

**NATIONAL DEVELOPMENT STRATEGY
(2001-2010)**

A POLICY FRAMEWORK

ERADICATING POVERTY AND UNIFYING GUYANA

A CIVIL SOCIETY DOCUMENT

ANNEX 7

ENERGY

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The Annexes to the National Development Strategy: An Explanatory Note

In June 2000, the National Development Strategy (NDS) of Guyana was formally presented to the President of Guyana and the Leader of the Opposition in the form of a core document, a 348 page distillation of the main elements of the analysis of the Guyana situation and the resulting strategy for action drawn from material prepared by 24 sectoral committees of the National Development Strategy Committee (NDSC). While Chapter 1 of the core document provides an outline of the origins of the NDS and the methodology of its preparation, the purpose of the present note is to explain the Annexes to the core document.

The Annexes are edited versions of the original drafts that the sectoral committees prepared, using a format that facilitated systematic thinking, though at the cost of some repetition. They are therefore longer than the corresponding Chapters of the core document, and also differ from them in other ways:

1. While the Annexes were individually edited in terms of their content, in the core document, disagreements or dissonances between Chapters were removed; for example, if the Chapter on the Private Sector proposed a strategy for Education that was in contradiction with a strategy proposed in the Chapter on Education, the two were rationalised.
2. While the core document was updated with the most recent data where possible, the Annexes generally retain their original data; for recent economic and social statistics, the attention of readers is particularly drawn to the recently completed *1999 Guyana Survey of Living Conditions*. In addition, again because of differences in when they were prepared, what was a Bill at the time of the original draft may have become an Act by the time the core document was being edited. This type of difference may be footnoted in the Annexes.
3. The treatment of the Annexes as historical documents occasionally produced another kind of difference, the main example of which is the Annex on Energy which was written before the privatisation of the Guyana Electricity Corporation, and whose strategy was largely preempted by that privatisation; while the edited Annex deliberately relied on the original material, new material was developed for the core document. These differences may also be footnoted.

It is worth noting that the updates found in the core document usually demonstrate the soundness and continued applicability of assessments made on the basis of earlier data or other information.

There are fewer Annexes than there are Chapters in the core document. For various reasons, some sectoral committee drafts were finalised in the same format as the Chapters of the core document, and there would therefore be little difference between the Chapter and the corresponding Annex. (Examples of this are the Macro-Economic Strategies and the Management of the economy; Sugar; Urban Development; Land; Housing; and The Family). The core document also includes Chapters for which there were no corresponding sectoral committee drafts; the first three Chapters of the core document (Origins and Methodology, National Objectives and Governance) are examples.

For those sectors where there are both separate Annexes and core document Chapters, the titles and numbering of the two correspond except in two cases: one, the corresponding Annex for the Chapter on Manufacturing is titled Manufacturing and Technology and includes material on Science and Technology that the core document had placed elsewhere; and two, the corresponding Annex for Chapter 4, Macro-Economic Policy, is Annex 4, Financial Sector Policy, because the material prepared for the Financial Sector Policy Annex was incorporated into the Chapter on Macro-Economic Policy.

The National Development Strategy was published in summarised form (the core document) for the practical reason that few people would have the time to read the over 700 pages represented by the Annexes. Yet the Annexes have a clear value. They include background information and assessments that were too detailed for inclusion in the core document, but which trace the process that shaped the strategy. Above all, they preserve for us and for posterity the earlier thinking, and the full range of thinking, of the women and men whose work provided the foundation of the NDS. In doing so, they honour the labour which the sectoral committees put into distilling their own work and life experience and the views of the public they consulted in the process. It is this foundational material that is now being published, making the National Development Strategy of Guyana available in both summary and extended forms.

TABLE OF CONTENTS

	Page
ACRONYMS.....	7-ii
LIST OF TABLES	7-iii
LIST OF FIGURES	7-iii
I. Basic Features of the Section.....	7-1
A.Introduction.....	7-1
B. Current Situation	7-1
C.Domestic Energy Resources.....	7-3
1. Petroleum	7-3
2. Hydropower	7-4
3. Bagasse	7-5
4. Fuelwood.....	7-6
5. Other Sources.....	7-6
II. Policies Of The Sector.....	7-6
A. Past Evolution of Policies	7-6
B. Description of Recent Policies.....	7-7
III. Issues And Constraints.....	7-8
A. Issues.....	7-8
B. Constraints.....	7-9
1. Financial.....	7-9
2. Technological.....	7-10
3. Institutional	7-10
4. Environmental.....	7-11
IV. Sectoral Objectives	7-11
A.Broad Objective	7-11
B.Specific Objectives.....	7-12
C.Supporting Objectives	7-12
1. Financial Policies.....	7-12
2. Institutional Policies.....	7-13
3. Technological Policies.....	7-13

V.The Strategy	7-14
A. Economic and Financial Policies	7-14
B. Institutional Policies	7-14
C. Other Policies	7-14

ACRONYMS

CHEQ	Canadian Conglomerate Corporation Hydro Energy-Que
GDP	Gross Domestic Product
GEA	Guyana Energy Agency
GEC	Guyana Electricity Corporation
GGMC	Guyana Geology and Mines Commission
GNEA	Guyana National Energy Authority
GNRA	Guyana Natural Resources Agency
GUYSUCO	Guyana Sugar Corporation
IPP	Independent Power Producer
KW	Kilowatts
KWH	Kilowatts per hour
MW	Megawatts
THI	Tumatumari Hydro Incorporation
T&T	Trinidad & Tobago

LIST OF TABLES

	Page
Table 7-1	Energy Supply and Sectoral Use, 1997.....7-2
Table 7-2	Value of Petroleum & Lubricant Imports (1990-1997).....7-2
Table 7-3	Petroleum Prospecting Activity in Guyana.....7-4
Table 7-4	Development Status of Three Active Hydro Power Projects.....7-5
Table 7-5	Capacity of the GEC as of March 18, 1999.....7-8

LIST OF FIGURES

	Page
Figure 7-1	Map of Guyana Showing Potential Petroleum-bearing Areas Onshore and Offshore.....7-3

ANNEX 7

ENERGY

I. Basic Features of the Section

A. Introduction

Energy is extremely vital to the production process and its use straddles all economic and social sectors. The dramatic increases in the price of oil in the 1970s catapulted energy to the centre of worldwide attention. Petroleum, by that time, had replaced coal as the major source of energy fueling western economic growth, and this sudden and large increase in cost had profound effects for oil-importing and oil-exporting countries alike. The steep rise in energy costs increased its importance as a factor in production functions, and it often assumed the status of a major variable. This forced most governments to accord energy a central place in policy formulation.

Energy planning and policy formulation must take into consideration projected rates of growth and levels of activity of the various economic sectors. It is critical, therefore, that those responsible for national energy management be provided with information on likely energy demands, so that supplies can satisfy future requirements. However, even more than making projections, it is vital that appropriate policies and institutional structures be put in place to assure an adequate and reliable supply. In this respect, our electricity sector has been deficient for many years, and this National Development Strategy contains new policy orientations designed to correct that deficiency.

B. Current Situation

The principal primary sources of energy in Guyana are petroleum products, (which are all imported), bagasse and fuelwood. In 1999 they accounted for 67 percent, 26 percent and 7 percent respectively, of the energy produced. Portions of all are transformed to electricity for use in all sectors. In 1999, electricity generation, industry, and mining accounted for 90 percent of the utilisation of the primary energy supplied.

Table 7-1 below shows total energy supply and sectoral use in 1997. These figures show that in that year, electricity generation, industry and mining and the residential sector account for 85 percent of the utilisation of the primary energy supplied, compared to 90 percent in 1999.

Table 7-1
Energy Supply and Sectoral Use, 1997

Unit = 10³ BOE

Sector	Bagasse *	Fuelwood	Petroleum Products	Total	% of total supply
Electricity generation	1,492.8	U.A.	701.4	2,194.2	38.2
Charcoal production	N.A.	2.9	N.A.	2.9	0.05
Transportation	N.A.	N.A.	549.2	549.2	9.6
Industry	U.A.	17.4	527.3	544.7	9.5
Residential	N.A.	388.6	187.3	575.9	10.0
Commercial and public	N.A.	N.A.	9.5	9.5	0.2
Agriculture/Mining	N.A.	N.A.	1650.7	1,650.7	28.7
Fishing/Other	N.A.	N.A.	220.8	220.8	3.8
Total	1,492.8	408.9	3,846.2	5,747.9	100.0

Source: GNEA records. BOE is Barrel of Oil Equivalent

Bagasse figure is in total – part is utilised for electrical energy production and part for mechanical power production.

The figures in Table 7-2 below show the value of petroleum and lubricant imports for the years 1990 to 1997 in thousands of U.S. dollars and as a percentage of domestic exports. These figures reveal a decreasing trend, indicative of an improvement in export performance. Nevertheless, petroleum imports still take up significant amounts of foreign currency resources.

Table 7-2

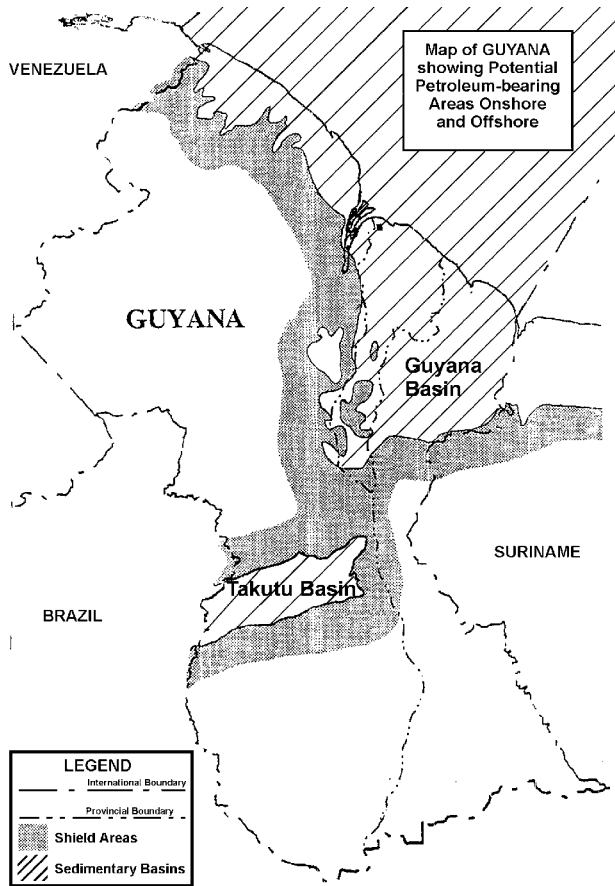
Year	Fuels & Lubricants Imports (million US\$)	As % of Domestic Exports
1990	70.5	28.19%
1991	67.1	26.38%
1992	78.9	21.71%
1993	80.7	19.98%
1994	82.3	18.40%
1995	87.6	18.29%
1996	89.9	16.28%
1997	95.9	16.72%

Source: Bureau of Statistics and Customs & Excise Department

C. Domestic Energy Resources

1. Petroleum

Figure 7-1



The only fossil fuel occurring in Guyana is petroleum. Petroleum exploration took place intensively between the late 1950s and the mid-1970s, and some additional exploration was carried out in the early 1990s. However, petroleum was brought to the surface only in the Takutu Basin, and there is no commercial exploitation at this time.

Petroleum exploration is being promoted in three areas of Guyana: the offshore Guyana Basin, the onshore coastal section of the Guyana Basin, and the Takutu Basin, which is inland in the Rupununi District. Seismic coverage on all the areas has improved significantly since 1985, and the Government is prepared to offer attractive production-sharing agreements to investors for fields with upside potential.

Source: GGMC

The following table details current activity in Guyana:

Table 7-3

YEAR	November 1997	November 1997	June 1998
	Century Guyana Ltd.	Maxus Guyana Ltd.	CGX Resources Ltd.
BLOCK	Guyana Basin Offshore & Onshore segments Pomeroon Block (23,000km ²)	Guyana Basin Offshore Georgetown Block (13,400km ²)	Guyana Basin Offshore & Onshore segments Corentyne Block (18,200km ²)
LENGTH OF EXPLORATION LICENCE	Petroleum Prospecting Licence 4 Years	Petroleum Prospecting Licence 4 Years	Petroleum Prospecting Licence 4 Years
CURRENT STATUS	Licence in Force	Licence in Force	Licence in Force
REMARKS	Century Guyana Ltd has the option of renewing this licence for two Renewal Periods each of three years duration.	Maxus Guyana Ltd. has the option of renewing this licence for two Renewal Periods each of three years duration.	CGX Resources Ltd. has the option of renewing this licence for two Renewal Periods each of three years duration.

Source: Petroleum Unit of the Guyana Geology and Mines Commission (GGMC)

2. Hydropower

The economic potential of hydropower is estimated to be in the region of 7000 MW. This resource is not being exploited currently but clearly, a large part of the solution to the country's long-term power needs lies in hydro-energy.

The Guyana Natural Resources Agency (GNRA) has prepared a position paper on the development of medium/large scale hydroelectric facilities in Guyana. Based on existing data and previous studies, six sites have been identified with the purpose of selecting one for development in the first instance. These sites are:

- Tiboku Mazaruni Potaro River Basin
- Amaila Potaro River Basin
- Tumatumari Potaro River Basin
- Kamaria Cuyuni River Basin
- Tiger Hill Demerara River Basin
- Arisaru Essequibo River Basin

All the sites have been studied up to at least the pre-feasibility level, but environmental impact assessments remain to be done.

The current status of development of three active hydro-power projects is outlined below:

Table 7-4

<p>Moco-Moco – Region 9 Construction of the Moco-Moco hydro-power station is complete and the installed capacity is 500kw (2 x 250kw), the annual energy will be 3×10^6 kwh. The power will be transmitted from Moco-Moco via a 13.8kv transmission line (under construction) to Lethem and the surrounding communities.</p> <p>Tumatumari – Region 9 A letter of intent was signed for the Tumatumari Hydro Power project on March 5th 1998. The agreement was signed by Canadian Conglomerate Corporation Hydro Energy-Que (CHEQ) along with Tumatumari Hydro Incorporation (THI) along with the Government of Guyana. The installed capacity will be 45Mw. The power will be transmitted to the load centre at Omai Gold Mines Ltd.</p> <p>Amaila – Region 8 A memorandum of understanding for a feasibility study of the Amaila Hydro Power project was signed on April 24th 1998, by Synergy Holdings Incorporation of the USA and the Government of Guyana. This project, if implemented, will produce approximately 106Mw in the first phase.</p>

Sources: GEA Energy Supply & Resources Update, September 1998, GEA July 1999

It is clear that hydropower represents a major economic endowment and opportunity for Guyana, both as a primary source of power for domestic consumption and as a linch-pin for major development of the country's economic potential.

From available data it would seem that priority ought to be given to the development of the Amaila project. It is obvious that development of hydropower below this scale may not be economic. Nevertheless, a project of this size would enable the development of major industry such as the smelting of aluminum, with sufficient power in reserve to serve the remainder of Guyana's domestic and industrial needs for some time to come.

It would also seem that hydropower cannot be developed first, or in isolation. For this reason, urgent attention should be given to promotion of investment in mining and other energy-intensive areas of Guyana's economy which could bring with them the necessary development of our hydropower resources.

3. Bagasse

Bagasse is currently used for the co-generation of steam and electricity in the sugar industry. An analysis of the potential of this energy source reveals that more electricity could be generated than is currently done using bagasse as a fuel. However, potential barriers to expanding the supply of electricity based on bagasse include lack of year-round cane supplies, and the cost of converting installed machinery in existing sugar mills. A proposal has been made to establish a modern sugar mill designed to permit the co-generation of bagasse and other types of fuel.

4. Fuelwood

Forests cover approximately 75 percent or 16 million hectares of the country's land area. However, active encouragement of increased fuelwood consumption would have to be tempered by environmental concerns. *In situ* woodwaste from the timber industry remains a viable potential source of energy. At the current time, two lumber enterprises generate a total of 3 MW of power from woodwaste for their industrial uses. To better tap the fuelwood potential over the longer run, it is important to begin reforestation efforts promptly in the deforested zones adjacent to coastal areas.

5. Other Sources

Rice husk is also a potential source of energy and is currently used by two rice millers for steam and electricity generation (approximately 1 MW). Currently, solar and wind energy play a very small role in Guyana's energy spectrum, but their potential contribution cannot be disregarded in the long-term.

Biogas digesters provide methane gas for cooking and refrigeration. In the residential sector, the impact is more social and environmental than economic. The cost of construction of these digesters must be reduced considerably if they are to have a major economic impact in the residential sector. For large commercial and agricultural enterprises, this technology can be cost-effective.

II. Policies Of The Sector

A. Past Evolution of Policies

As mentioned before, with the steep increase in the price of oil in the 1970s, most governments felt it necessary to accord energy a central place in policy formulation. Guyana was no exception, and by 1981, the Government had set up the Guyana National Energy Authority (GNEA), established by Act No. 2 of 1981 (known as the Energy Act).

Among the functions of the Authority was to "study and keep under review matters relating to the exploration for, production, recovery, processing, transmission, transportation, distribution, sale, purchase, exchange, and disposal of energy and sources of energy, within and outside of Guyana, report thereon to the Minister and recommend to the Minister such measures as it considers necessary or in the public interest for the control, supervision, use, marketing, and development of energy and sources of energy."

With the 1980s being a decade when the economy of Guyana faced severe financial constraints, petroleum products took up an increasing proportion of foreign currency earnings, and along with debt servicing, it used up virtually all of this resource. New private investment of any significant scale was not forthcoming. Since Government, was strapped for funds, even if it adopted a policy to increase reliance on indigenous sources of energy, it was circumscribed by its

inability to attract the required capital investment. It therefore found itself reaching special agreements to maintain and ensure petroleum supplies, first with Trinidad and Tobago via that country's T&T Oil Facility, and then with Venezuela in the form of a San José-type agreement. Another consequence of the Government's financial straits was that GEC's maintenance requirements were not met, a situation exacerbated by management deficiencies; the result is that its present equipment is badly deteriorated.

Nevertheless, during this period, the Government undertook and encouraged some initiatives regarding small-scale alternative energy applications and energy conservation. For example, with the assistance of the Chinese and the United Nations University, a successful biogas project was implemented. Some enterprises in the timber and rice industries began to utilise their *in situ* waste to generate electricity and process steam. Demonstration projects using solar technology were undertaken. Energy audits were conducted at some major consuming entities, both public and private. By public exhortation and rationing programmes, such as restricting the sale of gasoline on weekends, the Government attempted to build up an ethos of conservation.

The period of the early 1990s has seen significant changes in the economic health of the country, characterised by new policy orientations, output growth and increased financial reserves. In this new situation, exploitation of our natural resource endowment for satisfying our energy needs is now being reexamined, and the institutional character of the electricity sector is being redefined.

B. Description of Recent Policies

To date, the sector's policies have been those incorporated in the "Energy Policy of Guyana," completed in July 1994 and ratified by the Cabinet. The core idea in this document is the replacement of imported petroleum, as far as possible, by indigenous renewable sources of energy. In fact, with the assumptions made at that time, based on available information, it was projected that by the year 2004, Guyana could see a reduction in consumption of petroleum products in the order of two percent as compared with 1992. It was envisaged that increased and more efficient utilisation of domestic energy resources, primarily hydro-energy and bagasse for electricity generation, would make the largest contribution in this regard.

The other significant element of policy in the 1990s has been the encouragement of private sector participation. President Cheddi Jagan stated in an address to the nation in December 1993: "The Government is set on a course to build a healthy market-oriented economy, with the private sector playing a vital role." The policy envisaged that Independent Power Producers (IPPs), which are investor-owned enterprises involved in power generation, would be encouraged.

These policies are still valid and are incorporated into the present Strategy. However, as stated in section IV of this Annex, additional policies are needed to revitalise the electricity sector.

III. Issues And Constraints

A. Issues

The purpose of energy policy and planning is to stimulate economic development by securing reliable sources of energy as economically as possible. Since energy is an input into other activities, its demand is a derived demand. Consequently, “the desirable level of energy production and supply cannot be specified independently of expected levels of activity in other areas of the economy.”¹ Energy must be supplied not only in the requisite volumes, but with reliability. The latter implies a steady supply, 24 hours a day and 365 days per year, and in the case of electricity, a supply that is not plagued by voltage fluctuations. The basic concerns, therefore, become the following: given the desired levels of activity, how best can the energy required be provided, how can its cost be kept within reasonable bounds, and how will this cost be financed?²

The following table describes the capacity of the GEC as of March 18, 1999:

Table 7-5

GUYANA ELECTRICITY CORPORATION – UPDATE ON SYSTEM DATA				
Total GEC Installed Capacity				128 MW
Circuit Miles of 69kV Transmission Line				147 mi
Circuit Miles of High Voltage Distribution Lines				235 mi
Circuit Miles of Low Voltage Distribution Lines				705 mi
Installed Capacity of the Interconnected System (DBIS)				122 MW
Generating or Available Capacity in the DBIS				106 MW
Present Peak Demand in the DBIS				71 MW
Present Minimum or Base Load in the DBIS				44 MW
Present Retirement Schedule	1998	0.5 MW	Diesel	
	1999	8.9 MW	Steam & Diesel	
	2000	8.9 MW	Steam & Diesel	
	2001	8.9 MW	Steam & Diesel	
	2002	7.2 MW	Diesel	
	2004	5.0 MW	Diesel	

Source: Office of the General Manager, GEC, March 1999

Petroleum products, which account for almost 50 percent of energy supply, are all imported, requiring a plentiful supply of foreign exchange to satisfy this need. It is therefore logical to seek to reduce this dependence, primarily by energy conservation and increased exploitation and utilisation of indigenous energy resources. However, considerations of cost-effectiveness must clearly be kept at the forefront of planning for the use of each potential source of energy.

Overall, energy demand can be expected to grow considerably more rapidly than real GDP, in part because manufacturing and private services will expand faster than GDP, and in

¹Trevor M. A. Farrell, *Planning for the Energy Sector*.

²The Guyana Electricity Corporation was privatised after the Sectoral Committee completed its work.

part because some major new industries are especially intensive in the use of electricity. Accordingly, the estimates made in 1994³ have been revised upward, and total effective demand for electricity is expected to grow by 8 percent per year from 1996 through 2000, and by 7 percent per year from 2001 to 2005.* This projection indicates that generating capacity in 2000 will have to be 95.5 MW, and installed capacity 137 MW, if the current deficit in supply is to be made up as well and the growth in demand satisfied. This estimate is significantly higher than other estimates used recently and it will require a revision of plans for capacity expansion.⁴

It needs to be stressed that the lack of a reliable supply of electric power has been holding back the development of our economy. Potential investors are discouraged not so much by the unit cost of utility electricity, as by the sheer inconvenience of self-generation and the damage caused by erratic supply. In addition, small enterprises, potentially the most important source of new employment, are discouraged from starting up because of the high cost of generating their own power. Furthermore, the deficiencies in electricity supply have a direct impact on the residential sector. An enduring solution to these problems has an important institutional dimension, as discussed below.

B. Constraints

Four types of constraints have been identified in the energy sector: financial, technological, institutional, and environmental. Each is examined in turn.

1. Financial

Energy supply systems—electricity generation, transmission and distribution, oil and gas wells and pipelines, coal mines, energy forests, petroleum distribution facilities—usually require large capital investments. Governments in countries like Guyana, where foreign exchange and other resources are often limited, face tremendous difficulties with energy development and development in general, and making acceptable arrangements for financing becomes a major economic and political task.

In Guyana, the Government faces an additional financial burden, in that the public power utility has found it difficult, for various reasons, to achieve financial sustainability. Rates have historically been below unit costs of production and huge transfers from Central Government have propped up the organisation. Non-payment for an input as important as fuel, imported under special arrangements with Venezuela, amounts to another subsidy. All this, in turn, inhibits the utility's ability to self-finance the required new investments.

2. Technological

Like many smaller developing countries, Guyana has very little indigenous technological capability in energy supply systems.

³ National Energy Policy Committee, *Energy Policy of Guyana*, Georgetown, July, 1994.

⁴ The core document conservatively estimates a requirement of 90 mw by the year 2005 and 120.2 mw by 2010; it states the demand for electricity in 1999 as 70.0 mw.

Currently, the country remains technologically dependent. Our manufacturing sector has demonstrated some capability in production and development of energy supply equipment. One firm for example, has manufactured a mini-hydropower turbine, while another is producing solar water heaters and programmes to develop and disseminate biogas and solar drying technologies have had some degree of success. However, the country has neither the productive capacity nor the technological know-how to develop equipment required for large-scale energy supply systems.

One additional issue facing the sector, from a technological point of view, is the cost competitiveness of some technologies for using some of our domestic energy resources. Many ideas for utilising renewable energy sources like solar and wind power are appealing, but the costs are high. However, it seems to be the view of many experts that wind energy applications can prove cost-effective, and researchers are confident that in the future the cost of solar power generation could be brought down considerably.

3. Institutional

For national energy planning and management to be done properly and executed effectively, the necessary institutional capability is essential. While this sounds obvious, it is all too often taken for granted, and therefore must be outlined explicitly.

An effective organisational apparatus should be put in place for formulating, executing coordinating, monitoring, and reviewing energy plans, projects, policies, and programmes with respect to energy. There is need to rationalise the institutional structure for energy management, and in recognition of this, there is draft legislation to set up a central energy agency that will focus primarily on energy planning and policy making. The execution of policy and day-to-day operations will remain the responsibility of line agencies like electric utilities or petroleum companies, and in this area also, major improvements are needed. Above all, management responsibility must be placed in the hands of the private sector.

Concomitantly, there is need for a cadre of people with the necessary skills and knowledge to undertake the job at hand. An adequate corps of hydropower engineers, renewable energy experts, energy economists, petroleum engineers, geologists, and so on has to be put together. A programme to provide overseas training in certain specialised areas to a number of people who could then undertake the jobs of energy planning and management may be a sound investment.

4. Environmental

The imperative of avoiding unnecessary environmental degradation in the development process has become a major issue for governments and people worldwide. It is recognised that many of the more developed countries in the world have achieved that status by exploiting resources in a reckless and unsustainable manner, and now great efforts are underway to correct the environmental damage caused by that approach. Current generations have a responsibility to

utilise resources in ways that take into consideration the needs of future generations. It is essential, therefore, to take into account the potential environmental effects of energy projects, and Guyana's Environmental Protection Agency has been established to address these issues.

In addition, multilateral financial institutions now have environmental conditionalities attached to loans, and environmental lobbyist groups have become much more effective in their advocacy.

The energy sector, in particular the use of fossil fuels, has been a major contributor to global environmental problems. In addition, hydropower development could have major localised environmental effects. The environmental imperative, therefore, presents a greater challenge to energy planners than to most other sectors.

IV. Sectoral Objectives

The electricity sector can play a strategic role in the development of the economy. As has been mentioned earlier, if Guyana is to realise its very considerable development potential, a reliable system of electricity generation and transmission is essential. The costs and inconveniences of self-supply of electricity are so high that they are effectively prohibitive for smaller enterprises and, of course, they are out of the question for most householders. In any case, a modern economy cannot be built on the basis of individual electricity generators. A properly functioning system with adequate capacity is needed.

A. Broad Objective

Accordingly, the principal policy objective for the energy sector is to ensure that an adequate and dependable supply of electricity is available for the country's future economic development. This includes improving both the quantity and the quality of the electricity supply. The latter refers to reducing the frequency and magnitude of voltage fluctuations, as well as the frequency of outages. It should be noted that achieving this objective will require substantial capital outlays and also improvements in the management of GEC.

B. Specific Objectives

Specific objectives include reducing dependency on imported petroleum products, where feasible; increasing the use of new and renewable domestic energy resources; ensuring that energy is used in an environmentally sound and sustainable manner and encouraging energy conservation practices through public awareness programmes and incentives.

C. Supporting Objectives

1. Financial Policies

It has already been noted that energy development requires substantial capital investment, and acquiring such financing is a major task. The National Energy Policy suggests several financing options that include short-term and long-term borrowing by the Government, 100 percent direct foreign investment, and joint venture schemes between foreign investors and Guyanese companies.

As countries seek to improve their economic condition, there is great global competition for investment and assistance. With the political changes in Eastern Europe and continuing cutbacks in American assistance, international financing can become more difficult to obtain. Government must put in place appropriate fiscal and monetary incentives to attract investment and to be competitive, while ensuring that the country gets its fair share of benefits to be derived. Meanwhile, it should continue discussions on energy development with multilateral financial agencies as an alternative means of financing.

Discussion of investment must inevitably address the issue of pricing policy. Energy investments tend to have long lead times and lifetimes, and pricing policy must therefore have a long-term horizon.

The following objectives of pricing policy have been identified:

- a. Promoting economically efficient allocation of resources both within the energy sector and between it and the rest of the economy. This implies that the price for the marginal unit of energy used should reflect the incremental resource cost of supply to the national economy, a direct contradiction of the average cost pricing practised by many energy sector operators.
- b. Ensuring that all citizens have available to them an energy supply which is sufficient to meet their essential needs.
- c. Ensuring a fair rate of return on assets, and tariff levels that will permit self-financing of an acceptable portion of the investment required to develop future energy resources.
- d. Promoting energy conservation, which is often a cheaper way to close the gap between energy supply and demand than increasing electricity generating capacity.
- e. Providing rate-setting mechanisms to prevent shocks to consumers from large price fluctuations, and enforcing simplicity in pricing structures to avoid arbitrariness and confusion for the public.

2. Institutional Policies

The need to enhance the institutional capacity for energy planning has already been emphasised. At this time, there still are not enough people in the country with the specialised skills necessary for energy planning. Government must decide whether to embark on a programme to train an adequate complement of technicians, or rely on hired consultants and short-term technical assistance, or put in place private management that will secure the required expertise.

Electric utilities should be regulated by an appropriate commission.

3. Technological Policies

Technological options have been divided into short-term (next two years), medium-term (up to five years), and long-term (five years and beyond). The objective here is to try to identify, on the supply side, the best mix of sources of energy and fuels that are available and cost-effective. On the demand side, it includes introducing more efficient energy conservation devices, such as better stoves for wood fuel, energy-efficient light bulbs, and fuel-efficient vehicles. The principal technological options are outlined below.

a. Intermediate and Short-Term

- Turnkey plant for electricity generation, most likely based on fossil fuels.
- Upgrading of the transmission and distribution system.

b. Medium-Term

- Additional fossil fuel-based generation, possibly complemented by some use of bagasse and wood waste.
- Exploration of the use of mini-hydro, wind systems, and solar applications, in the more remote areas of the country.
- Further upgrading of the transmission and distribution system.

c. Long-Term

- Hydro energy and possibly other renewable sources, depending on their demonstrated cost-competitiveness, e.g., wind, solar.

All these options cannot be evaluated at a single point in time. The cost-competitiveness of different technologies is evolving continuously. The energy authority, working in concert with GEC, GUYSUOCO, and other institutions, will need to undertake new evaluations and project new scenarios at frequent intervals.

V. The Strategy⁵

A. Economic and Financial Policies

1. Private sector participation in the energy sector, in particular in electricity generation based on both imported and indigenous resources and in transmission, will be actively encouraged.

2. An electricity tariff structure that is equivalent to marginal cost pricing will be maintained. At the same time, preferential rates to households that consume less than a specified threshold amount of electricity on a monthly basis will continue to be offered. Movement toward a rate structure that is more consistent with these guidelines was initiated in late 1995 and will be continued.

3. Transfers to GEC from the Central Government will be eliminated.

B. Institutional Policies

1. In light of the sectoral objectives and the history of problems in the electricity sector, one of the key policies in this National Development Strategy is to put GEC on a sounder institutional footing.⁶ This will involve reaching agreement with a strategic investor on a capital investment programme for the sector in exchange for equity participation, and providing the Guyanese public at large with equity in the institution. In this way, the sector's capital needs can be met, the requisite management autonomy can be achieved, and the wider public's interest in the sector can be given concrete embodiment, in line with the theme of a participatory economy that characterises the National Development Strategy.

C. Other Policies

1. Government is acquiring additional electricity generating capacity as an immediate priority. It also will embark, without delay, on improvement of the electricity transmission and distribution system, even prior to the restructuring of GEC.

2. The new Guyana Energy Agency will develop a national energy conservation programme and oversee its implementation.

3. Guyana's energy planners will continuously monitor world developments in respect to alternative energy sources, especially solar power, which has shown unit cost

⁵ Again, it is crucial to bear in mind that preparation of this document pre-dated privatisation of the GEC.

⁶ To put GEC's problems in historical perspective, it should be noted that its electricity generation in 1993 was less than in 1969, in spite of the widespread presence of private generators, indicating substantial pent-up demand for electricity from the system.

reductions of a hundredfold over the past twenty years. Solar power is especially promising as an energy source for widely dispersed communities in the interior.

4. A programme of reforestation of the Sandy Rolling Hills area in fuelwood species will be designed and implemented as a priority measure.