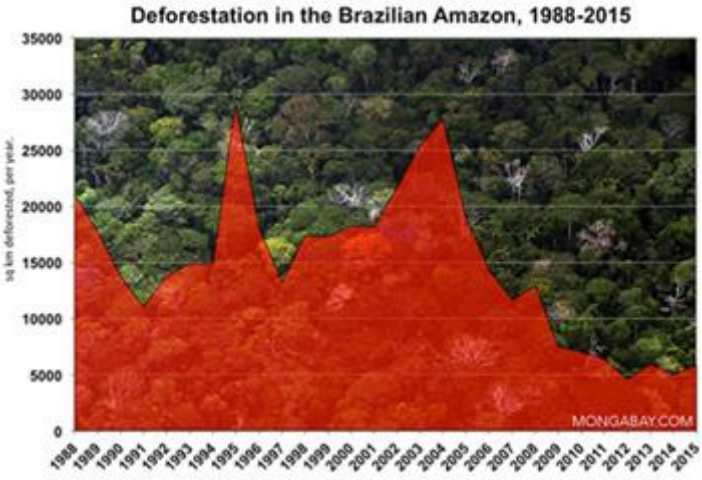

Figure 1- rate of deforestation in the Brazilian rainforest, in 1988-2015 (MONGABAY, 2020)

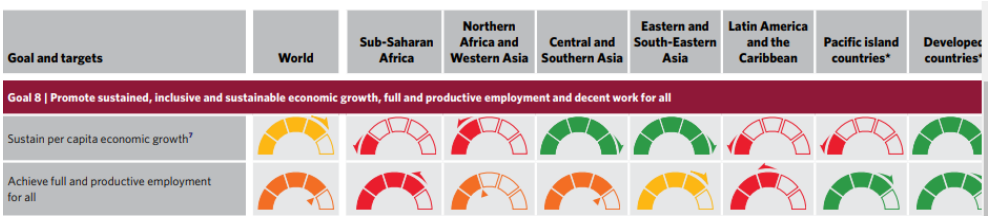

Figure 2- showing the growth of SDGs progress (united nations, 2020)

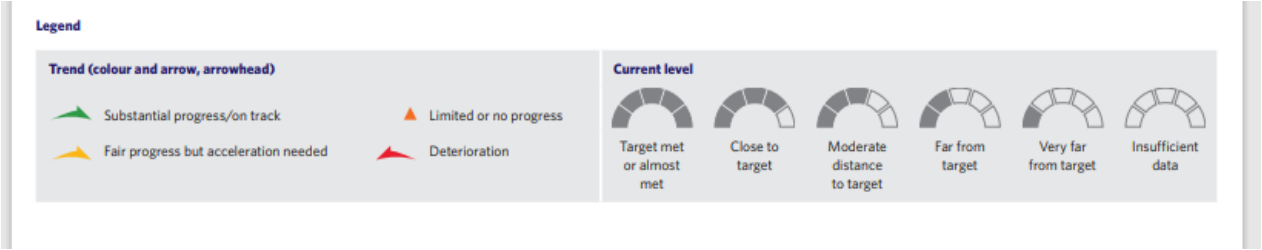

Figure 3- growth of SDGs progress (united nations, 2020)

Figure 4- legend for understanding SDG growth charts (united nations, 2020)

Aims and objectives

This research assesses the environmental sustainability of Askham Bryan College and Wildlife Park and suggest improvements for the future. Objectives include to discuss, research, and improve sustainability in Askham Bryan wildlife and conservation park through small changes in sustainability ways. A visual assessment of the college and wildlife park was undertaken. Based on this, recommendations for improvements of the college's sustainability were made after being costed against a consideration of the financial viability of the changes.

Sustainability is largely focused on preserving trees and stopping deforestation (Aquino and Bologna, 2020). Figure 1 shows the deforestation in the Brazilian rainforest. This

graph shows a high increase in deforestation in 2005 but since then a steady decrease. This may be a result of a higher conversation rate of sustainability as it gets more popular and more spoken about in the public as well as on social media (Lubin, 2010).

It has been shown that solar panels can save roughly £300 annually on electricity bills, and even with a £6,000 installation fee they would break after roughly 16 years. Beyond that, of course, they help to reduce the carbon footprint and are a significant factor towards businesses and households alike becoming more sustainable (Green Match, 2021).

Another way of becoming more sustainable is rainwater harvesting and water tanks, which contributes to a decrease of water bills by up to 40/50% annually. However, if collecting rainwater, it would need to be sterilized due to contaminants in the water, such as bacteria and parasites (CDC, 2020).

Askham Bryan is a college and wildlife and conservation park in York (ABWC). It was founded in 1936 as an agricultural institute and seen a number of improvements, such as modern buildings being built with more sustainable materials and technology and improvements in sustainability such as in 2015 when money was spent on improving the sustainability of the wildlife park and college directly. Their mission is to inspire and educate the public to respect and conserve animals and plants (BIAZA, 2018). Askham Bryan college and wildlife park teaches conservation and rescues animals, also teaches courses such as animal care, motorsports, and agriculture (Askham Bryan College, 2021). Askham Bryan College has taken important steps towards sustainability, but there

is still room for improvement. Practices such as solar panels have been put in place, but more practices could be put in place.

Literature review

Sustainability is needed for the environment, planet, and animals to live alongside humans. Without sustainability, the planet would not survive much longer (Farrington and Kuhlman, 2010). The need for clean air, natural resources and healthy communities is important and without sustainability natural resources may run out. By reducing costs, using better strategies, and seeming more sustainable will improve the reputation of the business. This is due to customers and the public increasingly wanting to be more sustainable and help the planet (Hind *et al*., 2012).

Askham Bryan college has implemented a variety of practices to be more sustainable, including solar panels, wind breakers, and colourful turrets, seen in figure 5. These all benefit the planet and reduce bills for electricity and energy (Shaikh, 2017). Dr. Tim Whitaker, CEO and Principle of Askham Bryan College, has stated that he intends for Askham Bryan to become a circular college to improve sustainability. This was published in York and North Yorkshire local enterprise partnership (2021). Becoming a circular college signifies a commitment to contributing to the economy through teaching, training, and education. Also, may include sustainable productions and consumption, and learning more for sustainability practices (Sibbel, 2009).

The solar panels, currently installed in Askham Bryan, help create the electricity used by the college. The buildings also have large, high windows, and skylights to create more natural light to further reduce electricity needs and decrease bills and carbon footprint.

The turrets and wind breakers on the sides and the roof of the building reduce the need for temperature regulation and reduce heating needs in the winter and colder months and produce shadow when sunnier (Guorong *et al*, 2009). Askham Bryan Wildlife and Conservation Park (or acronym) makes their message of sustainability visible through signs throughout the park, their website and Facebook and throughout the reception or main building.

Past studies such as McDonald et al (2010) have investigated the sustainability of businesses, particularly non-profit organizations, and concluded that the main parts of sustainability are people, profit and the planet, and the ability to survive. McDonald *et al* (2010) suggests that organisations always have an agenda with sustainability and are strategic whether that is honest or greenwashing. Another research paper from Kolk and Perego (2010) suggests that business may just adopt sustainability practices to gain customers and money but without greenwashing.

Solar panels can save an estimate of 20% off electricity bills, and some communities have started installing them for a reduced price or free through initiatives that governments have implemented to become more environmentally friendly (Li *et al*., 2018). Water tanks may save 40% annually of water bills, and in animal industries can be used for agricultural purposes, and for ponds. If needed to be used for drinking water, a cleaning system can need to be put in place also, to eliminate bacteria in the water (Jayasuriya and Khastagir, 2010). Green roofs can save money in the long haul and reimburse the investment in 8

years for heating and insulation of buildings (Getter and Rowe, 2006). The switch of bins to recycling bins and general waste has been seen in Askham Bryan, in the accommodation and public spaces such as in the animal managements buildings. This helps to reduce landfills, conserve oceans, and increase the sustainability of Askham Bryan as a whole and therefore reduces the need for natural resources (Stoelzle Midden and Walters, 2018). Research papers have shown that natural resources such as gas, oil and other fossil fuels may run out in 2060, and therefore the need for self-sustainable practices such as solar panels, and water harvesting may be needed sooner rather than later (Ploeg, 2011).

Legislation such as the Environmental Protection Act (1990) has specific sections aimed to improve sustainability, such as a reduction in pollution for the safety of marine life and an increase in ocean health. Also, sections such as waste on land (part II) prohibit depositing harmful waste on land that may disrupt animals and habitats. Punishments for illegally dumping waste include clean-up costs and vehicles forfeit. This legislation also has acts against littering (part IV

The Climate Change Act (2008) includes baseline targets for 2050 to improve sustainability, placing limits on carbon units and setting budget targets for greenhouse gas emissions. The energy savings opportunity scheme (ESOS) (2014) works in tandem with the climate change act and is a mandatory assessment for organisations in the UK, that takes place every four years to make sure businesses are being energy efficient and find new ways to save energy and become more sustainable. In line with this, Askham Bryan try to decrease their carbon footprint as much as possible by using less energy and

electricity through their solar panels and temperature regulation technology such as large windows and skylights The Paris agreement (2015) also set out a framework to avoid climate change to a dangerous level globally by limiting warming and strengthen ability to change the impacts of climate change and support other countries in efforts (Kemp, 2021). Schemes such as ESOS help businesses such as Askham Bryan improve their sustainability practices at regular intervals which is important due to everchanging legislation and environmental needs. Environmental laws such as the environmental Act (2021) which was recently put in place with environmental targets and climate change and sustainable energy act (2006) which has been updated in 2021, has annual reports on gas emissions, and energy efficiency. Legislation such as this reduces businesses gas emission and improves energy needs by improving and expanding the knowledge of the business and the public on climate change and energy.

In York, where Askham Bryan is located, the local council have introduced sustainability policies to aid sustainability practices. These include policies on climate change, carbon reduction, behaviour change and climate hazards, matching their ambition to make York a net-zero carbon city by 2030 (York city council, 2021). Creating steps such as greener jobs, more marketing opportunities, and improving the wellbeing of York's residence can improve overall sustainability. Their 'one planet York' is a growing initiative aimed at constructing a more resilient city through sustainability (UK Government, 2021). This includes having a page with details of the plans on tackling climate change, by installing technology to control energy usage, replacing streetlight with more efficient ones (Knight, 2020). These policies apply to Askham Bryan, making it part of the effort to make York

carbon neutral in the future. This further aids their effort to become more sustainable, with solar panels and temperature regulation as it reduces carbon footprints, bills, and encourages the public (Artmann *et al,* 2015).

Data sources and analysis

Current Sustainability measures

The whole ‘Animal Management Building’ where educational classes take place and where the indoor animals are housed was built in 2013-14 (kennel build, 2016), This building is specially designed to incorporate energy efficient systems including solar powered intlivent solarstaire units, and colourful designed turrets (wind catchers). The solar panels and intlivent solarstaire units harvest solar energy from photovoltaic cells on the top of the penthouse turrets, seen in figure 5 (Baredar *et al*., 2016). This power lets 24 hours of extract ventilation, increasing the rate to 75% during summer or increased occupancy. The roof also had solar panels and solar shading seen in figure 6. The building also had wind catchers that to regulate temperature. The arboretum of the conservation park has several varieties of trees, some endangered and old tree. These grounds also include bug hotels,

Figure 5- turrets on the roof of Askham Bryan Animal Management centre (Air distribution specialists, 2016)

Figure 6 – the roof of Askham Bryan animal management centre (aspect 4, 2015)

and hedgehog houses for safety of wild animals during colder months, figure 7. Some of the food and enrichment is grown on site, cutting costs, and providing sustainable options for the animals. figure 8 shows wind breakers, looking like metal slates, that have been shown to regulate temperature through wind control and reflection of the sun (Bottcher *et al.,* 1998). These are found on all sides of the Askham Bryan animal management building horizontally and vertically (Ali *et al*., 1965). Accommodation for animals at Askham Bryan college seen in figure 9 has a flat roof which could means problems such as leaks which leads to repairs. This is seen in figure 9 and may mean that it is less sustainable due to money being wasted on repairs rather than improvement. Figure 10 shows that Askham Bryan college as a whole business has a lot of greenland, and an organised structure (Bayod- Rujula et al., 2011). This means that the site is more suitable to achieve their goals, particularly the SDGs, protecting ecosystems and ensure environmental protection.

Figure 7- bugingham pallets at Askham Bryan wildlife park. (BIAZA, 2017)

Figure 8- front of Askham Bryan animal management building (Authors own, 2021)

Askham Bryan wildlife park has multiple animal species that are rescued or endangered,

therefore supporting the protection of ecosystems, these may include captive and wild animals. By having greenlands that are unbuilt is beneficial for wildlife.

Figure 9- sky view of accommodation block at Askham Bryan college (authors own, 2021)

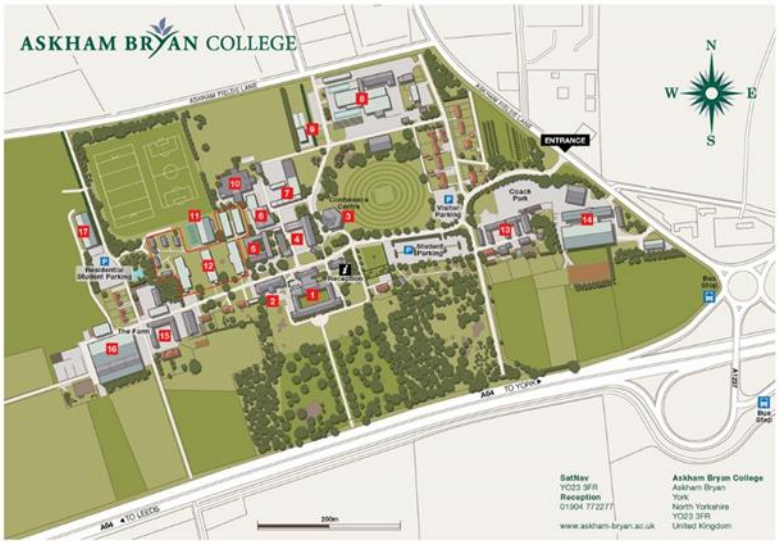

Figure 10- map of Askham Bryan college (Weston, 2017)

Further enhancements of sustainable measures

The tamarin enclosure is approximately 6m by 2 m, including inside and outside area. The inside section is roughly 3m by 2m. The price of installing a green roof, seen in figure 11, would cost between £300-£1200 Adriaens *et al.,* 2008), and this would absorb carbon dioxide, heat, and water. With potential reduction in heating bills (Gedge and Pullen, 2021, this will also provide habitat for insects and reduce water runoff.). Additionally, this may look more aesthetically pleasing and reduce the carbon footprint. In the future, they may need minor maintenance which may incur maintenance cost. Also, on enclosures such as these, other sustainable features could be made such as water harvesting systems. This price would range from £2000-£3000 (Ghimire *et al.,* 2012) to install but would save 40% of the annual bill. With a hypothetical annual water bill of £1,000, incorporating rainwater harvesting systems would save £400 annually (Ghisi *et al.,* 2009), hence after 10-13 years, the initial investment would have been recovered. (Lade and Oloke, 2020). Figure 12 shows water bill annually for a family of 4 in the UK, with and without a water harvesting system in place. For a business to be fully self-sufficient in water, a filtration system would need to be installed which would cost over £1500 (Habibian *et al.,* 1971).

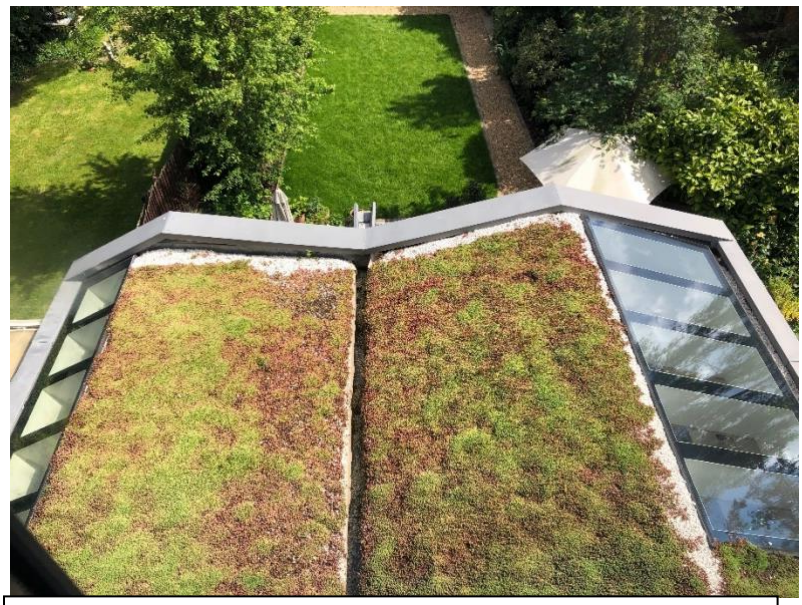

Figure 11 - green roof (Gedge and Pullen, 2021)

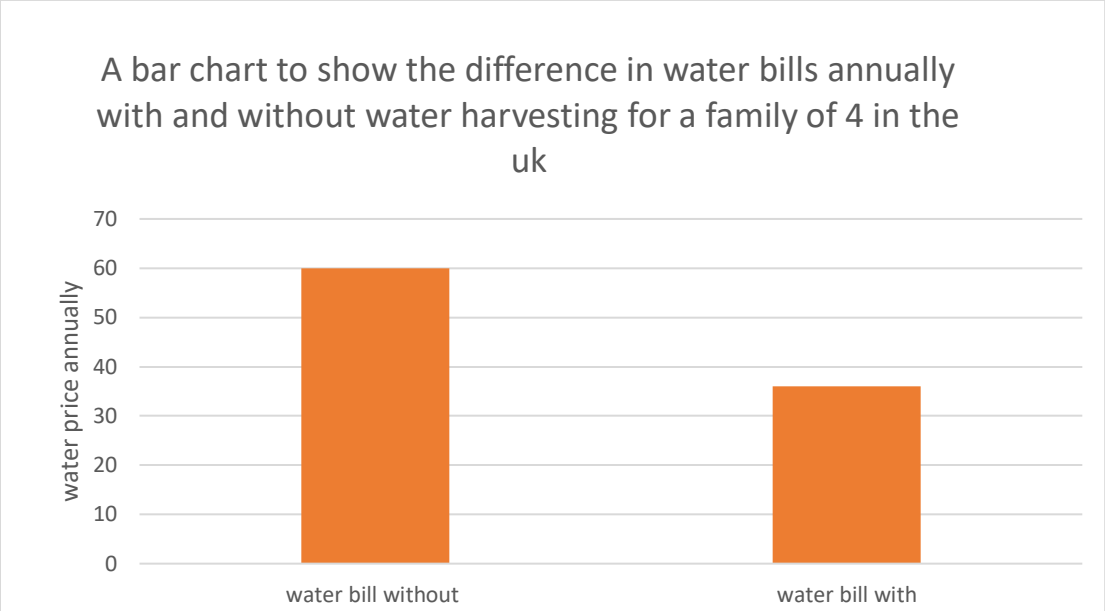

Figure 12 – difference in price with and without water harvesting (Authors own, 2021)

Installation of wind turbines can (Spinato, 2008) decrease the energy bill by 24% annually (Hau, 2013) seen in figure 13. However, the wind turbines can be noisy and have been said to ruin the skyline (Webb, 2013).

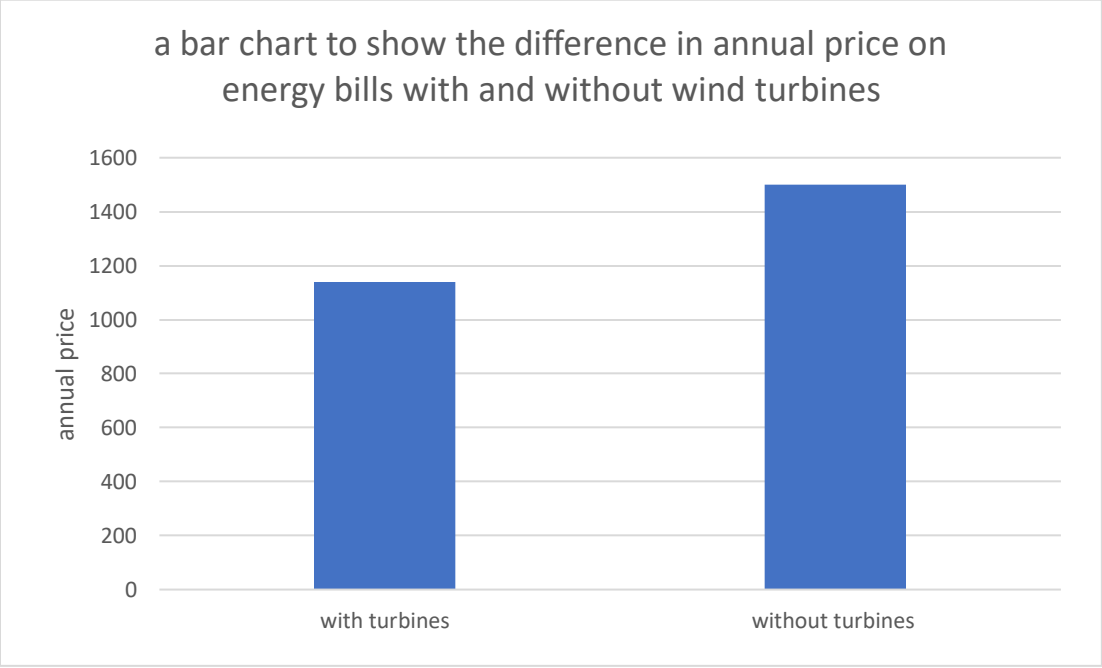

figure 13 – the difference in price with and without wind turbines (Authors own, 2021)

Conclusion and recommendations for future practice

Without the Brundtland commission, United Nations Conference on Environment and Development (UNCED), United Nations Environment Programme (UNEP), and International Environmental Education Programme (IEEP), awareness of sustainability would be out of question in the present, and the future. In the past two decades, the MDGs and SDGs were part of the impact on environmental sustainability to achieve equality the conservation of oceans, seas and land habitats, poverty reduction etc. These goals helped to drive the sustainability agenda forward. Askham Bryan wildlife park and college overall has several sustainable practices in place, such as solar panels and air distribution turrets. However, more practices could be explored, such as growing animal feed, adding water tanks and filtration systems, installing small wind turbines, and growing green roofs on spare spaces. Multiple improvements such as these will contribute to the reduction of non-renewable resource use, hence the negative impacts on the planet. College's recent vision of becoming a circular economy college, improves their sustainability agenda, reducing their carbon footprint and improving long term economic growth after the coronavirus pandemic. Some of these improvements such as installing green roofs can be accomplished by the estate's teams and student volunteers. The educational aspect of Askham Bryan is immensely beneficial as the college offers modules on sustainability across several courses.

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