8.0 CARBON EMISSIONS

8.1 INTRODUCTION

This Chapter considers the carbon emissions associated with accessing St Helena by ship and by aircraft. Further details regarding the methodologies used, data sources, the assumptions and limitations, and the results are available in Appendix 8 in Volume 4 of the ES.

8.1.1 Overview

Emissions of carbon dioxide (CO_2) have been calculated for a number of scenarios, with and without the proposed airport. This has allowed the CO_2 emitted per scenario and per passenger to be compared.

Currently the island is accessed by ship from the UK, Cape Town or Walvis Bay (Namibia), or by RAF flight from the UK to Ascension (and then by ship to St Helena). Following completion of the proposed airport, it is unlikely to be possible to travel by ship as a passenger. There will be regular flights from South Africa to St Helena, and possibly from other countries.

To undertake these emissions calculations and comparisons several assumptions have been made, these are detailed in the Section 8.2, Methodology. The significance of these assumptions is considered in the Section 8.3, Conclusions. Notably, only emissions of the key greenhouse gas CO_2 have been considered; emissions of other greenhouse gases have not been considered. Only emissions from aircraft and ships are considered, emissions from other sources, or emissions resulting from a potential increase in development on the island, are not considered.

The following scenarios have been studied:

Without St Helena Airport

1. Cape Town – St Helena (RMS St Helena)
2. UK Brize Norton – Ascension – St Helena (RAF flight and RMS St Helena)
3. UK Portland – Tenerife – Ascension – St Helena (RMS St Helena)
4. UK Heathrow – Cape Town – St Helena (commercial flight and RMS St Helena)

With St Helena Airport

5. Cape Town – St Helena (commercial flight)
6. UK Heathrow – Cape Town – St Helena (commercial flight)

8.1.2 Global Warming and Climate Change

This study is necessary due to the impact that emissions of greenhouse gases such as CO_2, have on the environment. There is now universal agreement that anthropogenic emissions of greenhouse gases are having an impact on the environment. Greenhouse gases are naturally present in the atmosphere and are essential as they regulate the temperature of the Earth. However, their concentrations in the atmosphere have increased dramatically in the last 50-100 years, largely as a result of the burning of fossil fuels and deforestation.

Consequently, global temperatures are rising at a rate greater than has been previously recorded. Whilst there is still uncertainty regarding the extent of rising temperatures and the effect this will have on, for example, sea levels and ocean currents, global warming is now at the forefront of politics worldwide.

8.2 METHODLOGY

For the Cape Town to St Helena scenarios (1 and 5), and for the UK to St Helena scenarios (2, 3, 4 and 6) the following comparisons have been made:

- **T**otal CO_2 emissions per 1-way trip;
- Total CO_2 emissions per 1-way trip per (St Helena bound) passenger; and
- Total CO_2 emissions per year (for St Helena bound passengers).

8.2.1 Shipping Emissions

The Royal Mail Ship "St Helena" (RMS St Helena) provides the only regular passenger service to and from St Helena. Andrew Weir Shipping (AWS) operate the ship and have provided passenger numbers, mileages, timetabling information, and fuel type and consumption data. The average emissions of CO_2 for each leg of the RMS St Helena's trip were calculated as were the emissions per (St Helena bound) passenger, and the annual emissions.

8.2.2 Aircraft Emissions

The RAF operates a scheduled service between RAF Brize Norton (Oxfordshire), Ascension, and The Falkland Islands (termed the South Atlantic Airbridge). The RAF provided details of flight distances between Ascension and Brize Norton, the aircraft type, flight schedules, and an estimate of passengers bound for St Helena.

Scheduled air traffic forecasts after opening of the airport on St Helena are based on the use of a B737-800, with 162 seats. It has been assumed that in the first year 135 of the seats will be occupied per flight on average, and therefore 7,020 passengers during 2011. Whilst scheduled flights may originate from various airports, such as Cape Town, Johannesburg, Walvis Bay and London airports, for the purposes of this assessment, it has been assumed that all flights are from Cape Town.

For each scenario, the average emissions of CO_2 per flight, per passenger, and annually, were calculated.

8.3 CONCLUSIONS

8.3.1 Key Findings

Four existing scenarios and two future scenarios were examined. These allowed a direct comparison to be made between accessing the island from South Africa (Cape Town) by ship and by aircraft, and comparisons of different methods of accessing the island now and in the future (by air), from the UK. With cognisance of the assumptions and limitations, discussed further below, the findings are summarised:

- To access the island from Cape Town, approximately 10 times more CO_2 would be emitted from the RMS St. Helena than from an aircraft. Per passenger this equates to approximately 8.5 times more CO_2. Annually, about 1.5 times more CO_2 is predicted to be emitted from the RMS St Helena, based on six sailings and 52 flights per year from Cape Town.
- Accessing the island from the UK exclusively by air is predicted to be more efficient in terms of CO_2 emissions, than the three existing UK scenarios. The greatest emissions are associated with accessing the island from the UK exclusively by ship.
- On a per-passenger basis, approximately three times less CO_2 is predicted to be emitted by accessing the island from the UK by aircraft in the future, than by a combination of aircraft and ship currently.
- On a per-trip and per-passenger basis, travel by air is more efficient in terms of emissions of CO_2 than travel by RMS St Helena.
- The with-airport calculations have been based on passenger numbers in the first year after completion of the airport. Passenger numbers are predicted to rise in the 30 or so years after the completion of the airport. Total CO_2 emissions will therefore also rise, even if accompanied by improvements in aircraft efficiency. Annually, CO_2 emissions may be up to 10 times greater in 2040 than 2011, assuming 10 flights per week in 2040, rather than one in 2011. However, this may be considered to be a worst-case estimate due to likely improvements in aircraft efficiency and fuel use, and the likelihood of direct flights to the island from a greater number of airports.

The comparison suggests that, at least on a per passenger and per trip basis, that CO_2 emissions during the first years after opening the airport would be lower than those emitted by the RMS. A number of assumptions have been made in undertaking the study (see below) which means that the difference between the two modes of transport are likely to be lower than calculated. In the longer term $C0_2$ emissions will increase although the number of aircraft flights (10 per week, 35 years after opening) will remain very small.

8.3.2 Assumptions and Limitations

To undertake this study a number of assumptions were made. The assumptions and limitations of greatest significance are:

- The RMS St Helena has a dual purpose in that it transports people and freight. However, the future scenarios assessed here have only considered passenger aircraft, which have a far smaller capacity for freight and therefore comparisons between the emissions calculations for aircraft and the RMS St Helena should be treated with caution. SHG is considering several options for the provision of sea-borne cargo including regular charter, spot charter, and a St Helena owned freighter. Each option would have different levels of emissions but it is likely that a bespoke freight transport service would be more efficient than the RMS.
- CO_2 emissions from sources associated with increased tourism on the island, as a result of the proposed air access, have not been considered. The provision of air access will lead to an increase in development on the island, to cater with the projected increase in visitor numbers. This development is likely to result in increased carbon emissions.
- A future scenario of one return flight per week to St Helena is assumed. It should be noted however that current projections are for a gradual increase in the number of passengers and flights to the island once the airport is operational. This will clearly have a significant bearing on annual emissions, but a less significant bearing on 'per passenger' emissions.
- An important issue is the differing effects of CO_2 emissions at altitude; the Intergovernmental Panel on Climate Change has estimated that the global warming potential of carbon emissions at altitude is approximately 1.75 times greater than that at ground level. Therefore the aircraft emissions calculated should be increased to make them comparable with the ship emissions in terms of their global warming potential.

A number of assumptions and limitations of lesser significance were also necessary; these are listed and discussed in Appendix 8 in Volume 4 of the ES.