Directorate General of Climate Affairs المديرية العامة للشؤون المناخية

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في دراسة تقييم التأثيرات البيئـــية للمشاريع

Guidelines for the Preparation of Climate Affairs Chapter in the Environmental Impact Assessment (EIA) Study for the projects

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Prepared by :

Directorate General of Climate Affairs
Ministry of Environment and Climate Affairs
Sultanate of Oman

1.0 Introduction

The Directorate General of Climate Affairs, Ministry of Environment & Climate Affairs (MECA) has commenced a chapter on Climate Affairs to address the Climate Change and protection of Ozone Layer issues in the Environmental Impact Assessment (EIA) Studies for industries and infrastructure projects since year 2008. Further, Ministry has developed present guidelines to be used as guidance for the major developmental projects in the Sultanate of Oman. The projects owners shall integrate the climate affairs issues according to the requirements in the guideline.

The chapter on climate affairs shall be provided as Part B of an EIA report divided into the five (5) section as below. The detailed description of each section has been illustrated in the subsequent section of the guidelines. The project owners are advised to study this guideline carefully to address the climate affairs issues to EIA studies.

Section 1-Climate Change Issues
Section 2- Climate Change Baseline Data Set-up
Section 3- Climate Change Risk & Impact Assessment
Section 4- Identifying Alternatives and Mitigation Measures
Section 5- Climate Affairs Risk Reduction Plan (CARRP)

2.0 Integration of Climate Affairs Issues to the EIA

The climate change is being changed with inevitable impacts to both human and natural systems; unless greenhouse gas emissions are significantly reduced.. The consequences of climate change have the potential to significantly affect all the other environmental topics set out in the EIA report – e.g. Population, Fauna, Soil, etc.

Many ozone depleting substances are banned or are being phased out. International agreement to limit the production and consumption of ozone depleting substances was reached in 1987 through the Montreal Protocol on Substances that Deplete the Ozone Layer, which aims to reduce and eventually eliminate emissions of man-made ozone depleting substances. The protocol has been revised and amended over the years, and now contains new controls on methyl bromide, with a phase out from 1 January 2005, and a blanket exemption for quarantine and pre-shipment uses, and provision for critical uses after the phase out by 2015. The controls on HCFCs were strengthened in Montreal Protocol by introducing 10%, 35%, 67.5% and 100% of reduction by the by year 2015, 2020, 2025 and 2030 respectively with an allowance of 2.5% for maintenance & service sector till the year 2040.

A project requiring EIA is vulnerable to a changing climate, as are the communities and environment it poses a risk to; EIA should therefore consider the potential resilience, both to the

anticipated negative impacts and positive opportunities of climate change.

The EIA guidelines requires that EIA shall identify, describe and assess the direct and indirect effects of a project on the interaction between: human beings, fauna and flora, soil, water, air, climate, the landscape, material assets and cultural heritage. Conversely, assessing the resilience of a proposed development to the impact of climate change is not clearly required.

There is however a clear driver to see such resilience assessment built into future EIA practice, as evidenced within the First National Communication of the Sultanate of Oman. Further support for such an expansion of EIA can be found in the following Government Orders:

1. Montreal Protocol in the year 1987 and its amendments and National Regulations for the Control and Management of the Ozone Depleting Substances;
2. Royal Decree No. (119/1994) regarding the Approval of the Accession of the Sultanate of Oman to some International Conventions;
3. Royal Decree No. (73/1998) regarding the Ratification of the Vienna Convention on protection of Ozone Layer and Montreal Protocol on substances that deplete the ozone layer and its amendments in London and Copenhagen

4. Royal Decree No. (114/2001) issuing the Law of Conservation of the Environment and Prevention of Pollution;
5. Royal Decree No. (106/2004) regarding the Ratification of the Montreal Protocol amendments in Montreal and Beijing.
6. Royal Decree No. (107/2004) regarding the Ratification of the Kyoto Protocol under the United Nations Framework Convention on Climate Change (UNFCCC);
7. Royal Decree No. (18/2008) Specifying the Responsibilities of the Ministry of Environment and Climate Affairs and Approving its Organizational Structure;
8. Regulations for Obtaining Approvals of Clean Development Mechanism (CDM) Projects under the Kyoto Protocol issued under Ministerial Decision No. (30/2010) and amended by Ministerial Decision 53/2013;
9. Issuing Regulations for the Climate Affairs Management under Ministerial Decision No. (18 / 2012) ;
10. Regulations for the protection of the ozone layer

The current guidelines provide direction on integrating climate change and Ozone Layer Protection issues throughout the EIA process. It focuses on the EIA areas where climate affairs issues has the maximum impact.

2.1 Identifying Climate Affairs Issues in the Environmental Impact Assessment (EIA) Study

The project owners shall integrate climate affairs issues in the screening and scoping stages of EIA. Following three key issues shall be identified.

- Determining whether the project may significantly change GHG emissions and defining the scope of any necessary GHG assessments (climate mitigation concerns);
- Being clear about climate change scenarios used in the EIA and identifying the key climate change adaptation concerns and how they interact with the other issues to be assessed in EIA;
- The project owners shall be required to ensure during an EIA study that the existing restrictions on ODS are properly implemented for the project, ODS are replaced with climate-friendly alternatives, recovering ODS from existing equipment and buildings, and reducing use of ODS in applications that are not considered as consumption under the Montreal Protocol.

Further, the project owners shall identify the risk and vulnerabilities due to the project and report in the EIA report.

The main climate change concerns are listed in Table 2.1, below. They can help project owners to define a set of questions on climate change mitigation and adaptation. These could then be asked in the screening and/or scoping stages of EIA.

lower-GWP refrigerant systems would need to be widely used and/or refrigerant containment and service practices would need to be improved to reduce emissions in these systems, and the energy efficiency of the systems would need to be maintained or improved. The alternatives shall be used to replace HCFC-22 are with lower GWPs.

3.0 Climate Affairs Baseline Data Set-up

The trends/climate affairs baseline set-up in climate affairs key indicators over time shall be investigated, for example GHG emissions, indices of vulnerability, frequency of extreme events, climate affairs disaster risk. The project owner shall find out whether these trends continuing, changing, or leveling out. Further, an evaluation shall be required on environmental and climate affairs outlooks or available scenario studies already made for the region in which project falls. The baseline on GHG emissions should be developed according to the **Appendix-1**[1] of this document. Necessary data groups shall be acquired during EIA will include, but is not limited to :

1. GIS base maps for project area (topographical);
2. Exposure data (details of population, assets, land use);
3. Climate change risk data (past records, of floods, cyclones, temperature, Sea Level rise etc); and

[1] The Project Owners shall also submit the GHG calculations under the appendix 1 in soft copy

Table 2.1: Examples of the Main Climate Affairs Issues to be considered as part of the EIA

Potential areas for Mitigation by the Project
❖ Direct GHG emissions caused by the construction, operation, and possible decommissioning of the proposed project.
❖ Indirect GHG emissions due to increased demand for energy; indirect GHG emissions caused by any supporting activities or infrastructure which is directly linked to the implementation of the proposed project (e.g. transport, waste management).
❖ Specify the types and quantities of ODS to be used in all stages of the project.
❖ Specify the numbers and kinds of equipments that contain ODS to be used in all stages of the project
❖ Identify any alternatives for ODS to be used in all stages of the project.
❖ Specify the project plan for the usage of ODS alternatives and the avoidance of any ODS release to the atmosphere
Climate Change Risk & Vulnerabilities by the Project
❖ Temperature increase
❖ Extreme rainfall, wadi flooding and flash floods;
❖ Storms and high winds (including damage to infrastructure, buildings, and agriculture);
❖ Landslides;
❖ Rising sea levels, storm surges, coastal erosion and saline intrusion;

The project owners shall phase-out of HCFCs and increase the use of ODS alternatives as substitutes. In order for an acceleration of an HCFC phase-out to increase climate protection,

4. Vulnerability data (people, construction types, wealth indicators) Available greenhouse gas emissions data from various sectors and examples of mitigation response options in developing countries .

4.0 Climate Change Risk & Impact Assessment

Using the GIS climate change database the project owner should assess key historical and projected future climate change related risks, exposures and vulnerability data for the particular project. Using available data, the project owner will determine projected future climate change related risks & vulnerabilities to understand project's climate change risk exposure and vulnerability, by risk type and sector below. This process should use existing empirical and qualitative data (from observational records) in addition to published literature as necessary. A combination of maps and time series could be presented. There are five main steps involved in this climate change risk & vulnerability assessment process:

- Assess historical and current climate change-related trends and risks & vulnerabilities: The project owner will analyze and summarize historical time series climate change data for not less than past 25 years and current data on project area and the nature of change over time. This is important for identifying the historical occurrence of climate change risks such as floods, Sea level rise,(for coastal projects) tropical cyclones and

temperature change all of which are expected to change in frequency and severity with future climate change. The historical and current risk & vulnerability assessment will include a spatial assessment of the natural and built landscape in the project area, identifying where hotspots of risk occur. Where available, information on historic socio-economic impacts of past risks will be captured.

- Assess future projected climate change impacts: The majority of data relating to projected future climate change impacts will come from existing global and regional climate models, using downscaled data and scientific reports where available. An analysis of model uncertainty (i.e. the difference between models) will be presented in addition to uncertainty arising from the choice of future scenarios e.g. A2 and B1 (using standard IPCC scenarios, as per international best practice). The application of such scenarios shall be used mainly for the major developmental projects. Guidance on how to interpret the data (and uncertainty) shall be presented in the report.

- Assess and prioritize key future climate change risks & vulnerabilities: Informed by all the steps above, future climate change impacts and vulnerabilities will be determined for the project site, presenting the results as spatial maps and priority sector statistics for each climate change risk type (e.g. I flooding including sea level rise, inland flooding, temperature change

and windstorm). Key sectors where risk is highest will be identified.

- A climate change risk and vulnerability matrix will be developed for the project area for major projects. A high level overview of each of the key risks facing project through each thematic risk area will be identified here and presented alongside an associated risk score/rating. The specimen guidelines to develop this matrix is provided in **Appendix-2**.

Many assessment approaches used in the EIA process have the capacity to address climate change. There are three fundamental issues that project owners shall consider when addressing climate change :

1) the long-term and cumulative nature of effects ,

2) complexity of the issues and

3) cause-effect relationships and uncertainty of projections.

The impacts on the projects finally shall be summarized as below in the Table No 4.1.

Table No 4.1: Climate Change Risks Matrix on the Project

Type of Risks	Frequency /degree of Vulnerability[2]	Climate Impacts due to identified Vulnerability[3]	Risk Magnitude[4]	Remarks, if any
Natural Disasters such as cyclone, earthquake, high waves, landslides and dust storms				
Sea Level Rise				
Temperature Increase				
Heavy Rains				
Flash Flooding				

5.0 Identifying Alternatives and Climate Affairs Mitigation Measures for the Projects

In the early stages of the process, alternatives are essentially different ways in which the project owners can feasibly meet the project's objectives, for example by carrying out a different type of action adopting a different technology or design for the project.. At

[2] Please assign 1, 2 and 3 for low, medium and high frequencies of vulnerability
[3] Please assign 1, 2 and 3 for low, medium and high impacts due to identified vulnerabilities
[4] Risk magnitude should be calculated multiplying frequency of vulnerability and climate impacts

the more detailed level of the process, alternatives may also merge into mitigating measures, where specific changes are made to the project design or to methods of construction or operation to 'prevent, reduce and where possible offset any significant GHG emissions and ODS reduction.

For climate affairs mitigation, it is important to investigate and use options to reduce GHG emissions and ODS consumption as a precautionary approach in the first place, rather than having to deal with mitigating their effects after they have been released. Mitigation measures identified and introduced as a result of an EIA, e.g. construction and operational activities that use energy and resources more efficiently, may contribute to climate change mitigation as well.

The project owners (as a part of the proposed project for which EIA is being prepared) shall explore the potential of Clean Development Mechanism (CDM) projects under the Kyoto Protocol. The details of such feasibility should be presented in the EIA report.

Bear in mind that some of the climate affairs mitigation measures addressed in the EIA can themselves reduce GHG emissions e.g. using applications of renewable energy, energy efficiency or tree planting as illustrated in the Table No 5.1 and 5.2.

Table 5.1: Examples of Climate Affairs Mitigation Measures

Main issues	Examples of Climate Affairs Mitigation Measures
Direct GHG emissions	❖ Consider different technologies, materials, supply modes, etc. to avoid or reduce emissions; ❖ Protect natural carbon sinks that could be endangered by the project, such as peat soils, and wetlands; ❖ Plan possible carbon off-set measures, available through existing off-set schemes or incorporated into the project (e.g. planting trees).
GHG emissions related to Energy	❖ Use recycled/reclaimed and low-carbon construction materials; ❖ Build energy efficiency into the design of a project); ❖ Use energy-efficient machinery; ❖ Make use of applications of renewable energy sources such as solar panel, Photovoltaic cells, and use of CFL for lightening and green building.
Alternatives to reduce ODS	To review of the substitutes for the agriculture & fisheries, commercial, tourism, industrial and infrastructure sectors etc.

Table No 5.2 : Percentage of the (GHG) sinks (green cover)1.0 above[5]

Total Area of the project(m2)	Proposed area for green cover/Plantation (m2)	Percentage of green cover to total area of industry	Expected GHG reduction

6.0 Climate Affairs Risk Reduction Plan (CARRP) for the Project

In terms of climate affairs risk reduction, different types of EIA alternatives and mitigation measures (table 6.1)) are available to be used in planning of the CARRP of the projects.

The frequency and intensity of climate change events, such as floods, temperature increase, cyclones, landslides, storm & winds and Sea level rise will be significant. Whether an climate change event turns into a disaster is dependent on the level of

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1. The landscaping of the plantation area shall be submitted along with the type of species
2. The project owner shall preferably use the local species for the plantation
3. The project preferably shall use the treated waste water For the irrigation purpose

preparedness of project owners and national institutions, as well as on the capacity of communities and individuals to manage the risk.

The development and implementation of CARRP at projects and community levels, can facilitate a coordinated approach to preparing for and responding to risks. Monitoring threats and disseminating information on climate change risks are significant.

Table 6.1: Examples of Climate Affairs Risk Reduction and Mitigation Measures

Main Issues	Examples of adaptation measures
Protection of the Ozone Layer	❖ Use of ODS in compliance with the Montreal Protocol and national legislations requirements.
Temperature change	❖ Use of efficient technology & design for the project particularly for the cooling system; ❖ Reduce thermal storage in a proposed project (e.g. by using different materials and coloring).
Rainfall, wadi flooding , flash floods and Sea Level rise	❖ Consider change in the project design to protect the project components from the floods and water level rise; ❖ Improve the project's drainage system.
Storms and winds	❖ Ensure a design that can withstand increased high winds and storms
Landslides	❖ Project designs that control

Main Issues	Examples of adaptation measures
	erosion, : e.g. by quickly establishing vegetation — hydro. seeding, turfing, trees appropriate drainage channels and culverts
Mitigation Measures	❖ Refer table No. 5.1 and 5.2

A general framework of the CARRP shall include the following main themes:

a) **Description of the roles and responsibilities** of different officials for the CARRP implementation for the project

b) **Key strategies to build project's Risk Reduction Plan** which shall include the procedures and plans for the managing risks to project assets and services; building disaster and integrated emergency management;

c) **Managing climate risks** Action on managing critical risks on project in case of temperature increase, Cyclone & Tsunami, Floods and storms, Sea level rise and coastal inundation & erosion

d) **Building climate risk reduction plan in key sectors** Project/industry action on managing risks in key sectors such as Project infrastructure and built environment , Project's/industry economy, Natural environment, Staff, residential colony and the nearby community.

e) **Key Mitigation Measures for the project**: The description of climate affairs mitigation measures provided in the project design, technology modification and application of renewable energy sources

f) **Monitoring Plan for the Key climate affairs variables**: The Project owner shall provide the key climate affairs baseline and variables to be monitored during the construction & operation period of the project. The project owner shall provide the institutional set-up to establish this programme.

Appendix-1: Climate Affairs Baseline Study

Ozone Depleting Substances (ODS)

1. Specify the types and quantities of ODS to be used in all stages of the project.
2. Specify the numbers and kinds of equipments that contain ODS to be used in all stages of the project .
3. Identify any alternatives for ODS to be used in all stages of the project.
4. Specify the project plan for the usage of ODS alternatives and the avoidance of any ODS release to the atmosphere.
5. Describe the procedure to adhere to the requirements of the Regulations for the Control and Management of the Ozone Depleting Substances.

Greenhouse Gas (GHG) Emissions[4]

Please provide the GHG emissions from various activities required for the establishment of proposed industry during construction & operation phase of the project. The inventory should be provided annually for the entire project life. The quantification methodologies including use of emission factors etc should be provided in detail. Please provide GHG estimation as per following:

[4] The initial year should be considered as current year in progress e.g. 2014 and GHG inventory is asked for next 25 years. Project owners can modify it according to their convenience. However they should report it for entire period of the project life.

1.1 GHG Emissions from the Energy Sources – Combustion of Fuel from the Proposed Project

1. Stationary Combustion Processes

Year	CO_2	CH_4	N_2O
Year currently in progress			
From year currently in progress to next 25 years			
Total			

2. Mobile Combustion

Year	CO_2	CH_4	N_2O
Year currently in progress			
From year currently in progress to next 25 years (e.g. 2014-2039)			
Total			

3. Fugitive Emissions from Oil & Natural Gas System

Year	CO_2	CH_4	N_2O
Year currently in progress			
From year currently in progress to next 25 years			
Total			

4. Land use and Land Use Change etc- include other table as others

Year	CO_2	CH_4	N_2O
Year currently in progress			
From year currently in progress to next 25 years			
Total			

5. Details of GHG Emission Calculation[7]

Type of activity	Methodology	Emission Factor	Type of fuel	Qty of fuel	Total Emissions
Stationary Combustion processes					
Mobile Combustion					
Fugitive emissions from Oil & Natural Gas system					
Others					

[7] Please provide information in detail and add seperate sheets for additional information

1.2 GHG Emissions from Industrial Processes of the Proposed Plant / Industry

Year	CO_2	CH_4	N_2O	SF_6	HFC	PFC
Year currently in progress						
From year currently in progress to next 25 years						
Total						

Details of GHG Emission Calculation[4]

Type of activity	Methodology according to IPCC	Emission Factor	Total Production	Total Emissions

1.3 GHG Emissions from Solvent Use in the Proposed Plant / Industry

Year	CO_2	CH_4	N_2O	SF_6	HFC	PFC
Year currently in progress						
From year currently in progress to next 25 years						
Total						

[4] Please provide information in detail and add separate sheets for additional information

Details of GHG Emission Calculation[9]

Type of activity	Methodology according to IPCC	Emission Factor	Quantity of Solvents	Total Emissions

1.4 GHG Emissions from Solid Waste generating from Plant/Industry Premises

Year	CH_4	N_2O
Year currently in progress		
From year currently in progress to next 25 years		
Total		

Details GHG Emission Calculation[10]

Type of activity	Methodology according to IPCC	Emission Factor	Total waste quality	Total Emissions

1.5 GHG Emissions from Waste Water Treatment in the Plant/Industry Premises

Year	CH_4	N_2O
Year currently in progress		
From year currently in progress to next 25 years		
Total		

[9] Please provide information in detail and add separate sheets for additional information
[10] Please provide information in detail and add separate sheets for additional information

Details of GHG Emission Calculation[11]

Type of activity	Methodology according to IPCC	Emission Factor	Total quantity of waste water	Total Emissions

1.6 Reporting of the total amount of GHG Emissions

Year	CO_2	CH_4	N_2O	SF_6	HFC	PFC
Year currently in progress						
From year currently in progress to next 25 years						
Total						

[11] Please provide information in detail and add separate sheets for additional information

Appendix 2 : The Climate Risk Management (CRM)

The CRM for project will be an updateable directory of the climate risks that are faced by the Project . A score (from 1-5) shall be then assigned to each risk for both likelihood and severity for next 50 years. The risk score is then a factor of likelihood and severity. Risks shall be identified across 5 sectors identified by the project as representing the activities across the region;

1. Infrastructure
2. Business and industry
3. Agriculture and fisheries
4. Biodiversity
5. Socio-economic

In addition, these primary sectors shall be sub-divided into sub-sectors. This allows risks to be rapidly identified or defined that are relevant to individual users (see table 1). New sectors and sub-sectors can be added if needed.

Step 1: The Sectors

Risks shall be identified across 5 sectors as representing the activities across the project region;

1. Infrastructure
2. Business and industry
3. Agriculture and fisheries
4. Biodiversity
5. Socio-economic

Step 2: The risks

Within each sector , the risks shall be identified as below.

- Sector: The sector to which the risk applies.
- Sub-sector: Each sector shall be broken down into sub-sectors (see table 1)
- Climate driver: responsible for the risk
- Risk Process: the impact that the climate driver might have
- Potential Consequence: This shows the potential repercussions of that impact for project
- Likelihood: The likelihood that the risk will occur
- Consequence: The sericusness of the consequence should that risk occur
- Risk: The risk rating (Risk = Likelihood x Consequence)
- Associated Development Objective: development driver that could be affected by the climate risk.

Table- 1: Subsectors identified in the top risks, alongside their associated primary sectors:

Sector	Sub-sector
Infrastructure	Built environment
	Energy
	Water resources
	ICT
	Transport
	Tourist facilities (including beaches)
Biodiversity	Marine ecosystems
	Flora and fauna
	Mangroves
	Corals
Industry and	All business activities

business	
Agriculture and fisheries	Crops and livestock
	Transport, storage and trade
	Crops
	Crops and fisheries
	Fisheries
Socio-economic	Jobs and employment
	Health and wellbeing
	Cultural heritage
	Economic prosperity

Step 3: Searching by Sector , Sub-sector , Climate Driver or Development Objective

Risks that are applicable to each sector can be put as it could be viewed by clicking the relevant sector tab. Risks can also be viewed according to the sub-sector, climate driver, likelihood, consequence, risk rating or development objective to which they relate. To do this click the tab labeled 'all risks' to the right of the sector tabs.

Glossary

1	**Area of work**	A terrestrial, coastal or a float site in ports or in Exclusive Economic Zone of the Sultanate where one or more sources of pollution exist .
2	**Adaptation**	Means initiatives and measures to reduce vulnerability of natural and human systems against climate change impacts.
3	**All stages of the project**	Include preparation, planning, construction, operation, closure and after closure of the project
4	**Adaptation benefits**	The avoided damage costs or the accrued benefits following the adoption and implementation of adaptation measures.
5	**Climate change**	A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere observed over comparable time periods .
6	**Climate system**	The totality of the atmosphere, hydrosphere, biosphere, and geo-sphere and their interactions
7	**Scenario**	A scenario, according to the IPCC is a coherent, internally consistent and plausible description of a possible future state of the world. It is not a forecast; rather, each scenario is one alternative image of how the future

		can unfold. A projection may serve as the raw material for a scenario, but scenarios often require additional information (e.g., about baseline conditions). A set of scenarios is often adopted to reflect, as well as possible, the range of uncertainty in projections. Other terms that have been used as synonyms for scenario are "characterisation", "storyline" and "construction".
8	**Emissions**	The release of greenhouse gases and / or their precursors into the atmosphere over a specific area and period of time
9	**Energy efficiency**	The ratio of useful energy output of a system, conversion process or activity, to its energy input
10	**Greenhouse gases**	Those gaseous constituents of the atmosphere , both natural and anthropogenic ,that absorb and re-emit infrared radiation to the atmosphere . Those gases include Carbon dioxide, Methane, Nitrous oxide, Hydro fluorocarbons, Per fluorocarbons and Sulphur hexafluoride
11	**The Convention**	The United Nations Framework Convention on Climate Change signed in 1992 and ratified by the Sultanate of Oman in accordance with the Royal Decree No. 119/1994.
12	**Mitigation**	The anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases.

13	**The Protocol**	The Kyoto Protocol attached to The United Nations Framework Convention on Climate Change, signed in 1997 and ratified by the Sultanate of Oman in accordance with Royal Decree No. 107/2004
14	**Measures**	Technologies processes and practices that reduce greenhouse gas emissions or their effects below anticipated future levels.
15	**Major Developmental Projects**	Such as regional development projects, major tourism complexes, major ports & harbours and major industries etc.
16	**Montreal Protocol**	Substances that Deplete the Ozone Layer (a protocol to the Vienna Convention for the Protection of the Ozone Layer) is an international treaty designed to protect the ozone layer by phasing out the production of numerous substances believed to be responsible for ozone depletion. The treaty was opened for signature on 16 September 1987, and entered into force on 1 January 1989.
17	**Ozone Layer**	The ozone layer is a layer in Earth's atmosphere which absorbs most of the Sun's UV radiation. It contains relatively high concentrations of ozone (O_3), although it is still very small with regard to ordinary oxygen, and is less than ten parts per million, the average ozone concentration in Earth's atmosphere being only about 0.6 parts

		per million. The ozone layer is mainly found in the lower portion of the stratosphere from approximately 20 to 30 kilometres (12 to 19 mi) above Earth, though the thickness varies seasonally and geographically.
18	**Ozone Depleting Substances**	Substances having the characteristic of chemical stability in the lower atmosphere, comprising one or more chlorine or bromine atoms or both and beginning a series of reactions in the stratospheric ozone layer causing depletion of the ozone
19	**Renewable energy**	The continuing or repetitive currents of energy occurring in the natural environment, and includes solar energy, hydropower, wind, tide and waves, geothermal heat and biomass energy.
20	**Source**	Any process, activity which release a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere
21	**Sink**	Any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere
22	**Sea Level Rise**	Rise in the sea level due to global warming resulted from increase in the total mass of water due to the melting of snow and ice , and changes in water density due to an increase in ocean water temperature and salinity change.

23	**The owner**	Any natural or juristic person owning or leasing a source or an area of work or being responsible for operation or management of the same
24	**Vulnerability of Climate Change**	Vulnerability is 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