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Climate change and tourism: some industry responses to mitigate tourism's contribution to climate change

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Abstract

Climate change is becoming a central concern which is influencing many aspects of our lives on a daily basis. In an attempt to address this global phenomenon all sphere of life have to make a concerted effort to mitigate and reduce our contribution to this potentially catastrophic occurrence. The tourism industry is no exception. Tourism has the potential to make huge contributions to reducing its contribution towards CO_2 and Green House Gas (GHG) emissions. This manuscript investigates some of the tourism industries responses to mitigate its contribution to climate change. The first set of climate change mitigation initiatives relate to the Airline industry and are planned and implemented by the International Airline Transportation Association. The second set of initiatives relate to two southern African tourism companies which have implemented sustainable energy alternatives for accommodation establishments resulting in substantial diesel generator fuel savings and associated reductions in the CO_2 and GHG emissions.

Keywords: Climate change, Tourism, Airlines, andBeyond, Wilderness Safaris.

Introduction

Tourism is a major global phenomenon which is highly sensitive to climate change but is at the same time a major contributor to climate change which could have significant impacts on natural and manmade attractions worldwide (UNWTO & UNEP, 2008). Tourism has become a natural part of life for millions of people harbouring the expectations of becoming tourists at least once a year for their annual vacation if not more frequently. It is difficult today to imagine a world without tourism. In order to truly understand the phenomenon of tourism it has to be defined in order to appreciate what it actually means. Middleton (1994, p. 8) quotes the Tourism Society's definition: "Tourism is deemed to include any activity concerned with the temporary short-term movement of people to destinations outside the place where they normally live and work, and activities during their stay at these destinations." Tourism is largely based upon the offerings provided by destinations and the natural environment and if tourism is not managed carefully and sustainably, it is in danger of becoming a self-destructive process destroying the very resources on which it is based. In the same way as tourism is directly responsible for contributing to climate change, the tourism industry will be negatively affected by changing climatic conditions. The tourism industry therefor has a responsibility to make a concerted effort to reduce its impact on climate change.

Worldwide, tourism is estimated to be directly responsible for 5% of energy related CO_2 emissions (UNWTO & UNEP, 2008). Although this may seem to appear to be relatively small, when compared to other industries its relative size is substantially greater, as Strasdas (2013, p.212) shows tourism's CO_2 emissions are greater than that of the chemical industry. Within the tourism industry the CO_2 and Green House Gas (GHG) emissions are unevenly distributed, where 75% of emissions are attributed to transportation, of which air transportation accounts for 40%, automobile transportation 32% and other transportation source are responsible for 3% of emissions. Accommodation establishments are responsible for 21% of emissions while tourist activities contribute 4% (UNWTO & UNEP, 2008). This manuscript investigates some of the tourism industries responses to mitigate its contribution to climate change. The first section reviews some of the initiatives planned and implemented by the International Airline Transportation Association. The second section discusses the initiatives of two southern African accommodation establishments which have implemented sustainable energy alternatives in order reduce generator fuel related emissions. The methodological approach that was followed for the data collection was through interviews with sustainability managers representing the various organisations. Secondary data from andBeyond and Wilderness Safaris was also obtained and analysed.

Tourism and climate change

Tourism has grown rapidly over the last 100 years to become one of the largest global economic sectors and a significant contributor to national and local economies. It is estimated that the tourism industry employs more than 130 million people worldwide and makes capital investments in excess of US$400 billion annually (UNWTO, 2015). According to the United Nations World Tourism Organization (UNWTO) (2015) the number of international tourist arrivals shows a substantial growth from 25.3 million arrivals in 1950 to 1.138 Billion in 2014. The UNWTO (2014) estimates that worldwide, international tourist receipts have grown from US$2.1 billion in 1950 to US$1 159 billion in 2013 and more than US$ 3.1 billion is earned every day through international tourism. This shows the incredible rate of tourism growth. The UNWTO Tourism 2020 Vision (UNWTO, 1998) forecasts that international arrivals are expected to reach 1.6 billion by the year 2020. Of these, 1.2 billion will be interregional and 378 million will be long-haul travellers. It is also predicted that tourist arrivals will grow by an average of 4.1% a year until 2020, while receipts from international tourism will increase by around 6-7% annually. These predictions have been surpassed year after year despite economic downturns and international terror attacks (UNWTO, 2014). The UNWTO (1998) indicates that tourists will become increasingly environmentally conscious and will base their selection of destinations on the destinations environmental quality. These changes in the market forces, as well as the move towards more environmentally sensitive and sustainable forms of tourism, have led to significant changes in tourism. Between 1995 and 2007, it is estimated that international tourism in emerging and developing markets grew at twice the rate of industrialized countries (UNWTO, 2007). Developing countries have to consider as extremely important the tourism development-climate change nexus as these countries are potentially highly vulnerable to climate change and highly economically dependent on tourism (Scott, Gössling & Hall,

2012). The argument may be made that for the tourism industry to significantly reduce its contribution to climate change all long haul flights should be stopped in order to limit the impact on climate on the one hand. While on the other hand; many poor countries across the world are heavily dependent on these long haul travellers to create jobs and reduce poverty (Scheyvens, 2007; Peeters & Eijgelaar, 2014).

According to Scott, Hall and Gössling (2012) there is very limited knowledge of the capacity of current tourism operators and communities to adapt to the possible changes associated with climate change. Scott, Gössling and Hall (2012) state that there is a low confidence in the current understanding of the how climate change would actually impact tourism. Some of these impacts may result from changes in climatic conditions, changes in vegetation composition and the associated shifts in ecosystems, the disappearance of some attractions such as winter sports attractions and glaciers, while other areas may experience a lengthening of tourism seasons. According to Scott, Gössling and Hall (2012, p. 221) there is also a new kind of tourism that has resulted from envisaged climate-induced environmental changes namely 'last chance tourism'. This is where tourists want to visit a destination before it is 'lost' as a result of climate change. This indirectly results in additional GHG emissions that may lead to additional climate change leading to the quicker 'disappearance' of these destinations. The most common examples of last chance tourism include low-lying islands such as the Maldives islands, visiting glaciers and seeing polar bears in the wild.

The next section discusses some of the initiatives that have been introduced by the airline- and the accommodation industries to lower their carbon footprints and reduce CO_2 and other greenhouse gas emissions (GHG).

The international Airline industry's response to climate change

Even though the Airline industry is estimated to contribute between 2 and 5 % to global carbon and other GHG emissions, it's an industry making big strides to improve its environmental performance. The airline industry through the International Air Transport Association (IATA) has launched three ambitious initiatives to address the airline industries impact on climate change (Peeters & Eijgelaar, 2014). The International Air Transport Association (IATA) is the global trade association for the airline industry. IATA has 250 member airlines comprising 84% of total air traffic in the world. These 3 programmes are the IATA Environmental Assessment (IEnvA) programme; Biofuels and alternative fuels programme and the Carbon offset programme.

The IEnvA Programme.

The IATA Environmental Assessment (IEnvA) Programme is an environmental management and evaluation system designed to assess and improve the environmental performance of airlines. The IEnvA is a stringent environment assessment programme based on recognised international environmental management system such as ISO 14001. IEnvA seeks to introduce sustainability standards that cover all operations of an airline including air quality

and emissions, noise, fuel consumption and efficient operations, recycling, energy efficiency, sustainable procurement, biofuels etc. This programme also offers access to industry best practices, simplified environmental reporting, automated audit software, access to airport environmental database, peer-reviewed mitigation tools and expert support (IATA, 2016c). The programme recognizes that airlines have varying environmental management capacities and experience for the adoption of environmental considerations thus the programme has 2 stages of recognition. Stage 1 is for planning and compliance and Stage 2 recognizes implementation and review of the programme. South African Airways (SAA) along with Finnair became the first two airlines to achieve Stage 2 status on the IATA Environmental Assessment Programme (Wood, 2015).

Biofuels and alternative fuels programme

The Biofuels and alternative fuel programme of IATA aims to significantly reduce the carbon footprint over the next few decades and to develop a long-term, sustainable alternative for petroleum-based jet fuels. As part of this programme IATA member airlines have committed to a 1.5% per annum improvement in fuel efficiency on average between 2009 and 2020, to have carbon neutral growth from 2020 and a 50% net emissions reduction in 2050 using 2005 as a baseline. In order to achieve these ambitions targets the airline industry has to seek cooperation with the entire supply chain of aviation industry partners to develop and improve aircraft technology, operations and infrastructure as well as agricultural and government sectors to make significant investments in the development of sustainable biofuel feedstock and processing facilities. The airline industry has played an instrumental role in advancing technical certification for biofuels which can now be used on passenger flights. The first commercial flights using biofuels were achieved in 2011 (IATA, 2016a).

Carbon offset programme

Carbon offsetting involves the “neutralization” of an individual or an aircraft’s carbon emissions by investing in carbon reduction projects. Carbon offsetting is a short-term measure to mitigate unavoidable carbon emissions and encourages carbon neutral development. Over 30 IATA member airlines have already introduced carbon offset programs either integrated into their web-sales engines or to a third party offset provider. This IATA program provides standardization and independently validated offset programs. The calculation of carbon has also been standardised to the International Civil Aviation Organization (ICAO) methodology supplemented with actual airline carbon data (IATA, 2016b). In a study by Peck and Hedding (2014) investigating the willingness of tourists in South Africa to pay carbon tax to offset their contribution to climate change. It was found that tourists were willing to pay the carbon tax as long as their contribution was regulated and used effectively.

Initiatives implemented by the two case study accommodation sector companies in southern Africa.

andBeyond

andBeyond is a globally recognised luxury responsible tourism company that operates a series of luxury lodges throughout southern and eastern Africa and the Indian subcontinent. The company is driven by a set of core values namely: 'Care of the land. Care of the wildlife. & Care of the people.' These core values are driven by a business philosophy of taking less and giving more. Taking less relates to reducing the footprint of the business, while giving more implies giving to the land, the wildlife and the communities which form an integral part of the tourism experience (andBeyond, no date).

During the scheduled maintenance and upgrade of the Sandibe Okavango Safari Lodge in Botswana andBeyond embarked on a R6.4 Million[1] innovative and sustainable retrofit of the power and hot water systems (photovoltaic cost R5 million and the solar hot water system cost R1.4 million). This is part of andBeyond's ongoing attempt to improve the environmental performance, reduce carbon emissions and to reduce operating costs of their accommodation establishments. Sandibe Lodge has 12 guest rooms and staff accommodation for 60 staff members.

The details on the Sandibe Lodge Energy and Hot water systems were obtained during personal communication with Jonathan Braack (andBeyond Group Sustainability Manager, 12 March 2016). The power system is a hybrid system combining a 100kW photovoltaic solar farm with 2, 150kVA generators. The energy requirement for the Lodge comprises a 70% renewable component and a 30% non-renewable component. At Sandibe the renewable component energy source is solar and the non-renewable component is from diesel generators. The average daily expected demand for the lodge is estimated at 1000kWh/day, this estimated demand is met by 450 kWh from photovoltaic, 250kWh from solar water heaters and 300kWh from diesel generators. The demand is also allocated to different areas in the Lodge namely, front-of-house[2] 400kWh/day (excluding kitchen); front-of-house kitchen 150kWh/day; sewage, water purification and back-of-house 200kWh/day and the hot water system 250kWh/day. Although the energy supply and demand may fluctuate as a result of Lodge occupancy, temperature and cloud cover, it is still estimated that the longer term energy ratio will still meet the 70:30 target. Besides the production of a greater portion of energy from renewable sources a number of other measures were also taken to reduce the energy demand such as the utilising energy efficient appliances where

[1] 15 South African Rand equals 1 US$ (2016).

[2] The front-of-house comprises all guest areas, 12 guest rooms, the kitchen and stores, while the back-of-house comprises the entire staff accommodation staff canteen, stores, workshops, laundry, water purification and sewage systems.

possible, LED lighting, inverter type air conditioning, timers on pool pumps and air conditioners.

The hot water system is composed of two bulk systems one for the front-of-house and one for the back-of-house operations. The main source of heat energy is from evacuated tubes that heat the water. The system is backed up by energy efficient heat-pumps that heat the water if the solar system cannot maintain the temperature above 50^{o}C. These heat pumps draw their power from the main electrical system. The hot water is permanently circulated and pressurised along two insulated pipe systems that feed all the required areas. By circulating the water continuously, the water in the pipes is kept hot and when a tap is opened the water coming from the tap is immediately at the required temperature. This is not only for convenience but also allows for water saving as water is not wasted while waiting for the hot water to come through the pipes.

Figure 1: Photo taken during the installation of the bulk solar hot water system at Sandibe Okavango Safari Lodge in Botswana (photo courtesy of Jonathan Braack, andBeyond).

Besides the obvious environmental advantages of the new energy and hot water installations there is also a significant operational cost saving estimated to be around R1 million per year. During low occupancy periods the Lodge will be able to operate almost exclusively from the energy generated from the photovoltaic and solar systems. The environmental risks and impacts associated with the reduced transportation and storage of significantly lower fuel volumes in this sensitive ecosystem is an added advantage. andBeyond plans to role out

similar programmes in all of its accommodation establishments across southern and eastern Africa.

Wilderness Safaris

Wilderness Safaris (WS) was established in 1983, when the founders fell in love with the remote natural wild environment in Africa. The founder felt that the pristine natural wild areas of Africa were not being nurtured appropriately and extensive hunting was taking place. WS believe in conserving natural areas and, at the same time, earning a return for the company and its employees. WS are in the business of 'building sustainable conservation economies' achieved with a responsible tourism model. WS operate primarily in southern Africa and has become widely recognised as one of the world's leading responsible tourism businesses. WS is a responsible luxury ecotourism company that operates on over 3 million hectares of Africa's wildlife reserves with more than 70 lodges and camps (Wilderness Safaris, 2012, p. 4). WS believes in protecting pristine wilderness areas and the flora and fauna that they support, including the local communities; and in the process making a difference in Africa and the world. WS makes an effort to use responsible tourism to build sustainable conservation economies in Africa. The WS business has three 'strategic pillars', being: 1) *Tourism* (providing journeys and experiences for tourists), 2) *Conservation* (educating and empowering people, technological investment to reduce operating costs, environmental impacts and inventory research, relocation and rehabilitation to improve biodiversity); 3) *Awareness* (internal and external business model where doing good creates long-term strategic value and shares knowledge, experience and learning) (Wilderness, 2012). WS aims to deliver a unique experience for guests, fair returns for shareholders and stakeholders, while ensuring that Africa's pristine wilderness areas remain sustainably protected (Wilderness Safaris, 2015). In a similar vein as was stated in the andBeyond specific example above, Wilderness Safaris had already started the process of installing photovoltaic arrays in 2013 and continued with it in 2014 (see figure 2).

Figure 2: A typical photovoltaic array installed at Mombo Camp in the Botswana (Photo courtesy of Wilderness Safaris)

From the above examples it is evident that significant savings in the quantity of generator fuel is being achieved. But the question arises. What the extent of the saving in generator fuel is and what the associated fuel savings per bed night is for the camps where solar power systems have been introduced. Using data provided by the Botswana operations of Wilderness Safaris results could be extracted to determine the variation in the volumes of diesel generator fuel used between 2013 and 2014.

The variations in the total diesel generator fuel consumption and variation in the per bed night total diesel generator fuel consumed are illustrated in Figure 3. Photovoltaic power systems were introduced in 3 camps in 2013 namely, Kings Pool, Mombo and Duma Tau and from the graph it is evident that there has been significant reductions in the total volume of generator fuel consumed.

Table 1: Generator fuel savings in Wilderness Safari Camps where Photovoltaic power systems have been implemented.

Camp	**Generator fuel savings (%)**	**Generator fuel savings (litres)**	**Generator fuel savings per bednight (%)**	**Generator fuel saving per bednight (litres)**
Kings Pool	79.4%	44 003	83.1%	12.09
Mombo	69.3%	19 058	69.1%	3.74
Duma Tau	72.1%	10 476	72.1%	2.04

The respective reductions were Kings Pool 79.4% (44 003 litres for generator fuel), Mombo 69.3% (19 058 litres) and Duma Tau 72.1% (10 476 litres). While the respective per bednight reductions were Kings Pool 83.1% (12.09 litres of generator fuel per bednight), Mombo 69.1% (3.74 litres per bednight) and Duma Tau 72.1% (2.04 litres per bednight).

These results indicate extensive savings in the volume of generator fuel used. It is also important to mention that a Solar power system has also been introduced in late 2014 at another camp namely, Xigera which will also result in significant saving in generator fuel use.

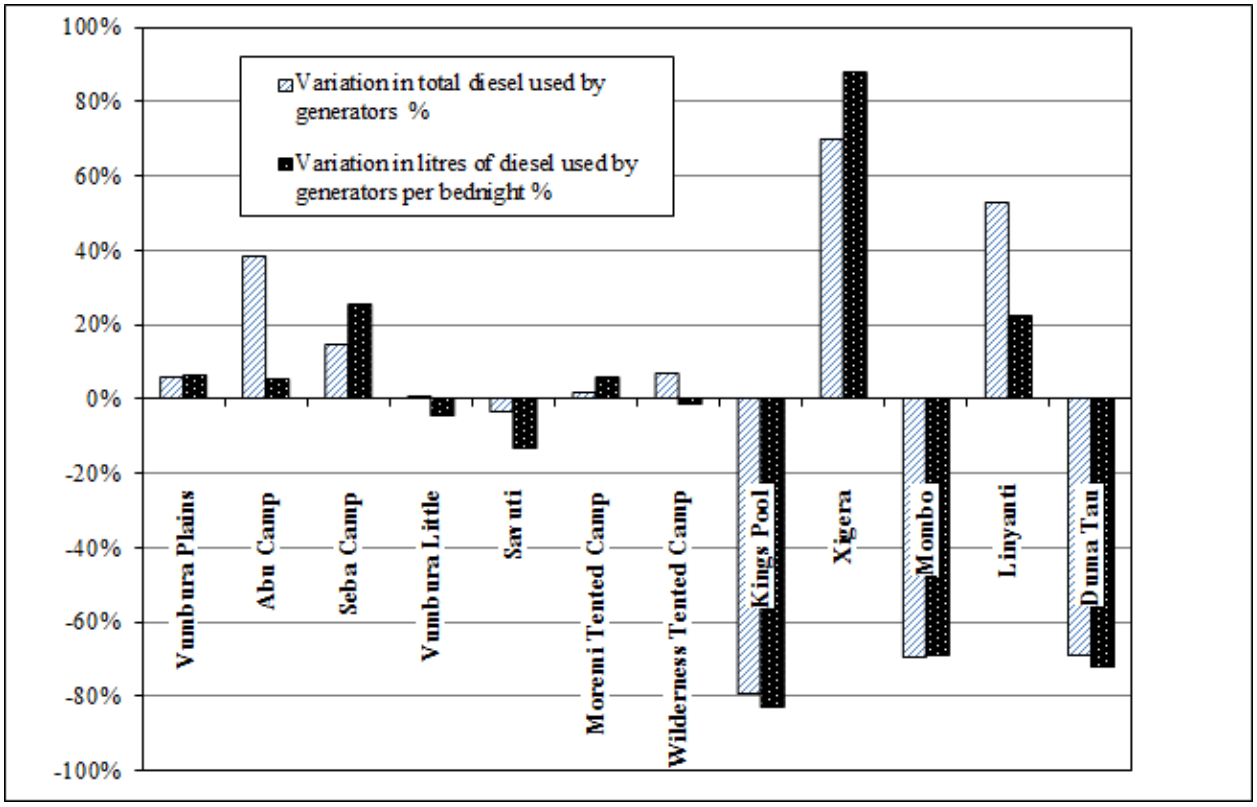

Figure 3: The variation between the 2013 and 2014 consumption of diesel generator fuel for a selected number of Wilderness Safari's Camps in Botswana.

Ongoing attempts to transfer the energy needs of accommodation establishments from non-renewable fossil fuels to renewable solar power systems are leading to significant reductions in carbon emissions and operation costs associated with the purchase of non-renewable polluting fossil fuels.

Conclusion

Global warming is set to endanger the natural systems and biodiversity which serve as the very basis of tourism in many developing countries. This could in turn result in detrimental effects on the welfare of communities which are dependent on tourism as a means of livelihood. Besides the efforts that need to made worldwide to reduce CO_2 and other GHG emissions it is fundamental that the tourism industry also make a concerted effort to minimise its impact on the environment. Thriving local communities living in intact natural functioning landscapes are critical for tourism's long-term sustainability and viability. Traveling to holiday destinations should not cost us the "earth", instead should create better places for people to live in and for people to visit (Cape Town, 2002).

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