The Trinidad & Tobago - Guyana Connection

Energy, Industry, Food Security, Diversification
Caribbean Economic Integration

A Giga Project comprising several Mega Projects,
connecting Trinidad & Tobago and Guyana and
using Energy Resources of today to create
Energy Security, Food Security, Export led growth and
Economic Independence
for the future.

Trinidad & Tobago - Guyana Power Interconnection
Guyal Aluminium Smelter in Guyana
Deep Water Port in Guyana
Industrial Park in Guyana with downstream in Trinidad
Turtruba Hydroelectric Power Plant in Guyana
Caribbean Institute for Technology & the Environment (CITE)

Designed for Mutually Assured Success

Executive Summary

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GUYANA HYDROPOWER PROJECT

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Introduction

The ENMAN Group of Trinidad & Tobago has designed and developed a synergistic amalgamation of projects, most of which are being or have been contemplated at one time or another. The core projects and their values in US dollars are

Trinidad to Guyana Power Interconnection	$700M
Aluminium Smelter in Guyana	$560M
Deepwater Port in Guyana	$700M
Industrial Park in Guyana	$250M
Hydroelectric Power Plant in Guyana	$2Bn
Training Institute in Guyana	$70M

By bringing the projects together, the developers have ensured that they are all viable. The overall development also addresses several regional challenges such as-

- Need for new, renewable, low cost sources of energy in Caribbean
- Oversupply of power in Trinidad & Tobago, Take or Pay contract
- Regional action on Climate Change and reduction in Carbon Dioxide emissions
- Need for a regional bauxite strategy considering the large reserves in several territories
- Unrecovered investments in aluminium smelting in Trinidad & Tobago
- Need for Deep Water Port in Guyana, and opportunity for increased trade with Brazil
- Undeveloped natural resources in Guyana needing large scale affordable energy
- Liquidity in Trinidad & Tobago banking system, need for diversification of the economy
- Caribbean imperative for Economic Integration, cluster development, and export led growth
- Need for sustainable job creation through sustainable infrastructure development

The development has been described as *The Caribbean's Project* and as a *Giga* project, made up of several *Mega* projects. It has been under development for several years and the developers have conducted critical studies in support of its implementation. The pathway to Financial Close and start of Construction has been mapped and the funding needed has been identified. The developers now seek strategic partners for participation in the various component projects in the areas of technology and equipment supply, financing, construction, and training.

Associated Projects

There are several associated projects which are very significant in their own right. Also, since the overall development is intended to create and facilitate new opportunity for business and economic activity, from the development will flow many more projects and business activities. The core projects, related projects and subsequent phases are summarised in the table below.

Core Projects	Related Projects	Expansion Projects
Trinidad - Guyana Power Interconnection 400MW	Integrated Fibre Optic Cable for telecommunication services	Overland Power Cable Guyana-Northern Brazil
	Overland Power Line in Guyana and Guyana to Brazil	Regional Power Interconnection
Aluminium Smelter in Guyana 120,000 TPY	Downstream Aluminium Manufacturing in Guyana	Alumina Refinery in Guyana
	Downstream Aluminium Manufacturing in T & T	Modular expansion of Smelter in Guyana
	Smelter Anode manufacturing plant Guyana	Caribbean Bauxite/Alumina production for Smelter
Port in Guyana	Road connection Guyana to Northern Brazil	Increased capacity, transshipment capabilities
Industrial Park in Guyana	Glass, Solar PV cells manufacture in Guyana/Trinidad	Oil exploration service facility
	Industrial Park in La Brea, Trinidad & Tobago	Agro processing, Mineral processing, Timber products
Hydroelectric Power Plant in Guyana 800MW	Forestry, Mining at site prior to construction	300MW upstream site
	Fisheries, Eco tourism on lake	2000MW further upstream
Training Institute in Guyana		

Developers

The ENMAN Group is a Trinidad-based grouping of technology-oriented companies operating in the Caribbean. ENMAN's principals include Donald Baldeosingh MSc (Engineering), former Chairman of the Petroleum Company of Trinidad & Tobago Ltd, and Eur Ing Aldwyn Lequay HBM BSc FIET FIMechE FASME, former Deputy Chairman of the Port Authority of Trinidad & Tobago and Trinidad & Tobago Electricity Commission and former Chairman of the National Training Board.

ENMAN partnered with Hardy Stevenson and Associates of Toronto, Canada, consultants in Infrastructure, Energy, Environmental/Social Impact Assessments, and Public Consultation. David Hardy, BA Hon., M.E.S. RPP MCIP, the company's President, has served in senior positions in Ontario Hydro, and as President of the Conservation Council of Ontario. The team also includes Ian London BEng, MBA - Former President, Ontario Hydro International, Director – Ontario Hydro Technologies, Director – Asia Power Group, Vice-Chair & Director – Luz del Sur (Peru) and Yuri Huminilowycz BAA - Former senior executive at Ontario Hydro companies.

Background

ENMAN studied the options for reduced usage of oil and gas for electricity production in the Caribbean, and concluded that the best option for alternative energy supply is **hydroelectric power** from Guyana's vast rivers. Hydroelectric power (or "hydropower") is based on well proven technology and is the world's most prevalent source of renewable power. At the invitation of the then President, ENMAN undertook to review the possibility of establishing a hydropower plant to service and attract new high power consuming industries such as an aluminium smelter within Guyana, as well as exporting energy to markets in the region.

ENMAN entered into an MOU with the Government of Guyana to develop a hydropower plant at the Turtruba Rapids, upstream of Bartica on the Mazaruni River. The company partnered with Hardy Stevenson and Associates and, along with MOBEC Engineering of Montreal, and Mr Samuel Ramsahoye, former Chief Hydrologist in Guyana conducted a Pre Feasibility Study. The study concluded: "Because of the good foundation conditions, large volume of flow, excellent reservoir characteristics, good transportation facilities, and proximity to load centers, the site provides a sound source of power"

The developers took into consideration environmental impacts and the capital costs and concluded that an optimised capacity of 800MW is possible. The resulting power price delivered to the industrial park is targeted at US$0.10 per kWh, the lowest unsubsidised price of power in the region. This is also roughly one third of the cost of power borne by commercial users in Guyana.

The power available far exceeds the current and foreseeable demand in Guyana, hence the opportunity to create new demand through establishment of a **port and industrial park** and as well as to export power to Trinidad & Tobago and to Northern Brazil. The most natural large consumer of energy for Guyana is an **aluminium smelter**. The country is blessed with large reserves of bauxite and has the land space to accommodate the environmental footprint required. Having a smelter and low cost power in Guyana allows the entire region to establish a **Regional Bauxite Strategy**.

Trinidad & Tobago around 500MW of excess power generation capacity and is faced with a **"Take or Pay"** situation. This power can be made available to the new industrial park in Guyana via a submarine power cable at a price of US$0.10 to 0.13, a highly competitive power price. It is envisaged that the availability of low cost power will result in many new industries in Guyana.

The power interconnection will have hydropower from Guyana for base load and gas generated power from Trinidad & Tobago for peak demand. This power will be transmitted to Boa Vista and Manaus in Northern Brazil.

Agreements

ENMAN has had discussions and entered into agreements with several international organisations for various parts of the development:

- MOU with China Machinery Engineering Company for construction of the Smelter
- Letter of Intent from Sinohydro for Financing and Construction of the Hydropower Plant
- MOU with Trinidad & Tobago's National Energy Corporation to support the implementation
- Non Circumvention Agreement with the Trinidad & Tobago Ministry of Energy
- Technical Cooperation Agreement with Manitoba Hydro International
- Offer for financing from an International Sovereign Fund for US $4Bn
- Expression of interest in supporting the financing from the Guyana Americas Merchant Bank
- Offer for design, finance, construction and lease of the power connection from a US company
- Expression of interest in power purchase from Trinidad & Tobago Electricity Commission

plus positive meetings with

- Heads of the IDB, CDB, Republic Bank, India Import Export Bank on financing
- Minister of Energy and Eletrobras in Brazil for supply of power
- Guyana Private Sector Commission and Trinidad & Tobago Chamber of Industry & Commerce

Timeline Summary

Start of construction is targeted in a matter of months for some parts of the development. Benefits by way of capital flows, training, employment and economic activity will begin then. The first operational portions i.e. the power cable, smelter and industrial park will then be in place in three years time, and the entire development can be completed within a six year time frame as summarised in the chart below.

Timeline - Years from today

Financing

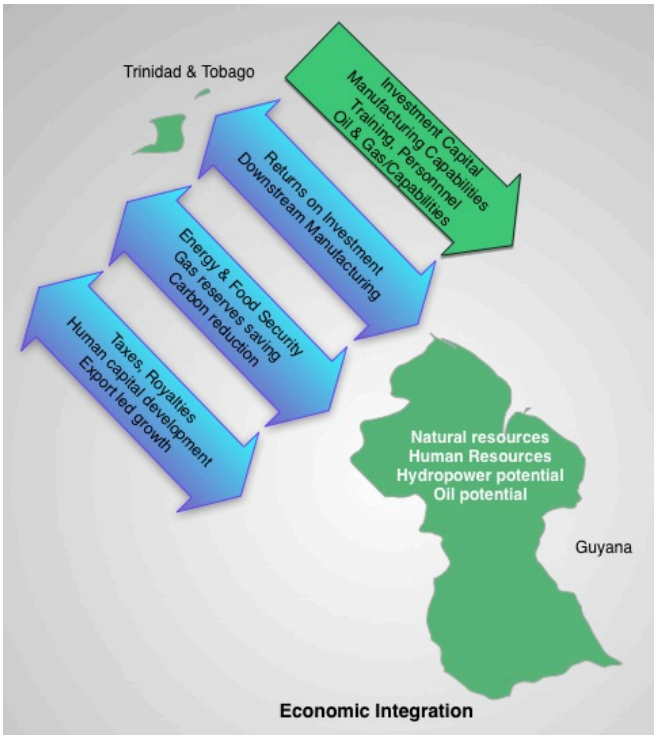
The construction cost of each project is shown below. Included is the estimated cost of the remaining work programme to bring each project to Financial Close and start of Construction. Each project will be financed separately, and the models may be different in each case e.g. Debt/ Equity financing, Public Private Partnership, Supplier financing or some suitable combination. The development funding needed prior to construction will cover remaining Environmental/Social Impact Assessments, acquisition of licences, site surveys, drafting of agreements and design work.

Component	CAPEX	Funding to Financial Close
Trinidad - Guyana Power Cable	$700M	$250k
Aluminium Smelter in Guyana	$560M	$2M
Port in Guyana	$500M	$2M
Industrial Park in Guyana	$250M	$300k
Hydroelectric Power in Guyana	$2bn	$20M
Training Institute in Guyana	$70M	$1M
Totals	**US$4Bn**	**US$26M**

Benefits

The projects will generate benefits in many areas, some of which are highlighted in the following:

- Several thousand new jobs with many more in support and spin off activities
- Royalties and taxes for Governments
- Hydropower is clean, renewable, lowest price, independent of world oil/gas prices
- Reduction of Carbon footprints through regional action on Climate Change
- Utilisation of TT surplus power capacity and contracted gas - cost of US$130M annually
- Saving of up to 3.0 Trillion Cubic Feet of Natural Gas from TT power generation
- Rapid development of Guyana's immense natural resources
- New economic space for regional entrepreneurs, Economic Diversification
- Capacity development and Job creation - skills, training institutes, financial, legal, contracting
- Hydropower plants have a life of 50+ years with a flat power price
- Access to Carbon Credits
- Shared capacity, System stability and Reliability - hydropower plant far from hurricane zones
- Sustainable infrastructure development
- Promotion of Energy Integration as a vital part of Economic Integration
- Access to large Brazilian market



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