



Addressing Climate Change by Promoting
Low Carbon Climate Resilient Development
in the UK Overseas Territories

Needs Assessment:
British Indian Ocean Territory
Department for International Development
July 2012

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Background and Purpose

Introduction

This report forms one of a suite of 16 individual needs assessments of the UK Overseas Territories (UKOTs) produced as part of the process of developing a DFID/FCO led cross HMG programme design to address climate change by promoting low carbon climate resilient development in the UKOTs. The purpose of this assignment was to identify the scope and best way to deliver an appropriate climate change programme for all UK OTs and develop a business case for it (contract duration Feb – June 2012).

The purpose of the reports was to provide a rapid synthesis of information contained within available documentation and frame this in a way which: helped to establish a clear rationale for a generic framework forming one business case for the UK OTs but not allowing this to exclude targeted and selective action to meet specific needs. They were also designed to provide an evidence base for the later comparative analysis across OTs and subsequent prioritisation of different approaches for the business case, which was going to be designed later in the consultancy.

It was agreed in May 2012 by the client and the consulting team that the contract was not fully deliverable as expressed in the original Terms of Reference. Details of the full programme of work and consultation is available in the project Inception Report (29th March 2012) and End of Contract Report (11th June 2012).

These reports now form a standalone output of the abbreviated consultancy.

The Reports

The original purpose of the reports still holds and the reader should recognise that the design and level of analysis in this report was set to be achievable within the time available (2 days of evidence gathering, research and writing against over 150 specific data points) and for the original purposes specified and no other. This report provides a general overview to facilitate future potential decision making and does not constitute a comprehensive nor in-depth analytical climate change report.

In a process facilitated by the UK Overseas Territories Association, data content in this report has been reviewed by in-country stakeholders via a nominated point of contact, with feedback incorporated if appropriate.

The report is tailored to the data points required to complete a climate change vulnerability matrix (VAM) tool. The VAM is structured around an understanding of four main issues: the exposure of an OT to climate change (threat analysis); adaptation and resilience; low carbon development and UK exposure. Each issue contains a number of subsets and indicators.

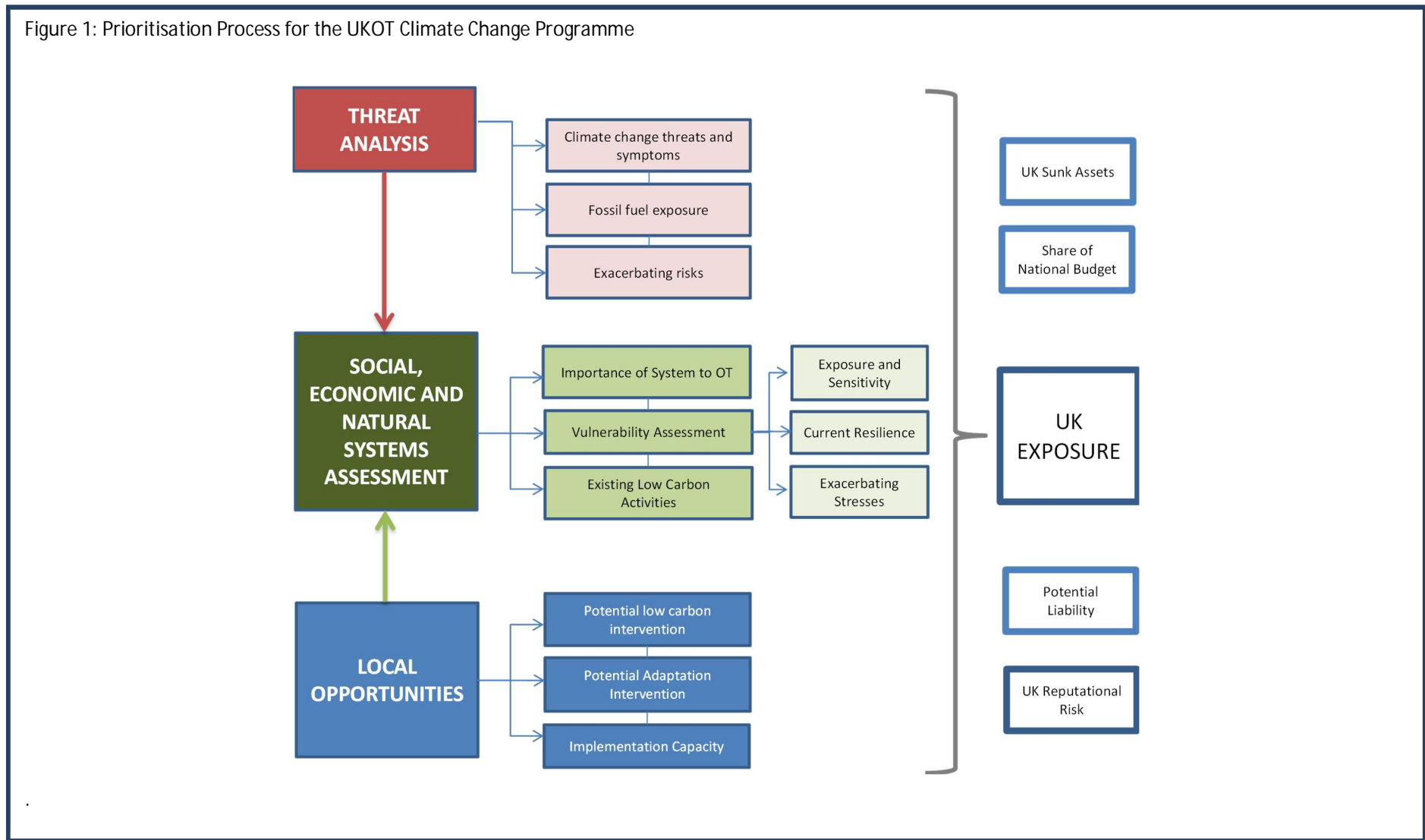
The completed VAM in this report uses a RAG colour coding system to provide a comparative analysis across all of the OTs to feed into the overall programme design. In most cases, data has been included specifically for the later appraisal and business case design process which would have followed.

Attached as annexes to this report are: an associated glossary of terms; a climate change VAM system definitions list; the VAM scoring system (which feeds into the coloured squares in the report text); the scored OT VAM; an initial programme approach table with preliminary sectoral and geographical analysis; and, if relevant, a greenhouse gas emission table.

Figure 1 overleaf illustrates how the data points in the VAM and in this report would have fed into the prioritisation process for a potential UKOT Climate Change Programme and DFID Business Case.

For a full understanding of how the data in this report and the VAM framework has been used, the reader is directed to the programme approaches which are elaborated in the programme Inception Report.

Figure 1: Prioritisation Process for the UKOT Climate Change Programme



Needs Assessment: British Indian Ocean Territory



KEY INDICATORS

| | |
|---------------------------|--|
| Population: | 2,800 (military personnel and support staff) |
| GDP (\$): | N.A. |
| Per Capita GDP (\$): | N.A. |
| ODA Entitled: | No |
| UK Annual Budget Support: | £ 505,000 (2005-2006) |
| Value of UK Sunk Assets: | N.A. |
| Key Economic Sectors: | N.A. |

Threat Exposure Analysis

Climate Change Exposure

The British Indian Ocean Territory (BIOT), otherwise known as the Chagos Islands, are an archipelago of five atolls containing 55 islands covering 54,400 sq. km in the centre of the Indian Ocean. The territory includes the Great Chagos Bank, which is the largest atoll in the world.

At present sea surface temperature (SST) are rising at over 0.25°C per decade. The projected impact of this could be completely devastating for the Islands. In 1998 there was a major coral bleaching episode in the region, with the Chagos Islands SST remaining at 30°C for a number of months, this seriously affected the corals with 95% bleached in some areas: corals to a depth of 15m were effected in the north, while in Diego Garcia in the South, corals at a depth of 30m were affected. There have been two further bleaching incidents since. Models based on historical data and projections suggest that beginning in 2050 the average annual temperature could be 30°C, which would have a devastating effect on the corals and their ability to repair and subsequently protect the Islands themselves from significant erosion.¹

The sea level in Diego Garcia increased by 0.54cm per year since 1986, but this rate appears to be accelerating,² with IPCC predicting a global sea level rise of 0.35m.³ Already ocean acidification is reported to be affecting the rate of post-bleaching recovery.⁴ Rising sea levels will have also an impact on coastal erosion. Some islands are already experiencing coastal erosion caused by the rise of sea level, with erosion already being identified on Diego Garcia and Salomon.⁵

¹ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.93

² Sheppard, C and Spalding, M, 2003. *Chagos Conservation Management Plan for British Indian Ocean Territory Administration Foreign & Commonwealth Office* [Online] Available at: http://www.zianet.com/tedmorris/dg/chagos_conservation_management_plan_2003.pdf [Accessed on 2 April 2012].

³ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.81

⁴ NERC, 2009. *Marine conservation in the British Indian Ocean Territory (BIOT): science issues and opportunities*. Report of workshop held 5-6 August 2009 at National Oceanography Centre Southampton, supported by the NERC Strategic Ocean Funding Initiative (SOFI).

⁵ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.93

It is estimated that the annual rainfall by 2020 or 2040 is likely to be small, though annual fluctuations may increase, with the IPCC predicting that average rainfall in the archipelago will rise in winter (June, July, August).⁶ Significant changes in storm activity and ocean circulation are considered very likely. Any increase in the potential number of storms and overtopping by waves will increase the risk of floods.⁷

Resource Exposure

Electricity is supplied by the US military through diesel generators but data on energy consumption or imports was not available.⁸

The islands are self-sufficient as regards water resources. On Diego Garcia, the military base uses over 100 shallow "horizontal" wells to produce over 560,000 litres per day from the "Cantonment" lens on the northwest arm of the island - sufficient water for a population of 3,500.⁹

Adaptation and Resilience

Importance to OT

Importance of System to OT

Natural Systems: The archipelago is one of the best preserved tropical Islands systems in the world.¹⁰ The Indian Ocean hosts approximately 15% of the world's coral reefs,¹¹ with BIOT itself supporting 1.5% (25,000km²) of the total global area of reefs and 220 species of coral.¹² While other reefs in the Indian Ocean have been degraded, those in the Chagos archipelago are better preserved.¹³

BIOT is a significant natural habitat and is host to 440 red-listed species with 76 having elevated risk of extinction. There are at least 784 species of fish, 280 land plants, 220 corals, 105 macroalgae, 96 insects and 90 birds (24 breeding).¹⁴ The Islands also have 10 Important Bird Areas, including Barton Point which is home to the world's largest reserve of red-footed Boobies.¹⁵ Bird breeding populations are amongst some of the densest in the Indian Ocean.¹⁶ BIOT also provides nesting sites for the green (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) turtles, both on the IUCN Red List.¹⁷

⁶ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.81

⁷ Sheppard, C and Spalding, M, 2003. *Op cit*.

⁸ Economy Watch, 2012. *British Indian Ocean Territory Electricity Production, Electricity Consumption, Electricity Exports and Electricity Imports* [Online] Available at: http://www.economywatch.com/economic-statistics/British-Indian-Ocean-Territory/Electricity_Production/ [Accessed on 31 March 2012].

⁹ Hunt, C. D., 1997. *Hydrogeology of Diego Garcia*. In: Vacher, H. L. and Quinn T., 1997. *Geology and Hydrogeology of Carbonate Islands. Developments in Sedimentology 54*. pp. 909–929. doi:10.1016/S0070-4571(04)80054-2

¹⁰ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.81

¹¹ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.92

¹² Sheppard, C and Spalding, M, 2003. *Op cit*.

¹³ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.92

¹⁴ NERC, 2009. *Marine conservation in the British Indian Ocean Territory (BIOT): science issues and opportunities*. Report of workshop held 5-6 August 2009 at National Oceanography Centre Southampton, supported by the NERC Strategic Ocean Funding Initiative (SOFI).

¹⁵ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.81

¹⁶ NERC, 2009. *Marine conservation in the British Indian Ocean Territory (BIOT): science issues and opportunities*. Report of workshop held 5-6 August 2009 at National Oceanography Centre Southampton, supported by the NERC Strategic Ocean Funding Initiative (SOFI).

¹⁷ Brown, N., 2008. *Climate change in the UK Overseas: Territories: An Overview of the Science, Policy and You*. Peterborough, UK: Joint Nature Conservation Committee.

BIOT also comprises a significant diversity of deepwater habitat types, although not significantly mapped, deepwater biodiversity is closely linked to physical diversity, with associated high species richness.¹⁸

Regarding hydrology and water resources, the "Cantonment" lens in Diego Garcia holds 19 million m³ of fresh water and has an average daily recharge from rainfall of over 10,000 m³, of which 40% remains in the lens and 60% is lost through evapotranspiration.¹⁹

Water pollution around the archipelago is low, with analyses (carried out between 1996 and 2006) indicating that they were the cleanest in the world: subsequently, the waters act as a global benchmark.²⁰

Economic Systems: All economic activity is concentrated in Diego Garcia, where a joint UK-US military facility is located. There are no industrial or agricultural activities on the islands.²¹ Before the declaration of a Marine Protected Area, fishing licences were issued. However, all commercial fishing is now prohibited, with the last licences expiring on 31st October 2010. A recreational fishery was located off Diego Garcia.²²

As a military base, BIOT is not a tourist destination. The area is also used as a research station for observing the impacts of climate change without the presence of human-induced environmental stresses.²³

Social Systems: There is no permanent civilian population on the BIOT. Access to the islands is very controlled and limited to military personnel and support workers.

Vulnerability

Sensitivity to Climate Exposure



An increase of about 2°C in SST is expected over the next 20-30 years,²⁴ with IPCC estimating that the mean annual temperature in the Indian Ocean could rise by 2.1°C by 2100.²⁵ This would have a dramatic effect on the marine bio-diversity of the Islands. The most important effect of temperature rise lies in the fact that corals, on which the entire reef system is based, are killed when it rises above about 29.8 °C for a sustained period of time, as occurred in 1998.²⁶ These coral bleaching events will have a significant knock-on effect on the entire marine ecosystem. The bio-diversity of reefs and their biological integrity is already being compromised,²⁷ with a study in the Chagos Islands indicating that the abundance and bio-diversity of reef fish declined significantly after the 1998 coral bleaching event.²⁸ A 50% reduction (approximately) in coral growth rates are predicted if atmospheric CO₂ levels reach 450 ppm.²⁹ Global studies undertaken on the economic benefits of coral reefs estimate their annual value to range between \$100,000 - \$600,000 per sq. km.³⁰

Modelling of storm events has recently indicated that storms and overtopping by waves of these islands will increase the risk of flooding. With their concave profiles, increased overtopping onto Chagos islands would flow centrally, sinking into water tables and affecting water resources.³¹

¹⁸ NERC, 2009. *Marine conservation in the British Indian Ocean Territory (BIOT): science issues and opportunities*. Report of workshop held 5-6 August 2009 at National Oceanography Centre Southampton, supported by the NERC Strategic Ocean Funding Initiative (SOFI).

¹⁹ Hunt, C. D., 1997. *Op cit*

²⁰ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.93

²¹ Economy Watch, 2012. *British Indian Ocean Territory Economic Statistics and Indicators* [Online] Available at: www.economywatch.com/economic-statistics/British-Indian-Ocean-Territory [Accessed on 31 March 2012].

²² Sheppard, C and Spalding, M, 2003. *Op cit*.

²³ NERC, 2009. *Op cit*.

²⁴ NERC, 2009. *Ibidem*.

²⁵ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.82

²⁶ Sheppard, C and Spalding, M, 2003. *Op cit*.

²⁷ Brown, N., 2008. *Op cit*.

²⁸ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.82

²⁹ NERC, 2009. *Op cit*.

³⁰ NERC, 2009. *Op cit*.

³¹ Sheppard, C and Spalding, M, 2003. *Op cit*.

The Islands are significantly exposed to climate impacts, rising sea levels and an increase in extreme weather events could lead to significant erosion of the coastal ecosystems. There are already indications that the Chagos archipelago is eroding.³² If future increases in sea level are not fully matched by the upward growth of reef flats, the consequence will be increased shoreline wave energy, erosion of island rims and much greater flooding risk, potentially affecting infrastructure, particularly during extreme weather events. Since the maximum elevation of most northern BIOT islands is only a few metres above sea level, they are at risk of becoming submerged or “drowned” atolls within a century on the basis of business-as-usual climate change scenarios.³³

Rising sea levels and temperatures will also have a significant impact on migratory sea mammals and marine turtles that inhabit BIOT, with climate change effecting the feeding seasons of the sea mammals and the rising temperatures modifying the conditions of egg incubation for the turtles.³⁴

Current Resilience Activities

A BIOT Marine Protected Area was created in 2010. It is the UK’s greatest area of marine biodiversity and includes the world’s largest no-take marine reserve.³⁵ Its designation, establishment and maintenance are not cost-free activities: annual protection costs were estimated to be only \$5 per sq km.³⁶

Under the Darwin programme, a project for *Strengthening the World’s Largest Marine Protected Area: Chagos Archipelago* is currently on-going. It aims to strengthen the BIOT Marine Protected Area by providing scientific knowledge for effective management and to develop a strategy that engages the support of potential stakeholders through outreach, education and engagement.³⁷ Other projects for the habitat restoration for turtle conservation were funded in 2003 and 2006 as flagship projects.³⁸

The archipelago has had over 200 scientific research publications written on it to date, with recent work including reef resilience and palaeo-climate studies.³⁹

Exacerbating Stresses

On many of the Islands, direct anthropogenic impacts include invasive rats and cats, which have had a significant impact on the Islands nesting seabird populations feeding on both chicks and eggs. Large coconut palm plantations have also reduced the terrestrial bio-diversity of some of the islands in the archipelago.⁴⁰

Illegal fishing and harvesting of sea cucumbers and sharks around the islands can exacerbate the effects on climate change on ecosystem and biodiversity. The increase in the small-vessel fishing fleets from nearby nations, the rapid growth of populations all around the Indian Ocean and the declining condition of coral reefs elsewhere are among the underlying factors that increase the risk of illegal near-shore and reef fishing. Anchor-damage from yachts was also identified as a significant visitor impact in 2003 but currently mooring permits are strictly controlled and the maximum stay is 28 days.⁴¹

³² Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.82

³³ NERC, 2009. *Op cit.*

³⁴ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.81

³⁵ DEFRA, 2012a. *The Environment in the United Kingdom’s Overseas Territories: UK Government and Civil Society Support*. London, UK: DEFRA

³⁶ NERC, 2009. *Op cit.*

³⁷ DEFRA, 2012b. *The Darwin Initiative*. [Online] Available at: <http://darwin.defra.gov.uk/project/19027/> [Accessed on 31 March]

³⁸ Fauna and Flora International, 2012. *The Flagship Species Fund – Previously Funded Projects*. [Online] Available at: <http://www.fauna-flora.org/wp-content/uploads/Previously-Funded-Projects-updated-Feb-2012.pdf> [Accessed on 31 March]

³⁹ NERC, 2009. *Marine conservation in the British Indian Ocean Territory (BIOT): science issues and opportunities*. Report of workshop held 5-6 August 2009 at National Oceanography Centre Southampton, supported by the NERC Strategic Ocean Funding Initiative (SOFI).

⁴⁰ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.93

⁴¹ NERC, 2009. *Op cit.*

Future Opportunities

Potential Adaptation Interventions

A limited amount of information is available on potential adaptation interventions. However, the BIOT signed a Memorandum of Understanding for the *Indian Ocean and South East Asia (IOSEA) Marine Turtle Pacific Islands Cetacean* under the *Convention on the Conservation of Migratory Species of Wild Animals (CMS)*. It deals with conservation and management of marine turtles and their habitats in the Indian Ocean and South East Asia.

Defra have also provided funding for a research project which will look at the effects of large marine reserves on pelagic, migratory species in the BIOT Marine Protected Area.⁴²

Significantly as the Islands are amongst the best preserved in the central Indian Ocean, as such the reefs could act as global control sites for the study of the effects of global warming and globally significant advances in research on: deep sea biology, geochemistry and geology; spatial scaling of population connectivity; ocean acidification and climate change.^{43 44}

Implementation Capacity

Given the Islands primary function as a military base, there are limited and fragmented implementation capacities across the adaptive capacity arena.

Nonetheless, the BIOT is administered from London by a Commissioner.⁴⁵ A Chagos Environment Network (CEN) was also formed in 2008. The purpose of the CEN is to support efforts to ensure that the globally important natural environment of the Chagos Archipelago is conserved as a unique and valuable resource.⁴⁶

Defra have also provided funding for a research project which will look at the effects of large marine reserves on pelagic, migratory species in the BIOT Marine Protected Area and are able to advise on policy or scientific issues relating to the Memorandum of Understanding for *Indian Ocean and South East Asia (IOSEA) Marine Turtle Pacific Islands Cetacean*.⁴⁷

Low Carbon Development (Source)

Current Emissions

Share of Current Emissions

BIOT is not covered by UK GHG Inventory.

GHG Abatement

Abatement Potential

The Ministry of Defence has been implementing the *MOD Climate Change Delivery Plan* and the *MOD Climate Change Strategy* since 2010. They include among their objectives the reduction of greenhouse gas emissions

⁴² DEFRA, 2012a. *Op cit*.

⁴³ Petit, J. and Guillaume, P., 2008. *Climate Change and Biodiversity in the European Union Overseas Entities*. Gland, Switzerland: IUCN (International Union for Conservation of Nature) Publication Services, p.93

⁴⁴ NERC, 2009. *Marine conservation in the British Indian Ocean Territory (BIOT): science issues and opportunities*. Report of workshop held 5-6 August 2009 at National Oceanography Centre Southampton, supported by the NERC Strategic Ocean Funding Initiative (SOFI).

⁴⁵ Commonwealth Secretariat, 2012. *United Kingdom - British Indian Ocean Territory*. [Online] Available at:

http://www.thecommonwealth.org/YearbookInternal/140416/140420/british_indian_ocean_territory/ [Accessed on 2 April]

⁴⁶ Chagos Conservation Trust, 2012. *Supporters*. [Online] Available at: <http://www.chagos-trust.org/about/supporters> [Accessed on 2 April]

⁴⁷ DEFRA, 2012a. *Op cit*.

that result from Defence activities.^{48 49} Specific objectives for BIOT are not reported but it is likely to be covered by those strategies.

Current Abatement Activities

Information on abatement activities in place was not available.

Future Opportunities

Potential LCD Intervention

A private company from the US has recently undertaken feasibility studies on the adoption of an Ocean Thermal Energy Conversion (OTEC) system at US military bases in Diego Garcia. Once operational, OTEC will allow the island to place its current diesel generators in standby.⁵⁰

Information on other potential Low Carbon Development interventions was not available.

Implementation Capacity

As Future Opportunities, Implementation Capacity above.

UK Exposure

UK Sunk Assets

A Permanent Joint Operating Base (PJOB) is located on the island of Diego Garcia. It hosts a very limited number of British military personnel, conducting a number of civil functions ranging from policing to customs and excise on behalf of the FCO.⁵¹

Absolute Value of UK Transfer

The FCO allocated £505,000 to BIOT in 2005-2006.⁵²

Share of National Budget from UK Transfer

100% of the budget comes from UK Government.⁵³

Potential Liability

There are a number of legal cases concerning BIOT. The legal case on the return of Chagos islanders, who were evicted from the archipelago between 1967 and 1973, is still on-going. Successive court rulings and orders in council have disputed the right of the displaced Chagossian natives to return to the Territory. To date, the legal

⁴⁸ MOD (Ministry of Defence), 2010. *Defence in a Changing Climate*. London, UK: Ministry of Defence.

⁴⁹ MOD (Ministry of Defence), 2010 a. *MOD Climate Change Delivery Plan*. London, UK: Ministry of Defence.

⁵⁰ Guernsey, C. H., 2012. C.H. Guernsey & Company Featured Projects – Ocean Thermal Energy Conversion. [Online] Available at: <http://www.chguernsey.com/project.php?ProjectID=286>. [Accessed on 2 April]

⁵¹ MOD, 2012. *Permanent Joint Operating Base (PJOB) Diego Garcia*. Available at: www.mod.uk/DefenceInternet/AboutDefence/WhatWeDo/DoctrineOperationsandDiplomacy/PJHQ/PJobDiegoGarcia.htm [Accessed on 24 March 2012].

⁵² National Audit Office, 2007. *Foreign Commonwealth Office - Managing risk in the Overseas Territories*. London: The Stationary Office, page 29

⁵³ Commonwealth Secretariat, 2012. *United Kingdom - British Indian Ocean Territory*. [Online] Available at: http://www.thecommonwealth.org/YearbookInternal/140416/140420/british_indian_ocean_territory/ [Accessed on 2 April]

costs for the UK Government have been £600,000 but a study conducted in 2002 estimated that resettlement costs would be in the order of £40 million over 10 years.⁵⁴

BIOT is among the signatories of the following multilateral environmental agreements:⁵⁵

- Convention on International Trade in Endangered Species (CITES)
- Convention on the Conservation of Migratory Species of Wild Animals (CMS)
- Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter – the London Convention
- Vienna Convention for the Protection of the Ozone Layer.

UK BIOT is also a member of the Indian Ocean Tuna Commission, which regulates Indian Ocean tuna fisheries.⁵⁶

Reputational Risks

In addition to the clear reputational risks associated with not safeguarding the pristine environment of BIOT, there are significant political reputational risks for HMG regarding the Islands. BIOT and Diego Garcia in particular, where the UK military base is located, have a military strategic importance for the UK Government. The removal of 950 native Chagos Islanders in 1967 remains an on-going issue. The UK Government is appealing against the decision of the Court of Appeal of partially authorising the entry or settlement of Chagossian natives into the Territory. It would involve expensive underwriting by the UK Government for an open-ended period: probably permanently.⁵⁷ The Chagos Islands, including Diego Garcia, are claimed also by Mauritius.⁵⁸

⁵⁴ National Audit Office, 2007. *Op cit*, page 27

⁵⁵ DEFRA, 2012. *Op cit*

⁵⁶ NERC, 2009. *Marine conservation in the British Indian Ocean Territory (BIOT): science issues and opportunities*. Report of workshop held 5-6 August 2009 at National Oceanography Centre Southampton, supported by the NERC Strategic Ocean Funding Initiative (SOFI).

⁵⁷ NAO, 2007. *Op cit*

⁵⁸ CIA, 2012. *The World Factbook*. [Online] Available at: <https://www.cia.gov/library/publications/the-world-factbook/geos/io.html> [Accessed on 2 April].

Annex One: UKOT Climate Change Vulnerability Analysis Matrix
Glossary of Terms

UKOT Climate Change Vulnerability Analysis Matrix Glossary of Terms

| | |
|-------------------------------|--|
| Abatement Potential | (Cost effective) technical potential for reducing emissions within sector. |
| Absolute GHG Emissions | Annual amount of greenhouse gases (GHG) produced by an Overseas Territory. It is measured as metric tonnes of CO ₂ generated per year. |
| Absolute Value of UK Transfer | Total amount of funding from UK to an Overseas Territory per year. |
| Adaptation | The extent to which existing initiatives and measures (projects and programmes) are expected to reduce the vulnerability of natural and human systems against actual or expected climate change effects. |
| Adaptive Capacity | The ability of a social or natural system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change. |
| Carbon sink | A natural or artificial reservoir that accumulates and stores some carbon-containing chemical compound for an indefinite period. Natural: Absorption of carbon dioxide by the oceans via physicochemical and biological processes and photosynthesis by terrestrial plants. Artificial: include landfill and carbon capture and storage. |
| Climate Change | A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. |
| Climate Change Impact | Consequences of climate change on social, economic and natural systems without considering adaptation. |
| Climate Change Exposure | The change in climate with a potential adverse effect on social, economic and natural systems. |
| Current Abatement Activities | Any action that reduces the emissions or emissions intensity (per unit output) of a given sector on-going or completed in UK Overseas Territories as of March 2012. |
| Current Resilience Activities | Resilience activities on-going or completed in UK Overseas Territories as of March 2012. |
| Energy Efficiency | Ratio of energy output of a conversion process or of a system to its energy input: measures taken to reduce demand for energy for the same projected level of development. |
| Energy Import Dependence | Percentage of energy imported from abroad by the single Overseas Territory. |
| Exacerbating Stresses | Natural or human factors which in isolation or combination have the potential to lead to a change in the severity or frequency of a climate change threat. This may include inter alia a natural hazard, an extreme weather event, social tension or conflict, demographic trends and population characteristics and institutional and/or societal capacity constraints. |
| Exposure | The sum of the character, magnitude and rate of climate change variation to which a system is influenced by. |
| Fossil Fuel Dependence | The percentage of total fuel consumption derived from carbon-based fuels from fossil carbon deposits (including coal, oil, and natural gas) and the percentage of that fuel that is imported. |
| Frequency and Severity | Occurrence and magnitude of an event in UK Overseas Territories. |
| Future Opportunities | A territory's ability to reduce greenhouse gas emissions or to enhance carbon sink (Potential LCD Intervention) coupled with its potential to plan adjustment interventions in response to the effects of climate change (Potential Adaptation Intervention). |
| GHG Abatement (Current) | Potential for reducing emissions within sector coupled with any action already in place that reduces the emissions or emissions intensity of a given sector. |

| | |
|---|---|
| Implementation Capacity | Current (March 2012) capacity to design, implement and monitor all related low carbon / adaptive capacity activities. This includes all current resource constraints (i.e. funding, local personnel capacity, lack of personnel, supportive infrastructure etc.) and opportunities. |
| Importance of system to OT | The value that society and people in an UK Overseas Territory place on the significance of impacts and vulnerabilities (see Vulnerability) on social, economic and natural systems. |
| Low Carbon Development (Source) | Actions which include making a contribution towards stabilising levels of CO ₂ and other greenhouse gases at a level that will avoid dangerous climate change, through cuts in emissions, demonstrate a high level of energy efficiency, use low-carbon energy sources and/or utilise and enhance carbon sinks. |
| Magnitude | The area or number of people likely to be affected as a proportion of total population or land area. |
| Potential Liability | Legal, Financial, Moral and Political exposure arising from the activities of the UK Overseas Territories. This includes UK commitments to legal treaties that extend to the OTs (e.g European Convention on Human Rights) and response to natural and man-made disasters and terrorist events. |
| Potential LCD Intervention | A territory's ability to reduce anthropogenic CO ₂ and other greenhouse gas emissions or to enhance carbon sinks, where ability refers to skills, competencies, fitness and proficiencies that a territory has attained and depends on technology, institutions, wealth, equity, infrastructure and information. |
| Potential Adaptation Interventions | The potential for a planned intervention which constitutes or contributes to an adjustment in natural, social or economic systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. |
| Reputational Risk | Reputation is defined as the social evaluation of the public towards HMG. Risk is the probability that a failure to act will produce harm to that reputation. This reputation may be defined in terms of the potential: loss of HMG ethical (moral) reputation for safe guardianship of its citizens) disruption or distortion of HMG relationship with its citizens in the OTs withdrawal of private sector investment in UK Overseas Territories (investor flight). |
| Resilience | The ability of a social or natural system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change. |
| Resource Exposure | Degree at which a system is influenced by a variation in the availability or the price of resources (specifically water and energy). |
| Resource Use Efficiency | The effective use of energy and water resources – limiting wastage and maximising usable resources. |
| Sensitivity to Climate Exposure | Affects the magnitude and/or rate of a climate related perturbation or stress and is the degree to which a system [exposure unit] is affected, either adversely or beneficially, by climate variability or climate change. The effect may be direct (e.g. a change in crop yield in response to a change in the mean, range, or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea level rise). |
| Share of Current Emissions | Percentage of OT's Absolute GHG Emissions generated by each sector. |
| Share of National Budget from UK Transfer | Percentage and amount (at 2011 prices) of the total Overseas Territory Budget which comes from HMG budgetary support. |
| System (Social, Economic and Natural) | A set of functionally inter-related elements subdivided into Natural (ecosystems and biodiversity) and Social and Economic (Human) elements. |
| Threat Exposure Analysis | Identification of the threats that may affect a system and evaluation of their frequency and severity. |
| UK Exposure | Risk to the UK arising from activities in the UK Overseas Territories. It includes UK Sunk Assets, Share of National Budget from UK Transfer, Potential Liability and Reputational Risk. |

| | |
|----------------|---|
| UK Sunk Assets | UK investments in physical infrastructure in the Overseas Territories which cannot be recovered. |
| Vulnerability | The degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity. |

Key:

 Voice reported in VAM

 Additional voice

Annex Two: UKOT Climate Change VAM Systems Definition

| SOCIAL, ECONOMIC AND NATURAL SYSTEMS DEFINITIONS | |
|--|--|
| Biodiversity and Ecosystems (Marine and terrestrial) | <p>Ecosystems – A community of living (plants and animals) and non-living things (climate, landscape) which interact together and affect each other.</p> <p>Biodiversity – The variety of plant and animal life found in an ecosystem and the variation in their genetic makeup. It is a measure of the health of an ecosystem, with healthy ecosystems having greater variety and variation in plant and animal life than unhealthy ones.</p> <p><i>Source: Brown, 2008ⁱ</i></p> |
| Hydrology and Water resources | <p>Hydrology - The various systems that are involved in the hydrological cycle (water evaporation, atmospheric circulation of water vapour, cloud formation, precipitation, interception by plant life, land surface runoff, soil infiltrations, groundwater recharge, discharge into streams etc).</p> <p>Water resources – The availability of useful water, often a limiting factor for social and economic development. Sources include groundwater, rainwater and surface reservoirs or rivers.</p> <p><i>Source: Gray, 2010ⁱⁱ; Parry et al., 2007ⁱⁱⁱ</i></p> |
| Tourism | <p>Comprises the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purpose</p> <p><i>Source: UNWTO, 2011^{iv}</i></p> |
| Transportation | <p>A system of conveying people, goods, etc., from one place to another.</p> <p>The definition includes water, air, and land transport.</p> |
| Agriculture and Fisheries | <p>Agriculture- The science or practise of cultivating the soil and rearing animals</p> <p>Fisheries – The occupation of catching or rearing fish</p> |
| Forestry | <p>All economic activities that mostly depend on the production of goods and services from forests including commercial activities that are dependent on the production of wood fibre. It also includes activities such as the commercial production and processing of non-wood forest products and the subsistence use of forest products</p> <p><i>Source: FAO, 2004^v</i></p> |
| Energy Supply and Use | <p>Energy supply - Extraction, conversion, and transportation of fuels and electricity to ultimate end use</p> <p>Energy use - The amount of fuels and electricity utilized during a period of time to provide a useful service such as heating, cooling, or transportation</p> <p><i>Source: Wilbanks et al., 2008^{vi}</i></p> |
| Industry and Commerce | <p>Industry - Industry includes manufacturing, mining, construction and related informal production activities. Other categories, such as transport, energy supply & demand and processing of forest products have been included in other sectors.</p> <p>Commerce – Commerce is the exchange or buying and selling of commodities. In our definition it includes trade, retail and other commercial activities.</p> |
| Human Health | <p>Human health includes physical, social and psychological well-being.</p> <p>Society – Society includes <i>infrastructures, human settlements</i> and <i>social issues</i>.</p> <p><i>Infrastructures</i> are systems designed to meet relatively general human needs, often through largely or entirely public utility-type institutions. <i>Infrastructures</i> for settlements and society include both ‘physical’ (sanitation and communication systems) and ‘institutional’ (shelter, health care, food supply, security and fire services and other forms of emergency protection). <i>Human settlements</i> comprise physical capital (buildings) where most of the world’s population live. <i>Social issues</i> include all the factors relating to human society and its members, concerning the way of life of the local population (livelihoods and welfare).</p> <p><i>Source: Parry et al., 2007</i></p> |

| | |
|---------------------------------|---|
| HDI/ Livelihoods/ Poverty | <p>HDI (Human Development Index) - A summary composite index that measures a country's average achievements in three basic aspects of human development: longevity, knowledge, and a decent standard of living.</p> <p>Livelihoods - A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living.</p> <p>Poverty – A state or condition in which a person or community lacks the financial resources and essentials to enjoy a minimum standard of life and well-being that is considered acceptable in society.</p> <p><i>Source: Chambers and Conway, 1991^{vii}</i></p> |
|---------------------------------|---|

Note: The sectors considered as potential sources of greenhouse gases in the Low Carbon Development section are the ones reported by Department of Energy and Climate Change, 2009^{viii}.

ⁱ Brown, N., 2008. *Climate Change in Overseas Territories: An Overview of the Science, Policy and You*, Peterborough, UK: Joint Nature Conservation Committee

ⁱⁱ Gray, G. A. L., 2010. *Montserrat National Climate Change Issue Paper*, Montserrat: Ministry of Agriculture, Land, Housing and the Environment

ⁱⁱⁱ Parry, M., Canziani, O. & Palutikof, J. P., 2007. *Climate Change 2007: Impacts, adaptation and Vulnerability, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge, UK: Cambridge University Press.

^{iv} UNWTO, 2011. *World Tourism Organisation UNWTO*. [Online] Available at: <http://statistics.unwto.org/en>. [Accessed 12 03 2012].

^v FAO, 2004: Trends and Current Status of the Contribution of the Forestry Sector to National Economies, Rome: FAO, available on <http://www.fao.org/docrep/007/ad493e/ad493e05.htm>

^{vi} Wilbanks T. J. et al., 2008. *Effects of Climate Change on Energy Production and Use in the United States*, Washington, US: US Climate Change Science Programme

^{vii} Chambers, R., & Conway, G. (1991). *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century*. [Online] Available at: <http://www.smallstock.info/reference/IDS/dp296.pdf> [Accessed 28 03 2012].

^{viii} Department of Energy and Climate Change, 2009. *5NC - The UK's Fifth National Communication under the United Nations Framework Convention On Climate Change*. London

Annex Three: UKOT Scoring Matrix

ANNEX III: RAG SCORING FOR UKOT VAM

| # | | Red | Red/Amber | Amber/Green | Green |
|---|--|---|--|---|---|
| Threats Exposure Analysis | | | | | |
| | Exposure: Frequency and Severity of climate effects | Current: High Impact 2050: Impact + Confidence | Current: Medium Impact 2050: Impact + Confidence | Current: Low Impact 2050: Impact + Confidence | Current: No impact 2050: No impact |
| Resource Exposure | | | | | |
| | Exposure: Fossil Fuel and Energy Import Dependence, Resource Use Efficiency and GHG Emission | High Dependency, Emissions and Low Resource Use Efficiency | Medium Dependency, Emissions and low Resource Use Efficiency | Low dependency, emissions and medium resource use efficiency | Low (or No) dependency, emissions, and high resource use efficiency |
| Importance to Overseas Territory | | | | | |
| 1 | Importance of System to OT <i>Natural Systems</i> <i>Economic Systems</i> | Bio-diversity characterised by high levels of endemic / endangered species and / or territory with internationally recognised environmental designation ¹ Critical levels of water stress Dominant contribution to OT GDP (>20%) | Bio-diversity characterised by presence of endemic / endangered species and internationally recognised environmental designation Moderate levels of water stress Significant contribution to OT GDP (5%-20%) | Bio-diversity characterised by low levels of endemic / endangered species and no internationally recognised environmental designation Limited levels of water stress Limited contribution (<5%) to OT GDP | Bio-diversity characterised by very low levels of endemic / endangered species and no internationally recognised environmental designation No water stress No contribution (0%) to OT GDP |

¹ As identified by IUCN redbook.

| # | | Red | Red/Amber | Amber/Green | Green |
|--------------------------------|------------------------------------|---|---|---|--|
| | <i>Social Systems</i> | Per capita GDP (<\$6000) Low life expectancy / High infant mortality rates | Per capita GDP (\$6001 - \$20000) Medium life expectancy / Medium infant mortality rates | Per capita GDP (\$20001 - \$50000) Medium life expectancy / Low infant mortality rates | Per capita GDP (\$50000 +) High life expectancy / Low infant mortality rates |
| Vulnerability (Current) | | | | | |
| 2.1 | Sensitivity to Climate Exposure | High sensitivity to climate change exposure/high potential for irreversible impacts | Medium sensitivity to climate change exposure/medium potential for irreversible impacts | Low sensitivity to climate change exposure/low potential for irreversible impacts | No sensitivity to climate change exposure/no potential for irreversible impacts |
| 2.2 | Current Resilience Activities | No resilience planning and/or very limited adaptive capacity | Weak resilience planning and/or adaptive capacity | Moderately effective resilience planning and/or adaptive capacity | Strong resilience planning and/or adaptive capacity |
| 2.3 | Exacerbating Stresses | Significant exacerbating stresses | Moderate exacerbating stresses | Limited exacerbating stresses | No exacerbating stresses |
| Future Opportunities | | | | | |
| | | | | | |
| 3.1 | Potential Adaptation Interventions | No technical/programmatic opportunities available. | Limited technical/programmatic opportunities available, and significant work/investment required to develop bankable projects or programmes | Technical/programmatic opportunities exist, but only as pilot projects/strategies and require further investment to develop bankable projects or programmes | Technical/programmatic opportunities exist and bankable investments/projects are available for immediate funding |
| | | | | | |
| 3.2 | Implementation Capacity | No technical, political and financial capacity to | Limited technical, political and/or financial capacity to | Moderate technical, political and/or financial capacity to implement and | Strong technical, political and financial capacity to implement |

| # | | Red | Red/Amber | Amber/Green | Green |
|-----------------------------|------------------------------|---|--|--|--|
| | | implement and monitor adaptation activities, with full UK input required. | implement and monitor adaptation activities, with significant UK input required. | monitor adaptation activities, with moderate UK input required. | and monitor adaptation activities, with limited UK input required |
| Current Emissions | | | | | |
| 4.1 | Share of Current Emissions | High (>30%) | Medium (15%-30%) | Low (5%-15%) | None/Marginal <5%. |
| GHG Abatement | | | | | |
| 5.1 | Abatement Potential | No abatement potential <10% | Limited abatement potential identified 10%-25% | Moderate abatement potential identified 25%-50% | Significant abatement potential identified E.g. >50% of current levels |
| 5.2 | Current Abatement Activities | No low carbon development planning or investment | Weak low carbon development planning and investment | Moderately effective low carbon development planning and investment | Strong evidence of effective low carbon development planning and investment |
| Future Opportunities | | | | | |
| 6.1 | Potential LCD Intervention | No technical/programmatic opportunities available. | Limited technical/programmatic opportunities available, and significant work/investment required to develop bankable projects or programmes. | Technical/programmatic opportunities exist, but only as pilot projects/strategies and require further investment to develop bankable projects or programmes. | Technical/programmatic opportunities exist and bankable investments/ projects are available for immediate funding. |
| 6.2 | Implementation Capacity | No technical, political and financial capacity to implement and monitor low carbon activities, with full UK input required. | Limited technical, political and/or financial capacity to implement and monitor low carbon activities, with significant UK input required. | Moderate technical, political and/or financial capacity to implement and monitor low carbon activities, with moderate UK input required. | Strong technical, political and financial capacity to implement and monitor low carbon activities, with limited UK input required. |

| UK Exposure (2012) | | | | | |
|--------------------|---|---|--|--|---|
| 7.1 | UK Sunk Assets | >£100m | £20-£100m | £5-£20m | £0-£5m |
| 7.2 | Absolute Value of UK Transfer | £500,001 - £1,000,000 | £250,001 - £500,000 | £100,001 - £250,000 | >£100,000 |
| 7.3 | Share of National Budget from UK Transfer | 75%> of national budget for specific system from UK transfer | 51% to 75% of national budget for specific system from UK transfer | 26% to 50% of national budget for specific system from UK transfer | 25%< of national budget for specific system from UK transfer |
| 7.4 | Potential Liability | Cost of honouring and implementing legal treaties and other HMG commitments (>£200m) | Cost of honouring and implementing legal treaties and other HMG commitments (>£50m) | Cost of honouring and implementing legal treaties and other HMG commitments (>£10m) | Cost of honouring and implementing legal treaties and other HMG commitments (<£10m) |
| 7.5 | Reputational Risks | Irreparable reputational risk in terms of loss of: HMG reputation for safeguarding citizens / climate change and ecosystems; HMG disruption to the relationship with its citizens; and potential to severely disrupt private sector investment in the UKOTs related to specific system. | Serious but not irreparable reputational risk in regards to loss of HMG safeguarding reputation, HMG relationship with citizens or private sector investment related to specific system. | Limited reputational risk in regards to loss of HMG safeguarding reputation, HMG relationship with citizens or private sector investment related to specific system. | No reputational risk in regards to loss of HMG safeguarding reputation, HMG relationship with citizens or private sector investment related to specific system. |

Annex Four: British Indian Ocean Territory - Scored VAM

| |
|-------------|
| RED |
| RED/AMBER |
| GREEN/AMBER |
| GREEN |

| Threat Exposure Analysis | | |
|--|------------------------|------|
| | Frequency and Severity | |
| | Current | 2050 |
| Climate Change Exposure | | |
| 1 Increase in temperature | RED | RED |
| 2 Increase/decrease/variability in precipitation | GREEN | RED |
| 3 Decrease in snow cover and ice | GREEN | RED |
| 4 Heat waves | GREEN | RED |
| 5 Heavy precipitation events/floods | GREEN | RED |
| 6 Extreme storm events | GREEN | RED |
| 7 Rising sea levels | RED | RED |
| 8 Ocean acidification | RED | RED |

| Resource Exposure | Current |
|----------------------------|---------|
| 1 Fossil Fuel Dependence | RED |
| 2 Energy Import Dependence | X |
| 3 Resource use efficiency | X |
| 4 Absolute GHG emissions | X |

| Low Carbon Electricity Resource Potential | Share of Current Electricity Production | Potential |
|---|---|-----------|
| | 1 Wind | X |
| 2 Hydro | X | X |
| 3 Solar PV | X | X |
| 4 Geothermal | X | X |
| 5 Biomass | X | X |
| 6 Waste (solid, liquid) | X | X |
| 7 OTEC | X | Low |
| Low Carbon Heat Potential | % of buildings | Potential |
| 1 Solar Thermal | X | X |
| 2 Biomass | X | X |
| Liquid Fuels | % of consumptic | Potential |
| 1 Bioethanol | X | X |
| 2 Bio diesel | X | X |

British Indian Ocean Territory

| Summary |
|--|
| British Indian Ocean Territory (BIOT) is an archipelago of five atolls containing 55 islands covering 54,400 sq km. It is in the centre of the Indian Ocean. Population limited to UK and US military personnel and civilian contract employees (about 2,800 people). No major economic activities. |
| Threat Exposure Analysis Experienced events: Sea surface temperature (SST) rising at over 0.25 °C per decade; coral bleaching episodes (major one in 1998 destroyed 80% of corals at a depth of 30 m); sea level rise by 0.54 cm per year; ocean acidification affecting post-recovery rates. Expected events: Increase of about 2 °C in SST in 20-30 years; increase in rainfall fluctuations by 202-2040; augmented numbers of storm and overtopping by waves. Electricity produced through diesel generators by US military. Self-sufficiency as regards water resources. |
| Adaptation and Resilience Presence of threatened species of flora and fauna. BIOT supports 1.5% of total global area of coral reefs. Nesting sites for endangered turtles. Fresh water reservoirs available on Diego Garcia. Fishing prohibited since 2010. Biodiversity of reefs and biological integrity already compromised due to increased SST and CO2 levels. Risk of flooding and drowning to increase in the future. BIOT Marine Protected Area created in 2010. Other projects under Darwin and Flagship Initiatives and MoU for the protection of biodiversity in place. Illegal fishing main exacerbating stress. |
| Low Carbon Development BIOT not covered by UK GHG inventory. Feasibility studies on the adoption of Ocean Thermal Energy Conversion for US' military bases in Diego Garcia ongoing. |
| UK Exposure Permanent Joint Operating Base on Diego Garcia Island. BIOT received £505,000 from FCO in 2005-2006. BIOT signatory of several multilateral environmental. Number of legal cases, including the one on the return of Chagos islanders estimated to potentially cost £ 40 million over 10 years to UK Government. Opposition of Government of Mauritius to the declaration of Marine Protected Area. Strategic importance for UK for military purposes. Sovereignty issue among UK and Mauritius. |
| Exacerbating Risks Illegal fishing |

Additional Potential Classification

| | |
|--------|--|
| High | High levels of cost effective technical potential identified, with strong evidence of associated planning and investment |
| Medium | Medium cost effective resource potential identified, with medium evidence of associated planning and investment |
| Low | Limited cost effective technical potential identified, with limited evidence of associated planning and investment |
| None | No cost effective technical potential identified. |

| Adaptation and Resilience | | Importance to OT | Vulnerability (Current) | | | Future Opportunities | |
|---------------------------|-------------------------------|----------------------------|---------------------------------|-------------------------------|-----------------------|------------------------------------|-------------------------|
| | | Importance of System to OT | Sensitivity to Climate Exposure | Current Resilience Activities | Exacerbating Stresses | Potential Adaptation Interventions | Implementation Capacity |
| Natural | Biodiversity and Ecosystems | | | | | | |
| | Hydrology and Water resources | | | | | | |
| Economic | Tourism | | | | | | |
| | Agriculture and Fisheries | | | | | | |
| | Energy Supply and Use | X | X | | | | |
| | Industry and Commerce* | | | | | | |

| UK Exposure (2012) | | | | |
|--------------------|-------------------------------|---|---------------------|--------------------|
| UK Sunk Assets | Absolute Value of UK Transfer | Share of National Budget from UK Transfer | Potential Liability | Reputational Risks |
| | | | | |
| X | X | | | |
| X | X | | | |
| | | | | |
| X | X | | | |
| X | X | | | |
| X | X | | | |
| X | X | | | |

| Low Carbon Development (Source) | | Current Emissions | GHG Abatement (Current) | | Future Opportunities | |
|--|--|----------------------------|-------------------------|------------------------------|----------------------------|-------------------------|
| | | Share of Current Emissions | Abatement Potential | Current Abatement Activities | Potential LCD Intervention | Implementation Capacity |
| Energy Supply | | X | X | X | | |
| Public* | | X | X | X | X | |
| Waste management | | X | X | X | X | |
| Land Use, Land Use Change and Forestry | | X | X | X | X | |

* Including military and research activities

Annex Five: UKOT Potential Programme Approaches – Preliminary Sectoral and Geographical Analysis

| | Programme Approach | Sectoral and OT Relevance | | Activities | |
|---|---|--|------------|--|--|
| | | Sectors | OTs | Current | Potential |
| 1 | Adaptation: Needs Focus | Energy Supply and Use | Gibraltar | Replacement of power plants with a power station powered by diesel engines. | n/a |
| 2 | Adaptation: Effectiveness Focus | Biodiversity and Ecosystems | Bermuda | Bermuda Biodiversity Action Plan - Activity report 2010; The Bermuda Plan 2008 | Stringent water conservation practices; environmentally-sound desalination operations; better weather forecasting; coastal zone management plan (building on Draft Planning Statement (2008)) |
| | | | Gibraltar | Management and Action Plan for the conservation of Sites of Community Importance enforced; Marine Special Area of Conservation designated; Catalogue of living resources; Habitat and Species Action Plans. | Dolphin study; climate change studies. |
| 3 | Mitigation: Needs Focus | Energy Supply | Bermuda | Electricity for the entire Island is produced at BELCO's Pembroke location. | Public land/seabed allocated for utility-scale renewable electricity generation projects; generation licences for power producers and comprehensive interconnection standards; quality standards specifically for distributed renewable energy systems included in building codes; expedited planning processes for small-scale renewable generation; efficiency standards; energy auditing. |
| | | | Gibraltar | Replacement of power plants with a power station powered by diesel engines. | The use of biofuels to be encouraged by selling at lower price in petrol stations; adopt biofuels for Govt fleet. |
| | | Transport | Gibraltar | New bus transport system introduced; free to children. | Reduction in the energy used for road transport (9% target for 2016); Car park and park and ride bus shuttle service construction planned; Increase in public transport times/routes; More free public transport. |
| 4 | Mitigation: Emissions Reduction Potential Focus | Energy Supply | Gibraltar | New power station has the capability to run on biofuels. | Adoption of renewable energy resources: wind, energy from waste and tidal current all considered technically viable. |
| | | | Montserrat | 2008 Montserrat Sustainable Development Plan; shortly be upgrading its diesel based power station to more reliable 1.5 MW source | Exploitation of geothermal energy is a stated aim of the National Energy Policy; test drilling 2012; Geothermal energy is proved to be feasible, there is potential to generate up to 50MW of energy, with export of around 40MW to a neighbouring island; potential wind turbine sites at locations within the Blakes Estate although the new National Physical Development Plan for North Montserrat 2012-2022 zones this land for residential and recreational tourism; |
| | | Transport | Gibraltar | Use of private vehicles discouraged | Car park and park and ride bus shuttle service constructed; increase in public transport times/routes; more free public transport. |
| | | Business | Montserrat | New port development at Carr's Bay | Development of new town at Little Bay creates potential for incorporation of passive design principles; GoM Infrastructure Plan includes suite of potential low cost measures: energy efficient fans, water pumps, cooking appliances and behavioural change. |
| | | Land Use, Land Use Change and Forestry | Montserrat | 2008 Montserrat Sustainable Development Plan; New National Physical Development Plan for North Montserrat | National Physical Development Plan for North Montserrat 2012-2022 |
| 5 | Mitigation: Effectiveness Focus | Business | BVI | National Tourism Policy & Development Master Plan; strengthening Building Regulations; Climate Change risk management protocols, Disaster Relief Fund, micro insurance schemes and mutual/cooperative insurance schemes, financing options for renewable energy installations. | Climate Change Trust Fund - funds would meet costs associated with diversifying tourism product; sub-regional/domestic emissions trading scheme that will ensure benefits are flowing from the UK and European carbon trading scheme; Carbon Levy on guests of hotels and charter yachts; Climate Change Financial Risk Management Levy on foreign registered companies and ships |
| | | Residential | BVI | A National Physical Development Plan, Local Area Plans | Medium/long term implementation A National Physical Development Plan, Local Area Plans |
| | | Waste Management | BVI | Energy & water conservation/efficiency standards; | n/a |
| | | Land Use, Land Use Change and Forestry | BVI | National Tourism Policy & Development Master Plan; expanded protected areas; building & disaster management criteria; National Physical Development Plan; Local Area Plans | Medium/long term implementation A National Physical Development Plan, Local Area Plans |

| | | | | | |
|---|---------------------------|-------------------------------|---------------------|---|---|
| 6 | Standardised Policy Focus | Relevant to all sectors | Relevant to all OTs | Possibilities are: FCO sponsored pilot on environmental mainstreaming; Scaling up of FCO approach to | Mainstream climate change into existing policies and plans |
| 7 | Capacity Building Focus | Relevant to all sectors | Relevant to all OTs | Possibilities are: BAT: provision fo staff education under the Carbon Reduction Strategy. DFID support via | Prioritise interventions in the draft climate change policy and develop programme of capacity support to take forward |
| 8 | Next Step Approach | Relevant to all sectors | Relevant to all OTs | Possibilities are: Falklands: scale up wind farm technologies; Gibraltar: renewable energy legislation.DFID support via the ECACC programme and | Prioritise interventions in the draft climate change policy and develop programme of capacity support to take forward |
| 9 | UK Exposure Approach | Biodiversity and Ecosystems | Anguilla | Designation of one nationally protected (wetland) area and allocation of 7.5acre demonstration area for Department of Environment; draft climate change policy drafted and to be adopted in 2012; | Conserve existing wetland (saltpond) ecosystems and encourage wetland migration strategies; approve and implement a National Wetlands Policy; continuous monitoring and development of comprehensive bio-diversity baseline; development of an integrated coastal zone management plan which includes understanding the risk of flooding due to sea level rise and improvements to the national coastal monitoring system and system of beach profile data collection ; implement schemes for re-vegetation and re-nourishing beaches |
| | | | BAT | 26 Specially Protected Areas and Marine Protected Area designated; Penguin distribution study; Wildlife awareness manual; Toolkit for the management of Protected Areas; Identification of important bird areas; Polar Science for Planet Earth project | Proactive management of key Protected Areas; Continuation of the penguin distribution study |
| | | | Falklands | Bio-diversity strategy in place. FIG sponsored environmental research, awareness raising, conservation and management activities. OTEP projects to conserve or collect species or restore plant habitats. | Species monitoring and species action plans in place. |
| | | | Montserrat | Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention); Vienna Convention for the Protection of the Ozone Layer; | protected areas/zoning; in situ conservation of endemic species and control of invasive species; revise port legislation re discharge; ensure protection of ghauts and vegetative strips and enforce all aspects of land use planning |
| | | | Gibraltar | Management and Action Plan for the conservation of Sites of Community Importance enforced; Marine Special Area of Conservation designated; Catalogue of living resources; Habitat and Species Action Plans. | Dolphin study; climate change studies |
| | | | SBAs | Special protection Areas designated; Turtle projects; Acacia Control Project | Designation of Special Areas of Conservation; MoU for Conservation of Migratory Birds of Prey in Africa and Eurasia |
| | | Hydrology and Water Resources | Anguilla | New desalination water plant | Water harvesting, increased water storage and more effective maintenance of distribution network to reduce leaks; promote the use of water savings devices (low flush toilets etc); develop and implement national outreach and educational programmes; bring efficiencies to water desalination as technology improves and bring renewable energy sources on stream (wind and solar). |
| | | | BAT | Introduction of more efficient reverse osmosis plants; Introduction of water saving flow reduction valves | Implementation of a programme of water efficiency technology changes |
| | | | Falklands | n/a | Climate change modelling based on collected data. |
| | | | Gibraltar | Modernisation of fresh water distribution (saving of energy during desalination; seawater used for conveyance of sewage and other non-domestic purposes; Replacement of sea defences | Flood defences; Improvement of drainage infrastructure. |
| | | | Montserrat | Some adhoc water harvesting, (minidams, roof rainwater harvesting). Many assets not maintained and now in disrepair. | Protect groundwater sources from pollution; develop better water resource management and allocation systems; Opportunity for all new build at Little Bay and Carr's Bay. |
| | | | SBAs | n/a | Adoption of Concentrating Solar Power technologies for water desalination |

| | | | | | |
|----|---------------------|-----------------------|------------|--|--|
| | | Tourism | BAT | n/a | Enhancement of UK expertise on tourism management |
| | | | Montserrat | Potential investments in the new town at Little Bay and the construction of a new port, if affected, would not reflect well in the international press. | Fiscal incentives to encourage sustainable tourism; integrate mainstream CC issues (impact, responses, opportunities) into tourism development strategy; recommended design speeds increased for new tourism-related structures; enhanced reef monitoring systems to provide early warning alerts of bleaching events, and; artificial reefs or fish-aggregating devices |
| | | | Gibraltar | n/a | n/a |
| | | Transportation | SBA | n/a | n/a |
| | | | Montserrat | Potential investments in the new town at Little Bay and the construction of a new port, if affected, would not reflect well in the international press. | Integrate CC issues into current port design and the master plan development at Little Bay and other infrastructural development projects. |
| | | | Gibraltar | New bus transport system introduced; free to children. | Car park and park and ride bus shuttle service construction planned; Increase in public transport times/routes; More free public transport. |
| | | Energy Supply and Use | Anguilla | n/a | Enhance efficiency of diesel power generation. Link into regional sources of energy arising from potential geothermal networks on Nevis and Montserrat. Customer educational policies to encourage energy efficiency; promote energy efficient technologies such as energy efficient light fittings and solar hot water heaters. |
| | | | BAT | Solar heating systems installed at 2 stations; Introduction of sub-metering more effective monitoring of energy consumption; Introduction of LCD screens | Adoption of renewable energy sources: wind turbine and solar photovoltaic systems; Energy efficient retrofits for research ships; use of unmanned aerial vehicles |
| | | | Montserrat | 2008 Montserrat Sustainable Development Plan; shortly be upgrading its diesel based power station to more reliable 1.5 MW source. | Exploitation of geothermal energy is a stated aim of the National Energy Policy; test drilling 2012; Geothermal energy is proved to be feasible, there is potential to generate up to 50MW of energy, with export of around 40MW to a neighbouring island; potential wind turbine sites at locations within the Blakes Estate although the new National Physical Development Plan for North Montserrat 2012-2022 zones this land for residential and recreational tourism. |
| | | | Gibraltar | Replacement of power plants with a power station powered by diesel engines. | The use of biofuels to be encouraged by selling at lower price in petrol stations; adopt biofuels for Govt fleet; Adoption of renewable energy resources: wind, energy from waste and tidal current all considered technically viable. |
| | | Industry and Commerce | BAT | All infrastructures constructed with best practices in low energy design. | n/a |
| | | | Montserrat | Potential investments in the new town at Little Bay and the construction of a new port, if affected, would not reflect well in the international press. | n/a |
| | | | Gibraltar | n/a | Incentives for import and use of highly efficient equipment. |
| | | Livelihoods/Poverty | Anguilla | n/a | n/a |
| | | | Montserrat | Invested heavily in irrigation infrastructure, training of farmers, livestock production units and a farmer's resource centre. | Government is investing in improved fisheries infrastructure and training to improve the quantity, quality and presentation of produce. |
| | | | Falklands | n/a | n/a |
| | | | Gibraltar | n/a | n/a |
| | | Human Health | Anguilla | n/a | n/a |
| | | | Montserrat | n/a | Public education and outreach; forecasting systems for Dengue Fever and other vector-borne diseases. |
| | | | Falklands | n/a | n/a |
| | | | Gibraltar | n/a | n/a |
| 10 | Do Nothing Approach | n/a | n/a | n/a | n/a |