

**TRANSFER OF TECHNOLOGY CONSULTATIVE PROCESS  
(DECISION 4/CP.4)**

**LATIN AMERICA AND CARIBBEAN REGIONAL WORKSHOP**

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**COUNTRY PAPER - GUYANA**

**PREPARED BY - SHEIK M. KHAN  
PROGRAMME COORDINATOR  
NATIONAL OZONE ACTION UNIT  
HYDROMETEOROLOGICAL SERVICE**

**NOTE: The National Ozone Action Unit is coordinating the Enabling Activity Project to prepare Guyana's Initial National Communication to the UNFCCC.**

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**INTRODUCTION:**

Guyana signed the United Nations Framework Convention on Climate Change (UNFCCC) at the UNCED which was held in Rio de Janeiro in June 1992. The Convention entered into force worldwide on 21<sup>st</sup> March, 1994 and was ratified by Guyana on 29<sup>th</sup> August, 1994, entering into force on 17<sup>th</sup> November, 1994.

Guyana is a developing country, which relies primarily on fossil fuel imports for its energy needs. The Guyana Electricity Corporation has recently been privatized and is now known as the Guyana Power and Light Corporation. The economy is heavily dependent on sugar and rice production which together cater for the livelihood of over sixty percent of the population of 750,000. Gold and bauxite production also contribute to the economy. Over seventy percent of the country's 216,000 km<sup>2</sup> is covered by forests much of which are in pristine state.

Over ninety percent of the population resides in a coastal strip, some 400 km long, which faces the Atlantic ocean. Rice and sugar cultivation occurs in this coasted strip and fishing activities also occur here.

The Institute of Applied Science and Technology (IAST) is the main institution in Guyana to direct the introduction of technological changes in the country. It is the institution which will be involved in evaluating technologies and demonstrating the applicability, suitability, economics and sustainability of technologies. It will work closely with other governmental and private sector agencies to promote environmentally sound technologies and know-how to industry. The IAST will be directing actions, at the national level, to implement Article 4.5 (see appendix I) of the Convention.

**NATIONAL COMMUNICATION TO THE UNFCCC**

Guyana received funding from the Global Environment Facility to assist in its preparation of the Initial Communication to the UNFCCC in 1998. Guyana's communication is due in May, 2001. The communication will have the following components:

- National Circumstance
- Greenhouse Gas Inventory for 1994
- Vulnerability and Adaptation Assessment
- Mitigation Analysis
- Plan of Action

It is expected that the Communication will be completed in year 2000 and will address technology and technology transfer assessments as a separate chapter.

## **TECHNOLOGY NEEDS AND TECHNOLOGY NEEDS ASSESSMENTS:**

Decision 4/CP.4 - Development and Transfer of Technologies - identifies several areas and sectors in which actions can be taken to implement Article 4.5 of the Convention. These shall be highlighted here because they are identified as actions which will be necessary to enable Guyana to comply with its commitments under the Convention.

- Strengthening the capacities and capabilities of government and private sector agencies so that Guyana can contribute to the ultimate objective of the Convention and achieve sustainable development.
- Providing, to Guyana, financial resources to meet its agreed incremental costs, including development and transfer of technologies, enhancement of the endogenous capacity, implementation of such measures as improving energy efficiency, exploiting renewable energies, enhancing sinks and preparing for adaptation to adverse effects of climate change.
- Accessing financing and other facilities to promote the transfer of environmentally sound technologies and know-how to Guyana.
- Accessing support for capacity building and the strengthening of appropriate institutions in Guyana to enable the transfer of environmentally sound technologies and know-how.
- Providing assistance to Guyana in its efforts to build capacity and institutional frameworks to improve energy efficiency and utilization of renewable energies through multilateral and bilateral cooperative efforts.
- Providing assistance to Guyana to build capacity for sustainable management and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases not controlled by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems.

- Providing assistance to Guyana to build capacity to adapt to the adverse effects of climate change.
- Providing assistance to Guyana to strengthen its endogenous capacities and capabilities in the areas of technological and socio-economic research and systematic observation relevant to climate change and its associated adverse effects.
- Cooperating in and promoting capacity building of Guyana at the international, regional, sub-regional and national levels through cooperation programmes supported by the United Nations and other multilateral agencies, as well as bilateral agencies.

#### *SECTORAL CONSIDERATIONS:*

##### ***RESIDENTIAL, COMMERCIAL AND INSTITUTIONAL BUILDING SECTOR***

Energy is used in this sector to cool buildings, provide lighting and services such as cooking, computers, refrigerators, etc. Energy use efficiency and conservation in addition to the application of efficient technologies can be important. There is the need for assistance to Government to improve its capacity and strengthen its institutional capability to develop environmental standards for new buildings and equipment, information, education and labelling programmes and research, development and demonstration programmes. There is also the need to assist government and the private sector to work towards creating a market environment for the private sector to lead in the transfer of technology by decision-making on a wide range of financial and economic incentives, policies and regulations. A study on how to encourage and develop community programmes by identifying needs at the level of the community and by taking into consideration the initiatives of the community.

##### ***TRANSPORT:***

Energy use in this sector is almost entirely dependent on fossil fuels. The cost of technical and non-technical options are affected by availability of resource, technical know-how, institutional capacity and local markets. There is the need for assistance in preparing a comprehensive study into actions which the Government of Guyana can take to address the mitigation issue in this sector. The study must include consideration of improving the quality of imported fuels, alternative fuels (including methanol and ethanol) and energy use in the airline industry.

The public transport system needs to be studied with a view towards addressing energy savings; changing the transport infrastructure and systems to reduce travel trips and increase freight volume per trip; and, to explore ways and means for cooperation with other countries to effect technology transfer.

Above all, there is the urgent need for the development of a policy statement and the building of capacity to receive technology inflows.

#### ***INDUSTRY:***

The use of new process schemes, energy and resource efficiency, materials substitution, changes in design and manufacture of products leading to less use of material and increased recycling are all needed in the industrial sector. There is the need to know what are the technologies which are available for each type of industry and to obtain the investments needed to acquire them. Capacity building of the relevant agencies will be necessary for accessing, assessing and seeking financial assistance.

#### ***ENERGY SUPPLY:***

Economic development and international competitiveness depends on reliable and reasonably - priced energy supply. Guyana depends primarily on fossil fuel imports but the potential for using renewable sources of energy exists. It is clear that, in this sector, significant investments will be required for transfer of technology. Therefore, the role of the Government is important to facilitate technology transfer.

An Energy sector policy has been developed and can be used to encourage and facilitate technology transfer in the fossil fuel sector to foster clean energy technologies, switching to lower carbon fuels and high efficiency power generation.

The greatest potential for Guyana to mitigate greenhouse gas emissions lie in the use of renewable energy sources. However, lack of investments and the high capital costs have been a hindrance to the use of "renewables". The Government has embarked on the development of small-scale hydropower generating stations in the hinterland to cater for local communities. The potential exists for the setting up of wind farms and the use of sugar-cane bagasse and rice biomass cogeneration. Solar power generation is another renewable source especially for small communities.

In order to promote the use of renewable technologies, there will have to be adequate human and institutional capacities, assessment of the potential of the renewables and the investments required to address the acquisition of the technologies.

#### ***AGRICULTURE:***

The major crops are sugar and rice and these are important to the economy of Guyana. Adaptation to climate change will require changes in genetic stocks, improved and efficient irrigation practices, improved nutrient use efficiency and skillful risk management and production management practices. Mitigation measures can include carbon sequestration in soils, manure conversion to methane fuel, increased feed efficiency and reducing methane emissions from rice paddies. The mitigation measures should form part of a policy document on addressing emissions of greenhouse gases in

the sector. The policy can then be implemented by way of incentives, regulations and facilitation of technology transfer. There is the need to examine the impact of climate change on the sugar and rice industries.

***FORESTRY:***

Guyana's forest resource is already being sustainably used. However, there are actions which can be taken to mitigate climate change and to adapt to the impacts of climate change. There is the need to examine the best means to promote climate mitigation technologies and to determine, by way of collaboration with regional and international institutions, how to access, assess and obtain financial assistance for transfer of technologies.

***COASTAL ADAPTATION TECHNOLOGIES:***

Guyana's coast is low-lying and ninety percent of the population resides in the coast. The major agricultural crops are grown here and the commercial and industrial sectors are mostly located in the coastal belt. There is the need to access coastal adaptation technologies which are in use or have been demonstrated, to identify adaptation technology needs, examine how these technologies are developed and transferred and to seek funding for the transfer of these technologies.

***CAPACITY BUILDING NEEDS:***

Capacity Building is required at all stages in the process of technology transfer. The Government of Guyana is committed to ensure that programmes are fully supported by the governmental agencies. However, the capacity in terms of human, organizational and information assessment is weak. While it is recognized that effective technology transfer requires efficient networking, the weak capacity prevents an advance towards effective communication and understanding. It is therefore, critical to address the building of capacity in the governmental and private sector institutions while at the same time improving the networking of these institutions.

***HUMAN CAPACITY:***

The technical, business and regulatory skills are very limited. Capacity is required to assess, select, import, develop and adapt appropriate technologies. This can be tackled by formal training of local personnel; formation of links with other enterprises, trade, research and professional organizations; and through operational experiences with other firms.

***ORGANISATIONAL CAPACITY:***

The government, the private sector and the community institutions must together be involved in development and technology transfer. The need exists for strengthening the capacity of the various agencies as well as to improve the networks in which the several agencies can contribute to the transfer of technology. The needs include physical and

communications infrastructure; opportunities to develop firms for management consulting, energy service, investment and product rating and law; encouraging cooperative engagement of all sectors and agencies in environmental policy- making and project formulation and the involvement of communities in decision- making where their needs are concerned.

#### ***INFORMATION ASSESSMENT AND MONITORING CAPACITY:***

There is the need to ensure that information is available and can be competently assessed to take into consideration the strength/weakness of the underlying economics, adequacy of financial services and adaptation to local conditions. There is also the need to encourage groups of companies to build technology networks.

Government needs to establish a system of improved indicators and data collection on flows of environmentally sound technologies in addition to technology performance benchmarks compilation to indicate the potential for technological improvements. Establishing linkages to international and regional networks (inclusive of private sector networks) can be done by the setting up of a technology information centre with network links to NGOs, private sector, consumer associations, professional and scientific associations and consulting firms.

#### **BARRIERS TO TECHNOLOGY TRANSFER:**

The Government of Guyana has been addressing the matter of eliminating the barriers to trade and investment. The economy is generally a market- oriented one and there exists an open and transparent banking and trading system. Institutional corruption is also being address with a policy of “zero tolerance” to exposed corrupt public servants.

However, in Guyana, the most pressing obstacles are insufficient human and institutional capabilities; inadequate understanding of local needs, demands and potential for technological transfer; and the inability to access, assess, select, import, develop and adapt appropriate technologies.

The government sees the private sector as the engine for economic growth. However, the need exists for smaller firms to be able to access capital at concessionary lending rates and for the legal institutions to be supported to develop codes and standards for the evaluation of environmentally sound technologies.

There are several areas in which deficiencies can be barriers to technology transfer. Inadequate capacity to collect data, information and knowledge, especially on “emerging” technologies; no confidence in unproven technologies; aversion to taking risks; inadequate science, engineering and technical knowledge available to the private sector; and insufficient research and development are some of the areas of concern.

## **CONCLUSIONS:**

Guyana requires substantial assistance in order to fully implement the Convention. The assistance ranges from capacity building and institutional strengthening to investment projects in the various sectors. Capacity building needs to be addressed at all levels of the socio-economic infrastructure : government (national and local) , NGOs , private sector and community. Training will be necessary since the human resource base is very limited. Capacity building should also address the networking of the groups and linkages with regional and international scientific, professional and private enterprise groups in order to foster access to and assessment of information related to technology transfer.

Investment projects are needed in all the sectors which have been identified in this document. Feasibility studies and project finance sourcing (by developed Country Partners) will be prerequisites for attracting international assistance for these projects. The government is prepared to take actions to remove local barriers to investment in climate - friendly technologies and will facilitate private sector and investors meetings and other actions in order to promote direct involvement of the private sector in transfer of technology projects.

It is the view that an initial technology needs assessment is required to be done. This assessment should examine the current capacities of institutions, private sector, professional and scientific organizations and local communities to deal with the issues and identify what needs are required to improve the situation. The assessment should also examine the current technologies in use in Guyana in the various sectors with a view towards assessing the efficiency of the technology, the emissions associated with the technology and identify technologies which can prove to be more climate - friendly. It will be necessary for the assessment to include possible sources of financing or investment and make recommendations on the most effective measures to be taken to address Guyana's mitigation programmes.

Since the major part of Guyana's emissions of greenhouse gases come from the energy sector (see appendix 2) special attention will be placed on improving the efficiency of current power generation and utilisation, conservation practices and on use of fuel-efficient vehicles, equipment, etc. and on energy utilisation in buildings. Agriculture and forestry are also sectors which can be involved not only in reducing emissions but also in enhancing sink mechanisms. Waste Management and Human Health, though not mentioned in this document, will also have to be considered since improved technologies in these sectors will enhance Guyana's mitigation process as well as improve its health system.



## **APPENDIX I**

### ***UNFCCC ARTICLE 4.5***

The developed country parties and other developed parties included in Annex II shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention. In this process, the developed country Parties shall support the development and enhancement of endogenous capacities and technologies of developing Country Parties. Other parties and organizations in a position to do so may also assist in facilitating the transfer of such technologies.

## APPENDIX 2

**TABLE 22: SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES,  
YEAR 1994.**

SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (Gg)						
GREENHOUSE GAS SOURCE AND SINK CATEGORIES						
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO	NMVOC
<b>Total National Emissions</b>	<b>1446</b>	<b>51</b>	<b>1</b>	<b>17</b>	<b>208</b>	<b>23</b>
<b>1 All Energy</b>	<b>1446</b>	<b>1</b>		<b>11</b>	<b>45</b>	<b>6</b>
<b>A Fuel Combustion</b>	1446	1		11	45	6
1 Energy Industry	602			3	9	
2 Industry(Manufacturing)	191			1	3	
3 Transport	203			2	22	4
4 Other Sectors (Comm./Resid.;Agri./ect.	450			6	10	1
B Fugitive Emissions	Nil	Nil	Nil	Nil	Nil	
<b>2 Industrial Processes</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>NO</b>	<b>16</b>
A Mineral Products (asphalt use on road)	NO	NO	NO	NO	NO	10
B Chemical Industry	NO	NO	NO	NO	NO	
C Metal Production	NO	NO	NO	NO	NO	
D Beverages and food production						6
<b>3 Solvent and Other Product Use</b>	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.
<b>4 Agriculture</b>		<b>41</b>	<b>1</b>	<b>4</b>	<b>95</b>	
A Enteric Fermentation		14				
B Manure Management		1				
C Rice Cultivation		22				
D Agricultural soils			1			
E Prescribed Burning of Savannah		1			28	
F Field Burning of Agri. Residues		3		4	67	
<b>5 Land-Use Change and Forestry (a)</b>	<b>-26664</b>	<b>8</b>		<b>2</b>	<b>68</b>	
A Changes in Forest & Woody Biomass	-29195					
B Forest and Grassland Conversion	2531	8		2	68	
<b>6 Waste</b>		<b>1</b>				
A Landfill		1				
<b>Memo Items (b)</b>						
(i) International Bunkers, total	<b>28</b>					
- Aviation	24					
- Marine	4					
(ii) Biomass Emissions	<b>1200</b>					

**Note:** (a) - Emissions value indicated is the net of emissions and removals.

(b) - Not included in national emissions and removals.

**Key: 1.** (NO) - not occurring

2. (NE) - Not estimated

