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Opportunities for India-Guyana Cooperation in Energy and Infrastructure Sectors

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Disclaimer

This report has been prepared by faculty members of the School of Business, UPES, as part of a consultancy project. The opinions and conclusions presented herein are solely those of the authors and do not reflect the official views of UPES, its Board of Governors, the governments of India or Guyana, or any other organization mentioned in the report. Furthermore, the content—including any data or maps—does not imply any position regarding the legal status or sovereignty of any territory, the delimitation of international boundaries, or the naming of any region, city, or area.

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Acronyms used in the Report

ADB - Asian Development Bank

ADR - Alternative Dispute Resolution

ADIA - Abu Dhabi Investment Authority

BITs - Bilateral Investment Treaties

BOG - Bank of Guyana

BOT - Build-Operate-Transfer

CARICOM - Caribbean Community

CMCF - Caribbean Multilateral Clearing Facility

CORSIA - Carbon Offsetting and Reduction Scheme for International Aviation

EPC - Engineering, Procurement, and Construction

ESG - Environmental and Social Governance

EXIM Bank - Export-Import Bank of India

FDI - Foreign Direct Investment

FISIM - Financial Intermediation Services Indirectly Measured

GoG - Government of Guyana

GOINVEST - Guyana Office for Investment

GRA - Guyana Revenue Authority

GRIF - Guyana REDD+ Investment Fund

HAM - Hybrid Annuity Model

HIPC - Heavily Indebted Poor Countries

ICT - Information and Communication Technology

IDB - Inter-American Development Bank

IEA - International Energy Agency

IFRS - International Financial Reporting Standards

IMF - International Monetary Fund

IOCL - Indian Oil Corporation Limited

IP - Intellectual Property

IRFC - Indian Railways Finance Corporation

ITA - International Trade Administration

JGIF - India-Guyana Joint Investment Fund

LCDS - Low Carbon Development Strategy

LIC - Life Insurance Corporation of India

LNG - Liquefied Natural Gas

MDRI - Multilateral Debt Relief Initiative

NHAI - National Highways Authority of India

NIIF - National Investment and Infrastructure Fund

NRF - Natural Resource Fund

NTPC - National Thermal Power Corporation

ONGC - Oil and Natural Gas Corporation

PFC - Power Finance Corporation

PPP - Public-Private Partnership

RBC - Responsible Business Conduct

REDD+ - Reducing Emissions from Deforestation and Forest Degradation

RIL - Reliance Industries Limited

SBI - State Bank of India

SMEs - Small and Medium Enterprises

SPVs - Special Purpose Vehicles

SWF - Sovereign Wealth Fund

TRIPS - Trade-Related Aspects of Intellectual Property Rights

UNDP - United Nations Development Programme

UPES - University of Petroleum and Energy Studies

VAT - Value Added Tax

VGF - Viability Gap Funding

WTO - World Trade Organization

1. Executive Summary

1.Overview

Guyana has rapidly emerged as one of the world's fastest-growing economies, driven by significant deep water offshore oil discoveries and accelerated petroleum production. Since ExxonMobil's first discovery in 2015, the country has established over 11 billion barrels of oil equivalent in the Stabroek Block, with production surpassing 674,000 barrels per day (b/d) and projected to exceed 1.3 million b/d by 2027.

This oil boom has transformed Guyana's economic landscape. In 2024, real GDP growth reached 38.4%, with oil accounting for nearly 60% of GDP and over 90% of exports. Oil Revenues are being managed through the Natural Resource Fund (NRF), now exceeding $2 billion, with investments targeted at infrastructure, education, healthcare, and housing.

Despite its growing reliance on hydrocarbons, Guyana is pursuing a balanced energy strategy. The landmark Gas-to-Energy Project aims to cut electricity costs by 50% and reduce its diesel dependency. Renewable energy initiatives, including a revival of the Amaila Falls Hydropower Project, support Guyana's target of 70% renewable domestic power by 2030.

Geopolitically, Guyana's rising importance on the world oil map has brought renewed attention to its territorial dispute with Venezuela over the Essequibo region. While the issue is under review by the International Court of Justice (ICJ), it remains a key concern amongst the foreign investors.

Guyana is enhancing its investment environment through competitive offshore licensing rounds and local content policies. The new petroleum licensing round will come with restructured fiscal terms less attractive compared to Stabroek block but still better than most of the Latin American neighbours. However, challenges remain in infrastructure development, environmental regulation, institutional capacity, and equitable wealth distribution.

With prudent governance, strategic investment, and continued diversification, Guyana is positioned to become a regional energy and economic leader, offering a potential blueprint for sustainable development in resource-rich nations and a major energy exporting nation.

Strategic Collaboration

India and Guyana share longstanding diplomatic and economic ties, presenting significant opportunities for collaboration in energy and infrastructure development. With Guyana's rapid economic growth and India's expertise in project financing, technology transfer, best regulatory practices, biofuels and renewable energy, both nations can mutually benefit from strategic investments and joint ventures. India's wealth of experience in IT services and digital innovations, high performance computing (HPC) and training and skill development of Guyanese students and professionals and Joint academic courses on Energy & Infrastructure can go a long way in strengthening the two nations collaborations.

The growing partnership between India and Guyana represents a critical inflection point in the broader context of South-South cooperation and global development partnerships. This

executive summary synthesizes the findings and analyses across the methodology, sectoral diagnostics, feasibility and impact assessments, and strategic recommendations. It provides a unified and comprehensive overview of the policy, institutional, and operational pathways to accelerate transformative collaboration in the domains of energy and infrastructure.

Guyana, an emerging oil economy with abundant renewable energy potential, is rapidly ascending as a regional player in Latin America and the Caribbean. India, as a globally recognized leader in sustainable infrastructure, renewable energy, rural electrification, and oil sector governance, offers a robust model for South-South development cooperation. The convergence of Guyana's economic opportunities and India's institutional and technical capacities creates a compelling case for a structured and long-term strategic partnership.

The executive summary draws on in-depth sectoral assessments (Chapter 4), detailed feasibility and impact analysis (Chapter 5), and forward-looking strategic guidance (Chapter 6). It highlights policy priorities, institutional readiness, financing frameworks, and potential collaborative ventures that can shape the development trajectory of both countries.

1.1.Methodology and Analytical Framework

Chapter 3 established the methodology underpinning the report's conclusions, blending qualitative and quantitative approaches. It employed a multi-criteria framework that assessed technical, economic, environmental, and social dimensions of India-Guyana collaboration. Key methods included literature reviews, policy analysis, stakeholder consultations, and comparative benchmarking against international best practices.

The report also recommends a rigorous cost-benefit framework aligned with social cost-benefit analysis (SCBA) principles. It emphasizes opportunity cost evaluation, shadow pricing, and externality assessment to capture the broader welfare impacts of proposed projects. Special focus is placed on rural electrification, public-private partnerships, macroeconomic linkages, and capacity building for institutional resilience.

1.3. Sectoral Insights

1.3.1. Energy Sector

Guyana's energy sector is characterized by a dichotomy: significant potential (particularly in hydro, solar, and biomass) juxtaposed with infrastructural inefficiencies, overreliance on imported fossil fuels, and limited access in hinterland regions. The national grid, operated by Guyana Power and Light Inc. (GPL), suffers from technical losses of over 25% and frequent outages.

Electricity Access

As per Government of Guyana Budget 2025, Guyana targets universal electricity access by 2030, projected fourfold increase in electricity demand by 2035. However, the current system is not efficient and remains costly, necessitating modernization. The key Energy Projects identified by the Government for modernisation and expansion are:

- Amaila Falls Hydropower Project (165 MW) aims to replace 70% fossil fuel dependency.
- Wales Gas-to-Energy Project (250 MW) to lower electricity costs by 50%.

- Solar Expansion: Nine large-scale solar farms with 33 MW capacity plus 34 MWh battery storage.

India's success in electrification—achieving near-universal access through schemes like Saubhagya and UDAY—offers relevant models. India has also built over 125 GW of renewable capacity, with a robust ecosystem in solar parks, wind farms, and grid-scale battery storage. These achievements provide a replicable template for Guyana's renewable transition. Guyana has Strong potential for hydropower, solar, and wind energy. India's experience in solar energy infrastructure (via ISA) aligns with Guyana's objectives and this can be exploited to the full extent.

Recommendations:

- Establishing a Renewable Energy Task Force to coordinate bilateral technical assistance and investment.
- Deploying India's Gujarat Solar Park and Charanka models to aggregate land, transmission, and procurement for utility-scale solar.
- Supporting the Amaila Falls Hydropower Project through Indian engineering firms and innovative financial models.
- Integrating smart metering, energy efficiency, and grid modernization via Power Grid Corporation of India and other PSUs.
- Collaborating on hinterland electrification using Indian solar mini-grid expertise.

1.3.2. Oil and Gas Sector

Guyana has rapidly emerged as a significant player in the global oil and gas market. Since the discovery of substantial offshore oil reserves in 2015, the country has experienced unprecedented economic growth and infrastructural development. This section delves into the current state of Guyana's oil and gas infrastructure, the challenges and opportunities in its development, and the potential avenues for collaboration with India.

Guyana's offshore oil production is primarily concentrated in the Stabroek Block, operated by a consortium led by ExxonMobil, with partners Hess Corporation and CNOOC Limited. In 2024, the country produced approximately 674,000 barrels of oil per day (bpd) from this block. The production is facilitated by multiple Floating Production Storage and Offloading (FPSO) vessels, including the Liza Destiny, Liza Unity, and Prosperity.

The Liza Phase 1 development commenced production in December 2019 with the Liza Destiny FPSO, initially producing around 120,000 bpd. Liza Phase 2 followed in February 2022 with the Liza Unity FPSO, adding approximately 220,000 bpd. The third project, Payara, began in November 2023 with the Prosperity FPSO, contributing an additional 220,000 bpd. These projects have collectively elevated Guyana's production capacity significantly. The oil discovery trends further continued towards adjoining areas of shallow waters with an oil discovery made in Corentyne block by CGX energy. The sector faces dual imperatives: maximizing economic returns and ensuring environmental and social governance.

Development Challenges

Despite the rapid advancements, Guyana faces several challenges in its oil and gas sector:

Infrastructure Development: The swift increase in oil production necessitates substantial infrastructural development, including port facilities, transportation networks, and storage capacities. The government has initiated several projects to address these needs, such as the Gas-to-Energy project in Wales, aimed at reducing power costs and supporting industrial development. Associated natural gas produced from oil production will also constitute significant volumes and will need capital investments in gas utilization and monetization.

Regulatory and Institutional Frameworks: Establishing robust regulatory frameworks is crucial to manage the burgeoning oil sector effectively. The government is working on enhancing policies to ensure transparency, environmental protection, and equitable resource management. The contractual framework for new licencing blocks will need to be carefully designed to attract investing companies and to generate revenues for the state.

Human Capital Development: The specialized nature of the oil and gas industry requires a skilled workforce. Investments in education and training programs are essential to equip Guyanese citizens with the necessary expertise.

Opportunities

Economic Diversification: Oil revenues provide enormous opportunity to invest in other sectors such as transport infrastructure, water & sanitation, urban infrastructure (smart cities), agriculture, education and healthcare, fostering a more diversified and resilient economy.

Regional Energy Hub: Guyana's strategic location and growing production capacity position it to become a regional energy hub, supplying oil and gas to neighbouring countries and beyond. India can leverage on this through collaborative partnership in the entire energy value chain.

Government Initiatives:

The Guyanese government has outlined several priorities to ensure sustainable development of the oil and gas sector:

Revenue Management: The establishment of the Natural Resource Fund aims to manage oil revenues transparently, directing funds towards national development projects and ensuring intergenerational equity.

Local Content Development: Policies are being crafted to promote local participation in the oil and gas value chain, ensuring that Guyanese businesses and individuals benefit directly from the sector's growth.

Environmental Stewardship: Commitments to environmental protection are integral, with efforts to balance oil extraction activities with ecological preservation and adherence to international environmental standards. With ramping oil and gas production come challenges of containing emissions and adherence to SDG targets. An opportunity also for India in CCS and other emission reduction techniques.

Collaboration Opportunities

India, as a rapidly growing economy with increasing energy demands, has identified Guyana as a strategic partner in enhancing its energy security. The cultural ties, with nearly 40% of Guyana's population being of Indian origin, further strengthen this partnership.

In November 2024, Indian Prime Minister Shri Narendra Modi ji visited Guyana, marking the first visit by an Indian prime minister since 1968. During this visit, both nations expressed intentions to collaborate closely in the energy sector. India has shown interest in purchasing up to two million barrels of crude oil from Guyana and is exploring long-term supply agreements. Additionally, Indian companies are encouraged to participate in Guyana's oil block auctions, providing opportunities for upstream investments. The Memorandum of Understanding (MoU) signed during Indian Prime Minister's visit aims to enhance hydrocarbon trade and cooperation in petroleum products.

Guyana's oil production is projected to reach approximately 1.3 million bpd by 2027, with the addition of new FPSOs such as the One Guyana and Jaguar. This growth trajectory underscores the importance of strategic planning and international partnerships to ensure that the oil boom translates into sustainable development for the nation. The collaboration with India presents a mutually beneficial opportunity: Guyana can secure a stable market for its oil exports, while India can diversify its energy sources and enhance its energy security. Furthermore, joint ventures in infrastructure development, technology transfer, and capacity building can foster deeper economic ties between the two countries.

Guyana's burgeoning oil and gas sector holds immense potential for India. Addressing week infrastructural and regulatory challenges, coupled with strategic international collaborations can pave the way for sustainable economic growth and regional influence of Guyana in the global energy market. India has extensive experience across the hydrocarbon value chain. ONGC Videsh, Indian Oil Corporation, and Bharat Petroleum have operated across Africa, Asia, and Latin America, offering joint venture potential for Guyana.

Energy Infrastructure & Clean Energy

Investment & Project Execution: Indian firms can participate in hydropower, solar, and natural gas projects. Indian state companies like, ONGC, OIL and downstream companies IOCL, HPCL, BPCL and GAIL etc. could provide expertise and partnerships in these investments.

Technology Transfer: India's expertise in smart grids, energy storage, and micro grids can help modernize Guyana's energy sector. Setting up refineries and petrochemical plants can be great opportunities for Indian PSUs given their market and technological strengths. Digital / IT services which are the hallmarks of Indian companies would be another business segment

India can leverage on. Centre for Development of Advance computing (C-DAC) through its Centre already functional in Guyana can provide HPC systems of CDAC (PARAM Series) and related software for energy sector. Indian regulatory boards such as DGH and PNGRB could help/ advise in framing regulations for oil & gas sector.

Recommendations:

- Joint upstream exploration and drilling with ONGC Videsh.
- Construction of storage terminals, pipelines, and Floating Storage and Offloading (FSO) units.
- Development of a modular oil refinery in Guyana using Indian technology and operations frameworks.
- Institutional support in refining Guyana's Petroleum Activities Act and enforcement via the Directorate General of Hydrocarbons (India).
- Creation of a regulatory exchange platform for ESG compliance and local content strategy.

1.3.3. Infrastructure and Urban Development

Guyana's transport and urban infrastructure is underdeveloped, particularly in interior regions. The road network is fragmented, urban planning lacks coherence, and public housing is insufficient. India's leadership in highways (NHAI), metro systems, smart cities, and water/sanitation services provides a holistic model.

In the Budget Speech 2025 the following projects have been identified for development by Government of Guyana:

Transportation:

Roads & Highways: Over 1,000 km of new roadways planned, including key projects like Linden to Mabura Hill Road.

Bridges: Construction of Demerara River Bridge, Wismar Bridge, and Kurupukari River Bridge.

Airports: Expansion of regional airports and hinterland airstrips.

Water Supply & Sanitation:

First-time access to potable water for 10,000+ households.

Investment in modern sanitation infrastructure.

Housing Development

Construction of 5,000+ housing units.

Distribution of 12,000+ serviced lots.

Recommendations:

- Roads, Ports, and Bridges: Execution of key corridors like Linden-Lethem Road and Berbice Port with Indian firms. Indian infrastructure firms like NHAI, BRO, L&T RITES and IRCON can contribute to Guyana's transport projects.
- Railways & urban transformation: India's experience with railway infrastructure and metro rail can be explored for urban transport solutions.
- Housing Development: Collaboration in affordable housing projects and Smart City Pilot in Georgetown using India's AMRUT and Smart Cities frameworks can be explored. Prefabricated housing development using Tata Housing and NBCC to address housing deficits.
- Trade & Investment: India can export energy equipment & services such as solar panels, turbines, power grid solutions. Further, construction equipment & materials such as cement, steel, and engineering consultancy services can be considered.
- Joint Ventures: Indian firms can collaborate with Guyanese companies for PPP models in infrastructure projects.
- Water security through Jal Jeevan Mission model replication, including piped water, wastewater management, and sanitation infrastructure.
- Digital public infrastructure for service delivery using India Stack and *BharatNet* models.

1.4. Economic and Technical Feasibility Analysis

The economic rationale for India-Guyana collaboration is strong across all examined sectors. The report (Chapter 5) applies social cost-benefit analysis to quantify project externalities and use economic pricing to measure real welfare gains. Key findings include:

- Economic rates of return (ERRs) for solar and hydro projects in hinterlands can exceed 18%, driven by reduced diesel use and improved rural productivity.
- Infrastructure projects like the Linden-Lethem corridor have indirect benefits through trade facilitation, employment generation, and spatial equity.
- Refining and downstream oil ventures offer cost savings of 30–35% compared to current fuel import costs.
- Public-private partnership models reduce fiscal stress and introduce operational efficiencies.
- Shadow pricing shows high opportunity cost of delaying renewable integration, particularly due to growing demand and vulnerability to oil price shocks.

1.5. Institutional and Governance Alignment

Guyana's institutional architecture for energy and infrastructure is maturing. Key agencies include the Ministry of Natural Resources, Guyana Energy Agency (GEA), Ministry of Public Works, GO-Invest, and the National Procurement and Tender Administration Board (NPTAB).

India's institutional ecosystem—including NITI Aayog, Ministry of Power, Ministry of Petroleum and Natural Gas, Ministry of Road Transport and Highways, NTPC, TERI, NSDC, NHAI, etc. can serve as twinning partners for technical exchanges. The report recommends:

- Establishing a Joint Ministerial Commission on Energy and Infrastructure to coordinate all bilateral initiatives.
- Creating a Centre of Excellence for Infrastructure and Renewable Energy in Guyana.
- Expanding Technical and Vocational Education and Training (TVET) programs through NSDC and Indian universities.
- Strengthening procurement capacity and contract management using India's PPP Cell expertise.
- Enhancing policy coherence across ministries through integrated planning tools and performance management systems.

1.6. Investment and Financing Mechanisms

Financing remains a critical enabler. The report recommends a blended finance architecture that combines bilateral grants, multilateral debt, private capital, and sovereign investment.

- An India-Guyana Infrastructure Investment Fund should be established with contributions from EXIM Bank of India, India Infrastructure Finance Company, and Guyana’s Natural Resource Fund.
- The fund can prioritize catalytic sectors with high job multipliers and social returns.
- Public-private partnerships should be scaled using Indian models (DBFOT, HAM, TOT), customized for Guyanese law.
- Diaspora investment channels and SME equity platforms should be launched to unlock entrepreneurial capital.
- Investment risk insurance and green bond frameworks can be jointly developed to attract climate-aligned financing.

1.7. Monitoring, Evaluation, and Accountability Framework

To sustain momentum, a robust Monitoring & Evaluation (M&E) framework is critical. The report outlines a three-tier structure:

- Macro-level KPIs to track sectoral investment, energy mix transformation, access improvements, and GDP impact.
- Project-level metrics to assess timelines, cost control, social and environmental outcomes.
- Institutional dashboards to monitor capacity-building, governance reforms, and stakeholder engagement.
- Joint review missions, independent audits, and citizen scorecards should be incorporated into this framework.
- A public digital dashboard showcasing project progress will ensure transparency and foster public trust.

1.8. Roadmap for Implementation: 2025–2035

A phased implementation roadmap is proposed:

- Phase 1 (2025–2026): Formation of task forces; pilot projects in solar mini-grids, refinery feasibility studies, urban planning assessments, and housing.

- Phase 2 (2027–2029): Full-scale deployment in upstream oil, port development, housing rollout, and institutional training.
- Phase 3 (2030–2032): Commissioning of national refinery, integrated renewable-grid projects, expansion of smart cities.
- Phase 4 (2033–2035): Guyana positions as a CARICOM energy hub, India-Guyana joint presentation at global climate and infrastructure forums.

1.9. Model for South-South Partnership

This executive summary reiterates that the India-Guyana partnership is more than a bilateral initiative—it is a test case for a new kind of global cooperation rooted in equity, technology transfer, climate stewardship, and inclusive growth.

The collaboration must now move from high-level agreements to on-the-ground action. With shared political will, institutional innovation, and inclusive stakeholder engagement, the next decade can redefine how two developing nations drive mutual transformation. This partnership, rooted in shared values and strategic pragmatism, can offer a scalable and inspirational blueprint for the Global South.

Strengthening India-Guyana collaboration requires structured engagement through bilateral trade agreements, investment forums, and joint research initiatives. Establishing an India-Guyana Energy and Infrastructure Task Force can drive this partnership forward. An action plan as under is recommended:

i. MoUs & Policy Framework for project financing and execution.

ii. Business Delegations & Trade Missions to explore investment opportunities.

iii. Skill Development & Technology Exchange Programs to build local capacity.

iv. Academic partnerships between Indian universities and Institutions in Guyana would be of great interest for both. Engineering and management programs in Oil & Gas, Infrastructure, Logistics and supply chain are some of the areas Guyana would be benefited from Indian capacity.

By leveraging India's technical expertise and Guyana's growth potential, both countries can build a robust and sustainable partnership in energy and infrastructure development.

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2. Introduction

Guyana is undergoing a transformative moment in its national development trajectory. The discovery of significant offshore oil reserves, combined with rising global attention to sustainable development, has thrust the small South American nation into the spotlight. This report presents a comprehensive analysis of Guyana's energy and infrastructure sectors, with a view to identifying actionable opportunities for collaboration with India. It aims to guide policymakers, industry leaders, and development agencies in leveraging mutual capabilities and achieving sustainable, inclusive growth of Guyana and opportunities for India.

2.1. Background and Rationale

Guyana, with a population of just over 800,000 and abundant natural resources, is expected to experience one of the highest GDP growth rates globally through the 2020s. The emergence of the oil and gas industry has presented unprecedented fiscal capacity to invest in long-neglected infrastructure and expand the country's energy matrix. However, significant challenges remain, including energy reliability, geographic disparities in service delivery, climate vulnerability, and institutional capacity limitations.

India, as a global leader in renewable energy deployment, infrastructure development, and digital governance, is uniquely positioned to partner with Guyana in realizing its development ambitions. India's experience with hydrocarbon sector, scalable rural electrification, smart cities, low-cost housing, digital infrastructure, and climate resilience presents a compelling synergy with Guyana's strategic priorities. This study identifies and maps these synergies to foster a long-term partnership framework across energy and infrastructure sectors.

2.2. **Objectives and Scope of the Study**

The study titled *"Opportunities for India-Guyana Cooperation in Energy and Infrastructure"* aims to provide a comprehensive examination of the potential areas for strategic collaboration between the two countries. Recognizing the dynamic transformations underway in Guyana, particularly following the discovery of significant offshore oil reserves and concurrent national development initiatives, this study is intended to serve as a roadmap for meaningful and structured engagement with India.

Primary Objectives

The objective of this study is to identify and evaluate opportunities for India-Guyana cooperation in the energy and infrastructure sectors. Specifically, the study is guided by the following core objectives:

- To analyze the current state and future projections of Guyana's energy and infrastructure sectors, highlighting trends, gaps, and policy directions.
- To assess Guyana's institutional and technical capabilities in energy and infrastructure planning, management, and project delivery, including the roles played by public and private stakeholders.
- To identify complementarities between Indian and Guyanese development experiences, especially in energy systems, project financing, and infrastructure delivery models.
- To propose potential areas for bilateral cooperation, including joint ventures, technology transfer, public-private partnerships (PPPs), and capacity-building initiatives tailored to Guyana's national development goals.
- To outline a roadmap for structured India-Guyana engagement in these sectors over the next decade, including policy dialogues, institutional cooperation, and sector-specific investments.

Scope of the Study

The scope of the study covers a wide array of strategic, operational, and institutional dimensions in both energy and infrastructure sectors. The following areas define the contours of the research:

Energy Sector

- Presentation of current trends and future forecasts (including statistical projections) of Guyana's energy landscape, encompassing oil and gas, and renewable energy segments.
- Assessment of Guyana's energy capabilities, including its technological potential in solar, wind, and hydropower, and the extent of existing energy infrastructure and supporting policies.
- Identification of collaborative opportunities in energy infrastructure, particularly in clean energy technologies, grid expansion, power generation, storage solutions, and distribution systems.
- Evaluation of market demand and future potential for Indian enterprises to engage in Guyana's energy and infrastructure sectors, based on market intelligence and regulatory analysis.
- Exploration of India's strengths in energy project financing, engineering, design, execution, and after-project support, especially in cost-effective renewable solutions, utility-scale infrastructure, and technical consulting.

- Joint research and development (R&D) opportunities in oil & gas, clean energy and infrastructure technologies such as CCS and Gas-to-Liquids (GTL), including the acquisition of assets and technology deployment partnerships.

Infrastructure Sector

- Analysis of Guyana's infrastructure development priorities, especially in transportation (roads, ports, airports, railways, metro-rail), housing, water supply, sanitation, and digital infrastructure, as highlighted in national budgets, master plans and strategic roadmaps.
- Review of India's expertise in delivering large-scale infrastructure projects across diverse geographies and terrains, focusing on sustainable construction, smart city planning, and integrated urban infrastructure.
- Identification of Guyanese partners and agencies (government authorities, research institutions, and private firms) involved in planning, implementation, and investment promotion in energy and infrastructure.
- Overview of policy mechanisms and institutional support, including regulatory frameworks, subsidies, tax incentives, and investment promotion tools that influence both domestic and foreign participation in Guyana's infrastructure growth.
- Identification of regional investment opportunities, focusing on geographic zones in Guyana that offer high potential for joint India-Guyana ventures in infrastructure and energy development.

Bilateral and Institutional Cooperation

- Exploration of models for bilateral cooperation, including public-private partnerships, government-to-government initiatives, and collaborative platforms for knowledge exchange.
- Exchange of technical know-how and skill development programs, leveraging India's strengths in vocational training, digital upskilling, and institutional capacity building for long-term development of Guyana's human capital.
- Evaluation of existing and potential institutional frameworks, including bilateral agreements, investment treaties, and multilateral arrangements that can facilitate enhanced engagement.
- Mapping of research and policy institutions in Guyana and India that can serve as anchors for cross-border innovation, project planning, and joint academic-industrial initiatives.

Trade and Economic Linkages

- Assessment of the broader economic and trade dynamics between India and Guyana, identifying key sectors where India's technological, managerial capabilities and human capital strengths can accelerate Guyana's development journey.
- Policy and regulatory frameworks that shape bilateral trade and investment, with an emphasis on aligning with the best international standards and trade facilitation measures.

- Feasibility studies on joint ventures, PPP models, and strategic investments that enable both countries to share risks, pool resources, and generate long-term economic benefits.

- Recommendations for enhancing bilateral cooperation, based on a detailed understanding of strategic priorities, comparative advantages, and developmental complementarities.

Thematic Focus Areas

The study's thematic focus centers on:

- **Energy Sector**: Encompassing oil & gas exploration, refining, petrochemical and export, renewable energy sources (solar, wind, hydro), and energy infrastructure (generation, transmission, storage), Piped gas (CGD).

- **Infrastructure Sector**: Including transport (highways, ports, airports, railways, metro rails), housing, water supply, sanitation & urban infrastructure, and emerging priorities such as digital infrastructure and smart utilities.

While energy and infrastructure form the backbone of the analysis, the study also integrates relevant themes from trade, technology, investment facilitation, and capacity-building—acknowledging their vital role in supporting long-term and inclusive development.

2.3. Macroeconomic Development of Guyana

2.3.1 Economic Overview

Guyana, located on the northeast Atlantic coast of South America, is geographically South American but culturally and politically aligned with the Caribbean. Bordered by Venezuela, Suriname, and Brazil, it is undergoing a historic economic transformation propelled by vast offshore oil discoveries and production that began in December 2019.

Between 2020 and 2024, Guyana's real GDP growth surged, averaging 38.22% annually—the highest in the world. Growth reached 43.5% in 2020 amid the COVID-19 pandemic, 21.1% in 2021, 63.3% in 2022, 33,8 % in 2023 and was estimated at 43.6% in 2024. In 2025, real GDP is projected to grow by 10.25%, with non-oil GDP expanding by 13%. The economy is expected to maintain an average annual growth of 14% over the next five years, supported by robust oil output and a rising share of non-oil sector contributions.

Guyana's economy is resource-rich, with significant endowments in fertile agricultural land, bauxite, gold, and extensive forests covering 80% of the land. Oil and gas (O&G) now contribute over 40% of GDP, reshaping the economy's structure. However, the non-oil sectors—particularly construction, agriculture, and services—continue to grow steadily, aided by increased public infrastructure spending.

Guyana has committed to adopt responsible and accountable management practices in its oil sector. It should strictly enforce environmental regulations for oil companies, ensuring they have adequate plans and financial guarantees to cover potential oil spills, emissions and associated costs. It must establish transparent oversight mechanisms to monitor oil related activities, including independent audits of drilling and production operations and their environmental impact. The Natural Resource Fund (NRF) created to save oil proceeds should invest them wisely for both current and future generations. Parliament's involvement in investment decisions is commendable, but adopting market-driven mechanisms over top-down approaches is encouraged. Future profit-oil sharing (PSCs) agreements with international oil producers must ensure Guyana's long-term interest. It should expand the government's efforts to engage local communities, particularly those directly impacted by oil activities. Ensure they have a voice in decision-making, with their rights and concerns regarding environmental and social impacts respected. Guyana should invest in technical expertise, regulatory enforcement, and negotiation skills to strengthen local capacity. It must conduct thorough environmental and social impact assessments (ESIA) to comprehensively evaluate risks to ecosystems, local livelihoods, and community well-being. Oil revenues should be managed transparently and responsibly, directing funds toward development projects that deliver long-term benefits for the population. Finally, it must strengthen partnerships with international organizations and experienced oil-producing nations such as India which can help navigate the challenges of oil production and promote best practices both inland and offshore

Table 2.1 Key Macroeconomic Indicators

Indicator	2018	2020	2021	2022	2023	2024	2025 (Proj.)
Real GDP Growth (%)	4.4	43.5	20.1	63.3	33.8	43.6	10.25
GDP at Current Prices (US$M)	-	4,940.10	7,434.90	14,799.80	16,254.20	23,352.00	-
GDP per Capita (US$)	-	6,900.50	10,301.60	19,077.10	21,513.30	30,654.60	-
Inflation (%)	1.6	0.9	5.7	7.2	2	2.9	4
Current Account (% of GDP)	-	-	-25.6	27.3	27.9	27.3	19
Gov't Debt (% of GDP)	-	-	43.2	27.8	29.8	24.2	24.1
Fiscal Balance (% of GDP)	-2.5	-4.9	-	-1	-3.5	-	-

Oil Production (bpd)	0	~120,000	-	~350,000	~400,000	~616,000	~674,000
Mid-Year Population ('000)	-	770	773	775.8	778.4	780.9	-

2.3.2. Demographics and Urbanization

With a population of around 804,000 (2023), Guyana is one of the most sparsely populated countries globally, with fewer than 4 people per square kilometre. About 90% of the population lives on the narrow coastal plain (7% of land area), and urbanization is increasing, especially around Georgetown. Urban infrastructure remains underdeveloped; only 50% of urban roads are in good condition, and water supply is uneven. The country's diaspora contributes significantly through remittances and knowledge transfer.

2.3.3. Human Development and Poverty

Guyana ranks 95th out of 193 countries in the 2023-24 Human Development Index (HDI) with a score of 0.742. However, the national poverty rate is 38%, and inequality remains stark with a GINI index of 46.7. In 2019, urban per capita income was $5,200 compared to $2,200 in rural areas. In 2022, GDP per capita rose to $18,342, yet half the population lived below the international poverty line of $5.50/day.

Education and healthcare systems face gaps. Despite 12.2 years of schooling, the Learning-Adjusted Years of Schooling (LAYS) is just 6.8. Health indicators such as infant and under-5 mortality exceed regional averages.

2.3.4. Infrastructure and Labour Productivity

Labour productivity in Guyana remains 36% below the Caribbean average. Only 25% of roads are paved, and while electricity access is at 92.5%, rural areas still lack coverage. Access to safe drinking water is limited (50%), and internet costs remain high at $30/month.

2.3.5. Climate Vulnerability and the Low Carbon Development Strategy (LCDS)

Guyana is highly vulnerable to sea-level rise and coastal flooding. With 90% of economic activity concentrated along the low-lying coast, GDP losses from climate change effects could exceed 46% by 2100.

The government's flagship **Low Carbon Development Strategy 2030 (LCDS)** aims to:

- Conserve forests and biodiversity
- Promote renewable energy
- Enhance infrastructure resilience
- Leverage carbon markets (over US$150 million earned through ART-TREES)
- Develop Indigenous communities sustainably

The **Gas-to-Energy** project aims to halve electricity costs and reduce reliance on imported fuels, forming a bridge to renewable energy. To future-proof its grid, Guyana is investing in 155 km of double-circuit transmission lines, 214 km of 69 kV transmission lines, and over 340 km of distribution lines across key regions. In parallel, renewable energy development is accelerating. The government aims to operationalise mini-hydropower plants at Kato and Kumu and complete solar farms in Berbice, Essequibo, and Leguan. A 15 MW solar farm will be constructed at Linden, along with distribution upgrades in Mabaruma and Port Kaituma. A 450 kW wind farm in Leguan will generate 620 MWh annually.

An additional 7,230 solar panels will be distributed to hinterland communities, underscoring Guyana's commitment to sustainable energy access.

2.3.6. Public Investment and Budgetary Priorities

Guyana's oil and gas sector remains the engine of the national economy, with the government pursuing an aggressive agenda to maximise the benefits of its vast offshore petroleum resources. As of 2024, the country recorded 52 oil discoveries, including five new ones in the Stabroek Block, which continues to anchor production. Output from this block reached an average of 616,000 barrels per day (bpd) in 2024, with projections for 2025 at 674,000 bpd as the One Guyana FPSO becomes operational.

Development is also underway on the Uaru and Whiptail projects, with targeted startups in 2027. The ultimate goal is to push national production beyond 1.3 million bpd post-2027. Complementing upstream developments is the Gas-to-Energy (GtE) project, a critical pillar of Guyana's broader gas monetisation strategy. The natural gas reserves from operated assets are estimated to the tune of 16TCF presently and need accelerated monetization and uses for power needs. Exxon is building a pipeline from Liza filed to onland as part of a Longtail project. It would also be interesting to invest into facilities for gas exports by setting up LNG liquefaction trains in near future and Indian companies like GAIL can capitalize on this opportunity.

A significant emphasis is placed on local content development. Since the enactment of the Local Content Act in 2021, procurement from Guyanese firms has surpassed US$1.5 billion. Plans are underway to further empower small and medium enterprises and boost domestic fabrication capabilities. Key initiatives include

- **Gas-to-Energy** project for nationwide energy security
- **Silica City**: a smart urban center to ease Georgetown congestion
- **Housing for All**: expanding affordable housing
- Investments in health, education, and transportation

2.3.7. Strategic Economic Vision

The Government of Guyana is focused on transforming oil wealth into sustainable, diversified economic growth while avoiding the resource curse. Strategies include:

- Expanding the non-oil economy (non-oil GDP to grow 6.75% annually)
- Supporting private sector growth and innovation
- Developing human capital and infrastructure
- Promoting economic inclusivity and regional equality

2.3.8. Sectoral Opportunities and Challenges

Oil and Gas:

Guyana is estimated to have 13.6 billion barrels of recoverable oil and 32 trillion cubic feet of gas which is only expected to grow with the accelerated petroleum exploration, ExxonMobil's Stabroek Block alone accounts for nearly 11 billion barrels. The sector is currently dominated by U.S. firms, but opportunities exist for diversification and local content expansion. Other blocks where wells have been drilled in shallow waters like Kanaku block also holds substantial petroleum deposits (Spanish Repsol drilled Jaguar-1 well in 2012, discovered some light oil). The well was abandoned due to encountering high pressure. Another interesting asset is Corentyne block in shallow waters where CGX and partners have a made a significant light oil discovery in 2021 (177 ft. of net pay) on the trend of the discoveries in Stabroek block and block 58 in adjoining Surinam.

Renewable Energy:

Guyana offers tax incentives for renewable energy, including solar, wind, and hydro. Microgrid and rooftop solar solutions offer attractive investment potential. Guyana is also a member of Global biofuel alliance along with India and therefore offers ample opportunities for India to jointly develop biofuel and renewable energy throuput.

Transport Infrastructure

Transforming Guyana's transport landscape remains a key government priority with aggressive infrastructure rollout to alleviate congestion, improve access, and stimulate economic activity.

Roads and Bridges: In 2025, major projects include the Corentyne River Bridge linking Guyana and Suriname, the Palmyra-Moleson Creek Highway, the four-lane Berbice River Bridge, and the completion of the New Demerara River Bridge. The rehabilitation of the Linden-Soesdyke Highway and upgrades along the East Bank Highway and routes like Linden to Mabura Hill with 45 bridges are also ongoing.

Air Transport: Upgradation of hinterland airstrips, including at Apoteri, Aishalton, Chenapou, Jawalla, and Sand Creek are the ongoing projects. At the Cheddi Jagan International Airport (CJIA), a new 150,000 sq. ft. terminal is planned to be developed to increase passenger handling capacity, enhance efficiency, and showcase the country's natural beauty.

River Transport: Building on investments like the commissioning of MV Ma Lisha and online booking systems, 2025 priorities include further upgrades, including new vessels, port rehabilitations, and navigational aids in key waterways such as the Demerara River.

Water and Sanitation

Guyana has made notable strides in expanding access to clean water, moving national potable water coverage to 98.3% and hinterland access from 46% to 91% since 2020. Ongoing infrastructure upgrades include new water treatment plants along the coast and the installation of smaller treatment units at well stations across multiple regions.

Sanitation efforts are also being scaled up with investments in solid waste infrastructure—like the Haags Bosch landfill. New sanitary landfills are planned to be developed in all 10 administrative regions.

Housing and Urban Infrastructure

In 2025, target includes 25,000 new house lots and 1,000 new homes. Programmes like the Lethem Housing Support Initiative and the Steel and Cement Subsidy Programme are in place to support low-cost home construction. Incentives include VAT removal on construction materials and expanded mortgage ceilings to enhance affordability.

Urban development is being streamlined through a single-window planning approval system, allowing prospective homeowners to apply and track their housing applications digitally—a move expected to enhance efficiency and transparency in the sector.

Agriculture:
Accounting for 25% of non-oil GDP in 2022, the sector is a key diversification target. Opportunities lie in aquaculture, food processing, and revitalizing the sugar industry through partnerships with GUYSUCO.

ICT and BPO:
New data protection laws and a skilled English-speaking labour force position Guyana as a prime location for BPO, data warehousing, and ICT investments. India strength in digital and ICT is a huge opportunity for Guyana and India to upgrade It infrastructure. CDAC already has established an ICT centre in Georgetown.

Healthcare:
Government efforts focus on decentralizing healthcare, strengthening primary care, and expanding medical infrastructure—particularly for cardiology and oncology.

Challenges:

- Infrastructure bottlenecks in transportation and energy
- Shortage of skilled labour
- Regulatory and investment climate improvement needs
- Economic diversification beyond hydrocarbons

2.3.9. India-Guyana Economic Relations

India and Guyana share longstanding cultural and diplomatic ties, with a strong Indo-Guyanese community as a bridge. Recent cooperation includes:

- **$17.5 million Line of Credit** for solar and ICT initiatives
- **International Solar Alliance** collaboration
- **ITEC program** scholarships and capacity building

During Prime Minister Modi's visit, both nations signed MOUs in energy, health, agriculture, and technology, elevating ties into a strategic development partnership. India's strengths in renewable energy, digital infrastructure, and pharmaceuticals align well with Guyana's growth trajectory.

2.3.10. India's Economic Strengths and Global Position

India, as the world's fifth-largest economy, has demonstrated remarkable resilience and growth across multiple sectors. The country has emerged as a global leader in energy & infrastructure development with its vast experience in oil refining & petrochemicals, renewable energy, and infrastructure expansion, making it a suitable partner for Guyana's energy-driven growth. As a leader in digital transformation, AI, and high-performance computing, India can support Guyana's technology-driven initiatives. India's extensive education and vocational training programs can address Guyana's human capital needs through collaboration in skill development and capacity building.

Existing Trade, Investment, and Diplomatic Relations

Guyana and India have maintained a longstanding diplomatic relationship, reinforced by high-level visits and bilateral agreements. India is a key player in global trade, with a growing interest in securing energy partnerships and diversifying its global investment portfolio. India's crude oil imports from Guyana have been growing, and Indian firms have expressed interest in participating in Guyana's oil exploration and production activities. There have been capacity-building programs under India's ITEC (Indian Technical and Economic Cooperation) for Guyana which have strengthened ties.

Strengthening Bilateral Trade and Strategic Partnerships

Bilateral trade between India and Guyana has shown dynamic shifts in recent years, reflecting both challenges and opportunities. In the fiscal year 2021-22, trade surged to approximately US$223.36 million, with India's exports to Guyana totalling US$66.41 million and imports—primarily crude oil—amounting to US$156.96 million. This marked a substantial increase from US$46.97 million in 2020-21. However, trade contracted to US$66.37 million in 2022-23, with exports valued at US$59.76 million and imports at only US$6.61 million. Encouragingly, in 2023-24, bilateral trade rebounded by 60%, reaching US$105.97 million, underscoring the resilience of commercial ties.

India's key exports during this period included pharmaceutical products, iron and steel, machinery, mechanical appliances, and electrical equipment (source). However,

significant untapped potential remains in sectors such as agriculture, renewable energy, and digital infrastructure, offering ample room for deeper economic collaboration.

2.3.11. Strategic Opportunities Amidst Guyana's Oil-Driven Growth

The discovery of vast oil reserves off the coast of Guyana is set to catalyse rapid economic growth, transforming not only the oil and gas sector but also the broader economy. The oil revenues hold the potential to elevate Guyana from one of the region's least affluent countries to a higher income status. This newfound wealth presents a strategic opportunity for India to deepen its engagement with Guyana, leveraging its expertise in energy, infrastructure, manufacturing, agriculture, and technology. Indian companies, with their proven capabilities, are well-positioned to play a pivotal role in Guyana's development journey.

Enhancing Collaboration through Industrial Delegations

To capitalize on these emerging opportunities, both governments—through their diplomatic channels—could proactively organize industry- Academic delegations to Guyana. These missions can focus on identifying strategic partnerships in key sectors such as:

Energy: Oil and gas exploration, renewable energy, and energy infrastructure.

Critical Infrastructure: Modernization of transportation networks (roads, ports, airports, railways, metro systems), water supply, sanitation, and housing.

Digital Transformation: Expansion of telecom networks, e-governance systems, and smart city solutions.

Education: Universities offering flagship programs like Oil & Gas, Infrastructure, Aviation, Logistics and supply chain, Business analytics, health sciences etc could be of interest to Guyanese leadership.

Such delegations would enable companies to conduct rigorous due diligence, assess the cost, quality, and services required by the Guyanese government, and evaluate the viability of potential collaborations.

Leveraging Local Partnerships for Market Entry

Forming partnerships with local companies will be instrumental in expediting market entry and ensuring compliance with Guyana's Local Content Act, which may mandate local partnerships in the oil and gas sector. Collaborating with Guyanese firms will not only facilitate regulatory approvals and licensing but also accelerate business operations by navigating local market dynamics more effectively.

India's growing engagement with **CARICOM** (Caribbean Community), of which Guyana is a member, further strengthens the foundation for bilateral cooperation. By fostering long-term partnerships in energy, infrastructure, and digital transformation, India and Guyana can jointly pursue sustainable development, energy security, and technological advancement—unlocking mutual growth and prosperity.

2.4 Structure of the Report

This remaining report is structured into the following chapters: Chapter 3 details the methodology used to identify challenges and opportunities within the energy and infrastructure sectors for potential collaboration between India and Guyana. The approach integrates various tools such as desk research, comparative analysis, stakeholder mapping, scenario forecasting, SWOT analysis, benchmarking, and gap analysis.

Chapter 4 provides a comprehensive Sectoral Analysis covering key areas of the energy sector—including renewable energy and the oil & gas industry—as well as priorities in transport infrastructure, water management, ICT, and urban systems. This chapter identifies sector-specific challenges and outlines potential avenues for bilateral cooperation.

Chapter 5 assesses the feasibility and potential impact of enhanced India-Guyana cooperation in energy and infrastructure. The analysis spans four critical dimensions: socio-economic development, trade and investment relations, technological collaboration, and international diplomacy.

Chapter 6 presents Strategic Recommendations, exploring India's market and investment potential in Guyana. It proposes collaborative frameworks, institutional partnerships, and identifies both short-term (1–3 years) and long-term (4–9 years) opportunities, along with the roles of key stakeholders.

Chapter 7 concludes the analysis with a strategic roadmap, offering policy recommendations and actionable steps to advance Guyana's development agenda.

Chapter 8 includes appendices, visual data representations, and supplementary datasets.

Chapter 9 provides the references and bibliography supporting the report's analysis.

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2. Methodology

This study employs a comprehensive, mixed-method approach to examine the potential for collaboration between India and Guyana in the energy and infrastructure sectors. By integrating various research techniques, the study aims to provide a nuanced understanding of the current landscape, identify opportunities for partnership, and offer actionable recommendations. The methodologies utilized include desk research, comparative analysis, stakeholder mapping, scenario forecasting, SWOT analysis, benchmarking, and gap analysis.

3.1. Desk Research

Extensive desk research forms the foundation of this study, involving the collection and analysis of secondary data from official sources such as the Government of Guyana, Government of India, the World Bank, the International Monetary Fund (IMF), the Inter-American Development Bank (IDB), the International Energy Agency (IEA), and other pertinent international agencies to ensures that the study is grounded in the most recent and reliable data available.

3.2. Comparative Analysis

To contextualize Guyana's performance and priorities, the study employs comparative analysis through benchmarking indicators and country case studies. This involves comparing Guyana's oil and gas, energy, and infrastructure sectors with those of countries at similar stages of economic growth, oil & gas development, population and economic structure, geographic/climatic context, proven reforms or cautionary lessons, and regional proximity or strategic relevance. The benchmark countries considered are Brazil, Venezuela**,** Ghana, Suriname, Trinidad & Tobago, Malaysia, and Colombia. By identifying best practices and successful collaborations in other nations, the study aims to draw lessons applicable to the Guyanese context.

3.3. Stakeholder Mapping

Identifying key institutions and stakeholders in both Guyana and India is crucial for understanding the landscape of energy and infrastructure development. This process involves mapping governmental bodies, private sector entities, non-governmental organizations, and international partners engaged in these sectors. Recognizing these stakeholders facilitates the identification of potential collaborators and the assessment of their roles and interests.

3.4. Scenario Forecasting

Scenario forecasting is utilized to project future developments based on existing policy documents such as Guyana's Low Carbon Development Strategy (LCDS) 2030, national budgets, and sectoral master plans. This method allows for the anticipation of various future scenarios, aiding in the formulation of strategic plans that are resilient to different potential outcomes.

3.5. SWOT Analysis for Guyana

A SWOT analysis is conducted to assess the strengths, weaknesses, opportunities, and threats within Guyana's oil and gas, energy, and infrastructure sectors. This analysis provides a structured framework to evaluate internal and external factors impacting these sectors.

Strengths

Abundant Oil Reserves: Guyana boasts over 11 billion barrels of commercially recoverable petroleum reserves, positioning it among the countries with the highest per capita oil reserves globally. More oil deposits would be added in due course from stabroek and other licences.

Economic Growth: The commencement of oil production in late 2019 has led to a quadrupling of Guyana's economy, elevating its GDP per capita from US $ 6900.5 in 2020 to US$30,654.6 in 2024 in real (2012 base) terms.

Strategic Partnerships: Guyana has established significant partnerships with major oil companies, notably ExxonMobil, CGX, Repsol, Tullow Oil which has been instrumental in developing the Stabroek offshore block, Corentyne block and other exploration licences.

Government Initiatives: The Guyanese government has implemented policies to harness oil revenues for infrastructure development and human capital enhancement, aiming for inclusive growth and economic diversification. Reforms and changes in the petroleum activity bill is in that direction.

Strategic Geographic Location: Situated on the northern coast of South America,

Guyana offers access to both Caribbean and South American markets.Natural gas produced can be marketed to meet the increasing demand of neighbouring nations.

Weaknesses

Infrastructure Deficits: The country faces challenges related to inadequate infrastructure, including transportation networks and energy distribution systems. Despite economic gains, Guyana's infrastructure requires substantial upgrades to support and sustain rapid growth.

Dependence on Fossil Fuels: The country's energy sector remains heavily reliant on imported heavy fuel oil and diesel, leading to high greenhouse gas emissions and consumer costs.

Institutional Capacity: Rapid sectoral growth has strained existing institutions, highlighting the need for enhanced capacity to manage and regulate the burgeoning oil and gas industry effectively.

Limited Skilled Workforce: There is a shortage of skilled professionals in the energy and infrastructure sectors, which may hinder development efforts.

Opportunities

Renewable Energy Development: Guyana aims to achieve 70% renewable energy usage by 2030, presenting opportunities for investments in hydro, solar, and wind energy projects.

Diversification of the Economy: Oil revenues can be channelled into sectors like transport infrastructure, manufacturing, agriculture and services – health & education, reducing economic dependence on oil and fostering sustainable development.

International Collaborations: Guyana's growing energy sector offers avenues for partnerships with countries like India in areas such as technology transfer, capacity building, and infrastructure development.

Threats

Environmental Risks: Intensified oil exploration and production raise concerns about environmental degradation and the potential for oil spills, which could harm biodiversity and fisheries that could impact sustainable development goals.

Economic Overdependence on Oil: Reliance on oil revenues exposes Guyana to global oil price volatility, which could destabilize the economy if diversification efforts are not pursued.

Geopolitical Tensions: Territorial disputes, particularly with neighbouring Venezuela over the Essequibo region, could pose risks to offshore oil operations and regional stability.

3.6. Benchmarking

Benchmarking involves comparing Guyana's oil and gas, energy, and infrastructure sectors with those of countries experiencing similar economic growth trajectories. This process helps in identifying best practices and successful collaborations that can inform Guyana's strategies. Compare Guyana’s oil & gas, energy, and infrastructure sectors with other countries in similar stages of economic growth (e.g., emerging economies with new oil discoveries).

Guyana's recent offshore oil discoveries have positioned it among emerging economies experiencing rapid growth in the oil and gas sector. To benchmark best international practices, it's insightful to compare Guyana's oil and gas, energy, and infrastructure sectors with those of similar emerging economies and advanced nations.

3.6.1. Oil and Gas Sector

Emerging Economies with New Oil Discoveries:

- **Namibia**: Recent offshore oil and gas discoveries have attracted major energy companies, with the nation aiming to double its GDP growth within a decade. Namibia emphasizes strong governance to avoid pitfalls experienced by other oil-rich nations and plans to use energy revenues to improve citizens' livelihoods.

- **Senegal**: Senegal recent oil and gas discoveries offshore and the monetization efforts in natural gas as LNG is placing Senegal amongst the LNG exporting nations.

Advanced Economies:

- **Norway**: Renowned for its prudent management of oil revenues, Norway established the Government Pension Fund Global, ensuring long-term economic stability and investment in public welfare. Norway is also credited to use 100 percent renewable energy and exporting oil and gas to other European buyers.

3.6.2. Energy Sector

Emerging Economies:

- **African Nations under ACFTA**: The African Continental Free Trade Area aims to boost foreign direct investment in the energy sector by offering a unified market, enhancing customs efficiency, and promoting infrastructure development. This initiative is expected to increase cross-border energy investments, particularly in renewables.

Advanced Economies:

- **Germany**: Germany's Energiewende (energy transition) focuses on increasing renewable energy usage, reducing greenhouse gas emissions, and enhancing energy efficiency, serving as a model for sustainable energy policies.

3.6.3. Infrastructure Sector

Emerging Economies:

- **India**: Through its National Infrastructure Pipeline, India plans to invest over US$1 trillion in infrastructure over five years, focusing on transportation, energy, and urban development to support rapid economic growth.

Advanced Economies:

- **Singapore**: Known for its world-class infrastructure, Singapore invests heavily in sustainable urban planning, efficient public transportation, and smart city technologies, setting benchmarks for infrastructure development.

3.6.4. Best International Practices for Guyana's Consideration

1. **Establish Sovereign Wealth Funds**: Adopting models like Norway's Government Pension Fund can help manage oil revenues sustainably, ensuring long-term economic stability.
2. **Invest in Renewable Energy**: Drawing from Germany's Energiewende, Guyana can diversify its energy mix by investing in renewables, Biofuels reducing reliance on fossil fuels, and promoting environmental sustainability.
3. **Enhance Infrastructure Planning**: Emulating Singapore's approach to infrastructure, Guyana can focus on sustainable urban planning and smart technologies to improve public services and economic efficiency.
4. **Promote Regional Cooperation**: Taking cues from initiatives like ACFTA, Guyana can engage in regional partnerships to boost trade, investment, and infrastructure development, fostering economic growth.

   By benchmarking against these international practices, Guyana can strategically develop its oil and gas, energy, and infrastructure sectors to achieve sustainable and inclusive growth.

   Identification of Comparator Countries

   Countries such as Suriname, Trinidad and Tobago are selected for comparison due to their analogous economic structures and experiences in the energy sector.

   Analysis of Best Practices

   Examining how these countries have managed their energy resources, attracted foreign investment, and developed infrastructure provides valuable insights for Guyana.

In about a decade Guyana may like to have physical and social infrastructure in place to match with that of Brazil. The document does not explicitly compare Guyana's infrastructure investment needs to Brazil's, but based on broader regional estimates, Latin America and the Caribbean (LAC) require annual investments of around 3.12%–6.31% of their GDP to bridge the infrastructure gap. Given Guyana's GDP, the estimated investment needed to upgrade its infrastructure to at least that of Brazilian standards could range between USD 3-6 billion over the next decade. Guyana is undergoing a transformation driven by its recent oil discoveries, with potential for economic expansion in energy and infrastructure. However, the country faces significant challenges that could hinder sustainable development. India, with its expertise in project execution, renewable energy, and infrastructure, can play a pivotal role in bridging these gaps. Below is a detailed gap analysis of Guyana's challenges and India's capabilities to address them.

3.7. Gap Analysis

Gap analysis is conducted to identify areas where Guyana faces development challenges and to evaluate India's capacity to address these gaps through collaboration.

3.7.1. Identification of Development Challenges

Energy Infrastructure: Assessing the current state of Guyana's energy infrastructure to pinpoint deficiencies and areas needing improvement.

Technological Needs: Identifying technological gaps that hinder efficiency and growth in the energy and infrastructure sectors.

The Inter-American Development Bank has in its publication *The infrastructure gap in Latin America and the Caribbean* have estimated the following investment needed through 2030 by Guyana to meet the sustainable development goals:

Table 3.1. Investment needed through 2030 by Guyana to meet the sustainable development goals

Infrastructure Sector	Investment Gap Estimated	Key Challenges
Transportation	$1.2 - $2.0	Poor road connectivity, lack of modern highways, limited port facilities, and underdeveloped airport infrastructure.

Water & Sanitation	$0.5 - $1.0	Limited access to clean water, outdated sanitation systems, and lack of wastewater treatment plants.
Housing	$0.8 - $1.5	Shortage of affordable housing, inadequate urban planning, and lack of modernized housing units.
Energy Infrastructure	$1.0 - $2.0	Inconsistent electricity supply, reliance on fossil fuels, need for renewable energy expansion (hydropower, solar, wind).

Source: *The infrastructure gap in Latin America and the Caribbean,* Inter-American Development Bank

3.7.2. Investment Needs:

The estimated investment required to bridge Guyana's infrastructure gap in key sectors such as transportation, water and sanitation, housing, and energy is significant. The document provides projections for investment needs through 2030, aligning with Sustainable Development Goals (SDGs).

Transportation Infrastructure: There is a need for substantial investment in roads, highways, ports, and airports. Connectivity with neighbouring countries, including Brazil, remains a challenge due to underdeveloped road networks.

Water and Sanitation: Guyana faces challenges in ensuring universal access to clean water and sanitation services. Investments are needed to improve water treatment facilities and sewage infrastructure.

Housing Sector: Affordable housing is a key concern, with urban areas facing shortages in adequate housing. Expansion of residential infrastructure is necessary to accommodate a growing population.

Energy Infrastructure: Energy supply and reliability require improvement. The expansion of renewable energy sources is emphasized to meet SDG commitments.

3.8. Evaluation of India's Capacities

Technological Expertise: India's advancements in energy technology and infrastructure development are examined to determine how they can be leveraged to support Guyana's needs.

Human Capital: Assessing India's experience in capacity building and training programs that could benefit Guyana's workforce development.

By integrating these methodologies, the study aims to provide a comprehensive analysis of the potential for India-Guyana cooperation in the energy and infrastructure sectors. The

combination of desk research, comparative analysis, stakeholder mapping, scenario forecasting, SWOT analysis, benchmarking, and gap analysis ensures a robust framework for identifying opportunities and formulating strategic recommendations.

3.8.1. Oil & Gas Sector Key Challenges in Guyana

i. **Lack of Domestic Refining Capacity**

a. Guyana exports its crude oil and imports refined petroleum, making it dependent on external markets.

b. No domestic refineries exist, increasing energy costs and reducing economic benefits from oil.

c. Limited expertise in refining and petrochemical industries.

ii. **Limited Local Technical Expertise**

a. Oil exploration and production are dominated by foreign companies (ExxonMobil, Hess, and CNOOC).

b. Shortage of skilled local workforce in petroleum engineering, drilling, and reservoir management.

c. Dependence on expatriate professionals for offshore drilling and logistics.

iii. **Regulatory and Institutional Weaknesses**

a. Limited experience in oil contract negotiations and revenue management.

b. Need for stronger regulatory frameworks to avoid the "resource curse."

c. Gaps in environmental risk management for offshore drilling.

India's Expertise and Potential Solutions

Exploration, Production, Transport & storage, Refining and Petrochemicals: Indian companies like Oil & Natural Gas Corporation (ONGC) the largest crude oil and natural gas upstream Company in India with a unique distinction of being a company with in-house service capabilities in all areas of Exploration and Production of oil & gas, contributing around 71 per cent to Indian domestic production. ONGC has been placed at the 14th position in the S&P Global Commodity Insights Top 250 Global Energy Company Rankings 2022 and ranked 4th in India and 158th globally in the Fortune Global 500 List 2023. ONGC Videsh Limited, is the wholly owned subsidiary and overseas arm of Oil and Natural Gas Corporation Limited (ONGC) has a global presence include in Latin America. The primary business of ONGC Videsh is to prospect for oil and gas acreages outside India, including exploration, development and production of overseas equity oil and gas. ONGC Videsh owns Participating Interests in 35 oil and gas assets in 15 countries and produced about 30.3% of oil and 23.7% of oil and natural gas of India's domestic production. In terms of reserves and production, ONGC Videsh is the second largest petroleum company of India, next only to its parent ONGC. Further India has large refining capabilities (e.g., downstream companies like IOC, BPCL, HPCL, MRPL (last two are subsidiaries of ONGC) to refine and produce petroleum products like Petrol, Diesel, Kerosene, Naphtha, and Cooking Gas LPG. Furthermore, private

sector Company like Reliance Industries can help Guyana set up refineries or invest in refining capacity through partnerships. India can arrange Skill Development Training programs for refinery operations and petrochemical processing through its world-class petroleum universities (UPES, IITs, ONGC Training Institutes, and PDPU). Guyana can collaborate with India for training oil and gas professionals under technical cooperation programs. Indias IT sector like CDAC can provide computing hardware and services to Guyana's energy sector keeping in view their existing presence in the Caribbean. Companies like GAIL and Petronet LNG can provide expertise in utilization of Natural gas.

Regulatory and Policy Support: India's experience in balancing government and private participation in oil and gas can help Guyana design better local content policies and regulatory frameworks. India's Petroleum and Natural Gas Regulatory Board (PNGRB) and Director General of hydrocarbons (DGH) can advise Guyana on energy governance.

3.8.2.Energy Sector Key Challenges in Guyana

Heavy Dependence on Fossil Fuels: Despite having oil reserves, Guyana relies on imported heavy fuel oil and diesel for power generation. Further, it has high energy costs due to lack of refining and poor distribution networks.

Underdeveloped Renewable Energy Infrastructure: Guyana aims to reach 60% renewable energy by 2030, but lacks solar, wind, and hydropower infrastructure. It has limited transmission and grid connectivity.

Power Supply and Reliability Issues: The frequent power outages and unstable electricity supply hinder industrial development. Further the high transmission and distribution losses are a drag on the economy.

India's Expertise and Potential Solutions

Solar & Renewable Energy Development:

India has one of the world's largest solar energy programs, with leading companies like Adani Green Energy and Tata Power. India can partner with Guyana to build solar farms and microgrids for rural electrification. Use India's International Solar Alliance (ISA) expertise to develop solar policies and financing mechanisms.

Hydropower Development:

India has vast experience in small- and medium-scale hydro projects (e.g., NHPC, SJVN Ltd.). Guyana's Amaila Falls Hydropower Project could benefit from India's project management and financing.

Grid Modernization and Power Distribution:

India's expertise in smart grids and energy-efficient transmission systems can help improve Guyana's electricity reliability. Indian companies like Power Grid Corporation of India Ltd. (PGCIL) can assist in building high-voltage transmission infrastructure.

3.8.3. Infrastructure Development Gaps & Key Challenges in Guyana

1. **Inadequate Transport and Logistics Infrastructure**

- Underdeveloped roads, bridges, and ports limit economic efficiency, effectiveness and expansion.
- Inefficient logistics systems slow down oil and gas transportation and exports.
- Lack of investment in railways, inland waterways, and deepwater ports debilitate economic growth and efficiency.

2. **Limited Urban Planning and Smart Infrastructure**

- Rapid economic growth is outpacing urban infrastructure development.
- Poor drainage, waste management, and limited digital infrastructure.
- Rising real estate costs and informal housing settlements.

3. **Lack of Project Financing and Execution Expertise**

- Guyana has access to oil revenues but lacks the institutional capacity to manage large infrastructure projects.
- Limited experience in public-private partnerships (PPPs) for infrastructure funding.

3.9 India's Expertise and Companies in Infrastructure Development

India has successfully implemented large-scale infrastructure projects, such as Highway Development (Golden Quadrilateral & *Bharatmala* Project), Port Modernization (Sagarmala Initiative) and Airports expansion and modernisation through Public Private Partnerships which is emulated by many countries across the world. Recognizing the critical role of private investment in accelerating infrastructure development, India has pioneered an expansive public-private partnership (PPP) program. This model, marked by scale, diversity, and innovation, has positioned India as a global leader in infrastructure financing and execution—making it a blueprint for other countries seeking to leverage private capital for public good.

India's Leadership in PPP-Driven Infrastructure

Over the past two decades, India's PPP framework has matured into one of the most advanced in the world. According to the World Bank's *Private Participation in Infrastructure (PPI) 2023 Half-Year Report*, India ranked fourth globally in total private sector investments in infrastructure—a testament to its thriving PPP ecosystem. The country's success can be attributed to innovative models such as the Hybrid Annuity Model (HAM) and Toll-Operate-Transfer (TOT), which have significantly de-risked projects and enhanced private sector confidence.

India's PPP excellence is also reflected in the Economist Intelligence Unit's 2023 Infrascope report, where the country is ranked among the top three Asian nations for its institutional

maturity, regulatory framework, and business climate for PPPs. This showcases India's readiness to serve as a knowledge partner for nations seeking to develop sustainable infrastructure through PPPs.

Surging Infrastructure Investments

India's infrastructure spending is on a meteoric rise, with planned investments for 2024–2030 estimated at ₹143 trillion ($1.74 trillion)—more than double the ₹67 trillion spent between 2017–2023, as per the *CRISIL Infrastructure Yearbook 2023*. This surge underscores India's aggressive push to modernize its core infrastructure, particularly in roads, railways, energy, and urban development, while rapidly expanding investments in green infrastructure.

Table 3.2 Estimated Infrastructure Investments for India (₹ trillion)

Sector	2017–2023	2024–2030
Core Infrastructure	50.4	96.8
Roads	18.3	37.3
Railways	12.4	25.6
Urban Infrastructure	8.6	18.9
Other Infrastructure	11.1	15.0

Source: CRISIL Infrastructure Yearbook 2023

Flagship Initiatives Spearheading PPP

National Infrastructure Pipeline (NIP): Launched with an outlay of ₹111 trillion ($1.35 trillion) for 2020–2025, NIP covers over 9,000 projects, with nearly equal contributions from the central (39%) and state (40%) governments, while 21% is funded by private players. This integrated financing model has set a global benchmark in blending public and private capital for infrastructure development.

National Monetization Pipeline (NMP): India's asset monetization program is unlocking value from brownfield infrastructure assets to finance new projects. The NMP aims to raise ₹6 trillion ($73 billion) by 2025 by monetizing toll roads, power transmission assets, airports, and oil and gas pipelines. This approach is creating a replicable template for asset recycling in other countries.

Infrastructure Investment Trusts (InvITs): To attract both domestic and global institutional investors, India launched InvITs. The National Highways Authority of India (NHAI) and Power Grid Corporation of India Limited have successfully sponsored InvITs, raising billions in funding. For instance:

- In October 2022, NHAI InvIT raised ₹14.3 billion ($174.5 million) from domestic and international investors to acquire three road projects.

- Transmission assets worth ₹70 billion were transferred to the Power Grid InvIT.

Innovative Sector-Specific PPP Models

Roads and Highways: India has scaled up highway development through PPPs. The Ministry of Road Transport and Highways awarded 15 national highway projects worth ₹135.85 billion ($1.7 billion) in Bihar alone, reflecting the growing pace of infrastructure expansion.

Renewable Energy: With a strong policy push, India added 18 GW of renewable energy capacity in 2018 alone, despite global headwinds. By March 2023, India's installed renewable energy capacity surged to 172 GW, making it the fourth largest globally.

Urban and Social Infrastructure: Through initiatives like Smart Cities Mission and Housing for All, the government has promoted PPPs to transform urban areas. Tier-II and Tier-III cities are witnessing increased private investments in airports, water supply, and sanitation.

Ports and Airports: The port sector, open to PPPs since the 1990s, continues to witness steady private participation. The airport sector has also grown significantly, with 25 airports identified for monetization under the NMP by 2025, including Chennai, Patna, and Surat.

Green and Digital Infrastructure

India's PPP landscape is now expanding into green and digital infrastructure, offering new avenues for collaboration:

Green Investments: By 2030, India will invest ₹36.6 trillion in green infrastructure, focusing on solar, wind, hydrogen, and EV ecosystems.

Digital Infrastructure: The deployment of 5G networks, fibre optics, and data centres through PPPs is creating a robust digital backbone, essential for future economic growth.

India as a Knowledge Partner in PPPs

India's successful PPP models are increasingly being recognized as best practices for other emerging and developing economies. Through bilateral collaborations, technical assistance programs, and knowledge-sharing initiatives, India is positioned to support countries seeking to develop and execute PPPs for infrastructure modernization.

Countries in **Africa, Southeast Asia, and Latin America** are already seeking Indian expertise in structuring PPP contracts, risk allocation, and project financing. By offering capacity-building programs and facilitating cross-border infrastructure investments, India can strengthen its role as a global thought leader in PPP-driven development.

Leading Indian Companies in Infrastructure Development

Some of the most prominent Indian companies engaged in developing roads, highways, railways, ports, and airports, categorized by public and private sectors:

3.9.1. Roads and Highways

Public Sector Companies

National Highways Authority of India (NHAI): A government agency responsible for the development, maintenance, and management of national highways which spearheads major PPP projects under models like HAM, BOT, and TOT.

Border Road Organisation (BRO): A defence sector organisation focused on road construction, particularly in border areas.

PWDs (Public Works Departments): Various state-level PWDs actively develop and maintain state highways and road networks.

Private Sector Companies

Larsen & Toubro (L&T): One of India's largest infrastructure firms, renowned for executing major highway and expressway projects, involved in landmark projects like the Mumbai-Pune Expressway and the Delhi-Agra Toll Road.

IRB Infrastructure Developers Ltd.: A key player in BOT and HAM projects, managing over 20 highway projects across India.

Ashoka Buildcon Ltd.: Specializes in road construction and highway maintenance, with multiple PPP projects under its belt.

Dilip Buildcon Ltd. (DBL): Known for executing large-scale highway projects and emerging as a major EPC (Engineering, Procurement, and Construction) player.

GMR Infrastructure Ltd.: Although known for airports, GMR is also involved in expressway and highway projects.

3.9.2. Railways

Indian Railways: Network, Performance, and Modernization Initiatives

Indian Railways (IR) is one of the largest railway networks in the world, serving as the backbone of the country's transportation infrastructure. It plays a crucial role in both passenger and freight movement, contributing significantly to economic growth.

Key Statistics (as of 2023):

Network Length: ~68,000 km, making it the fourth-largest railway network globally.

Passenger Carriages: ~75,000 passenger coaches.

Freight Wagons: ~3,00,000 wagons.

Daily Passenger Volume: Over 22 million people travel by Indian Railways daily.

Stations: More than 7,300 railway stations across the country.

Employees: ~1.3 million people, making it one of the largest employers in the world.

Operational Performance

Passenger Traffic & Passenger-kilometres (PKM):

In 2022-23, Indian Railways recorded approximately 1,234 billion PKM, reflecting a strong post-pandemic recovery. Pre-pandemic figures (2018-19) were around 1,150 billion PKM, indicating steady growth.

Passenger Train Operations: About 13,500 passenger trains run daily, connecting rural, suburban, and metropolitan areas. Long-distance express trains, such as Rajdhani, Shatabdi, and Vande Bharat Express, are vital for intercity travel.

Freight Traffic & Freight Tonne-Kilometres (FTKM):

In 2022-23, freight traffic reached 856 billion tonne-kilometres, setting a record.

Key commodities transported: Coal (45% of total freight), Cement, iron ore, and steel, Petroleum products, Agricultural produce.

Daily Freight Volume: Around 3.5 million tonnes of freight is transported daily.

Modernization and Technological Advancements

Indian Railways has undertaken massive modernization efforts in speed, efficiency, electrification, and digitization to transform into a faster, greener, and more passenger-friendly network.

3A. Electrification and Green Initiatives

Railway Electrification: As of March 2024, over 90% of the broad-gauge network is electrified, up from 40% in 2014, with plans to achieve 100% electrification by 2030. Electrification improves efficiency, reduces fuel costs, and lowers carbon emissions.

Renewable Energy Adoption: Indian Railways is increasingly powered by solar and wind energy. Plans to achieve net-zero carbon emissions by 2030 by using 33 billion units of renewable energy annually.

3B. High-Speed Rail (Bullet Train) and Semi-High-Speed Rail

Mumbai-Ahmedabad Bullet Train (MAHSR): India's first high-speed rail project, based on Japanese Shinkansen technology, under construction with Max speed of 320 km/h., covering 508 km in just 2 hours (currently it takes ~6 hours by conventional train), expected completion: 2026 (phase-wise rollout).

Semi-High-Speed Trains (Vande Bharat Express): Introduced in 2019, capable of speeds up to 180 km/h, though currently operated at 130-160 km/h., 50+ Vande Bharat trains are operational, connecting key cities, there are plans to introduce 400 Vande Bharat trains by 2030.

3C. Track and Signalling Modernization

Track Upgrades: Major investment in track renewal, double-tracking, and gauge conversion to enhance capacity and reduce travel time, over 5,000 km of new tracks were laid between 2020 and 2024.

Automatic Signalling and ETCS Level-2: Upgrading the signalling system with European Train Control System (ETCS) to ensure better speed control and safety. ETCS Level-2 is being introduced on high-density routes, enabling continuous monitoring and communication.

KAVACH System (Train Collision Avoidance System): Indigenous safety system implemented across 1,400 km to prevent collisions. Planned rollout on 34,000 km of rail network.

3D. Dedicated Freight Corridors (DFCs)

Indian Railways is creating two massive freight corridors to improve freight efficiency and reduce congestion on passenger lines:

- Eastern DFC (1,337 km): From Ludhiana (Punjab) to Dankuni (West Bengal) which Enhances the transport of coal, iron, and food grains.
- Western DFC (1,506 km): From Dadri (Uttar Pradesh) to Jawaharlal Nehru Port (Mumbai), designed for container and bulk cargo movement.

Impact: Reduces transit time by 50%, boosting logistics efficiency and increases freight train speeds from 25 km/h to 70 km/h.

4. Digitization and Passenger Experience Upgrades

Smart Stations: Indian Railways is modernizing 200+ stations into world-class hubs with better passenger amenities. Features include automated ticketing, lounges, and high-speed Wi-Fi.

Real-Time Train Monitoring: Introduction of RFID-based tracking for real-time monitoring of wagons, locomotives, and coaches. Improved logistics planning and cargo management.

Ticketing and Passenger Services: Digital ticketing via IRCTC has reduced dependency on physical tickets. Introduction of e-catering services for better passenger comfort.

5. Global Expansion and Collaboration

Indian Railways is not only modernizing domestically but also collaborating with other countries:

Projects in Bangladesh, Nepal, and Sri Lanka: Developing railway lines, bridges, and stations.

Technical Support to African Nations: Providing expertise in track laying, rolling stock, and operations.

Collaboration with Japan and France: Partnership for high-speed rail projects and advanced signalling systems.

Electrification and green energy adoption are making Indian Railways more sustainable. High-speed and semi-high-speed rail projects are transforming travel efficiency. Freight corridors and track modernization are boosting logistics capacity. Digitization and passenger-centric upgrades are enhancing travel experience and Global expansion, and collaborations are strengthening India's position as a railway technology provider.

Besides the Indian Railways and its departmental undertakings, there are quite a few Private Sector Companies such as Larsen & Toubro (L&T), Tata Projects Ltd, Alstom India, Texmaco Rail & Engineering Ltd and KEC International Ltd which are actively involved in railway infrastructure projects, station redevelopment, metro, high-speed rail, EPC contracts, rolling stock, freight wagons manufacturing, electrification, track-laying and signalling.

3.9.3. Indian Ports: Development, Modernization, Expansion, and International Collaborations (2021–2024)

1. Overview of Indian Ports Sector

India has a vast and strategically located coastline of 7,517 km, with 12 major ports and 200+ minor and intermediate ports. The port sector plays a vital role in facilitating trade, handling over 95% of India's trade by volume and around 70% by value.

Key Statistics (as of 2024):

Cargo Volume: Over 1,350 million metric tonnes (MMT) handled in 2023-24, up from 1,280 MMT in 2022-23.

Major Ports' Share: ~60% of total cargo handled.

Top Major Ports:

Jawaharlal Nehru Port Trust (JNPT) – Maharashtra

Kandla (Deendayal Port) – Gujarat

Mundra Port – Gujarat (Private)

Chennai Port – Tamil Nadu

Visakhapatnam Port – Andhra Pradesh

2. Modernization and Expansion Initiatives

The Indian government, through initiatives such as Sagarmala and Maritime India Vision (MIV) 2030, has made significant efforts to modernize ports, improve efficiency, and expand capacity.

A. Sagarmala Programme: Launched in 2015, the Sagarmala Programme aims to reduce logistics costs and boost export competitiveness by modernizing ports and enhancing connectivity.

Progress (2021–2024):

Infrastructure Projects: Over 800+ projects worth ₹5.5 trillion ($66 billion) have been identified.

Completed Projects: By March 2024, 255 projects had been completed, while 200+ were under implementation.

Focus areas include port modernization, coastal community development, and improved hinterland connectivity.

B. Major Port Capacity Expansion:

Privatization and Capacity Augmentation:

The Jawaharlal Nehru Port Authority (JNPA) awarded a ₹4,000 crore ($480 million) project to privatize the container terminal for greater efficiency.

The Kandla Port (Deendayal Port) added 5 MMT of new cargo handling capacity in 2023.

The Chennai Port Trust is undertaking a ₹5,000 crore modernization project, including deepening channels and installing advanced cargo handling equipment.

Green Port Initiatives: Ports are shifting to renewable energy sources, aiming to reduce carbon footprints. Shore-to-ship power, solar plants, and electric cargo handling equipment are being installed.

C. Technology-Driven Modernization:

Digitization and Automation: Implementation of Port Community System (PCS 1x) for digital integration of stakeholders. Use of blockchain and AI-powered logistics management systems to enhance efficiency.

Smart Ports: Adani Ports introduced AI-enabled predictive maintenance systems at Mundra Port. Digital cargo tracking and automated container handling have improved turnaround times.

3. Performance Improvements

Efficiency Gains: The average turnaround time (TAT) for ships at Indian ports reduced from 64 hours in 2020 to 48 hours in 2024, improving efficiency. Container handling efficiency improved by 15-20% due to the adoption of automated cranes and faster clearance processes.

Increased Cargo Handling: Jawaharlal Nehru Port handled 6.8 million TEUs (twenty-foot equivalent units) in 2023-24, a record high. Mundra Port surpassed 160 MMT of cargo in 2023, making it India's largest commercial port.

4. International Collaborations and Investments

A. Foreign Direct Investments (FDI):

DP World (UAE) invested over $1.2 billion in Indian port infrastructure between 2021 and 2024, focusing on container terminals, free trade zones, and multimodal logistics.

APM Terminals (Maersk) expanded its operations at Pipavav Port, Gujarat, with a ₹800 crore investment to boost container handling capacity.

B. Bilateral and Multilateral Collaborations:

India-UAE Partnership: A strategic agreement to develop Maritime Logistics Zones in UAE and India, enhancing trade connectivity. Collaboration on green shipping corridors to promote sustainable maritime trade.

Chabahar Port Agreement with Iran: India is investing in Chabahar Port (Iran) as part of the International North-South Transport Corridor (INSTC). This project aims to enhance India's connectivity with Central Asia, Russia, and Europe.

Collaboration with Japan: Under the Japan-India Act East Forum, Japan is supporting the modernization of Kolkata and Chennai ports.

The Massive modernization and capacity expansion projects under Sagarmala and Maritime India Vision 2030 increased efficiency and reduced turnaround times through automation and technology adoption. Significant foreign investments and international collaborations are boosting port capacity and efficiency. Green port initiatives promoting sustainability and reducing the carbon footprint and the Strategic partnerships with UAE, Iran, and Japan are enhancing global trade connectivity.

3.9.4. Indian Airports: Development, Modernization, Expansion, Performance, and International Collaborations (2021–2024)

1. Overview of the Indian Aviation Sector

India's aviation sector has witnessed rapid growth in recent years, driven by increasing passenger demand, infrastructure expansion, and enhanced connectivity. The country has 148 operational airports (as of 2024), including 35 international airports, with ongoing expansion projects to meet rising passenger and cargo traffic demands.

Key Statistics (2023-2024):

Passenger Traffic: ~410 million passengers handled in 2023-24, up from 344 million in 2022-23, marking a 19% YoY growth.

Cargo Traffic: ~3.3 million metric tonnes (MMT) of cargo handled in 2023-24.

Top Airports by Passenger Volume:

Indira Gandhi International Airport (Delhi) – Largest airport with **70+ million passengers** annually.

Chhatrapati Shivaji Maharaj International Airport (Mumbai) – Over **50 million passengers**.

Kempegowda International Airport (Bengaluru) – Handled **37 million passengers**.

Chennai, Hyderabad, and Kolkata airports also saw significant growth.

2. Airport Modernization and Expansion Initiatives

The Indian government, through initiatives like UDAN (Ude Desh ka Aam Naagrik) and the Greenfield Airport Policy, is modernizing existing airports and building new ones to accommodate growing air traffic.

A. Airport Expansion and Upgradation Projects:

New Terminals and Runways:

Delhi Airport (IGIA): New Terminal 1 expansion completed in 2024, increasing capacity to 100 million passengers annually.

Mumbai Airport: Expansion of Terminal 2, enhancing capacity by 40%.

Bengaluru Airport: New Terminal 2 (Phase 1) opened in 2023, adding 25 million annual passenger capacity.

Goa's Manohar International Airport: Opened in December 2022, catering to 4.4 million passengers annually, with further expansion plans.

Greenfield Airports:

Noida International Airport (Jewar): Under construction, expected to handle 12 million passengers annually in Phase 1 (completion by 2025).

Navi Mumbai International Airport: Scheduled for 2024-2025 completion, with a capacity of 20 million passengers annually in Phase 1.

Hirasar Airport (Rajkot, Gujarat): Operational from 2023, boosting regional connectivity.

B. Cargo and Logistics Expansion:

New air cargo terminals and logistics parks being developed at major airports (Delhi, Mumbai, Hyderabad) to enhance cargo handling capacity. The focus is on perishable goods and express cargo infrastructure.

3. Performance Improvements and Technological Upgrades

A. Passenger and Cargo Performance:

Passenger Traffic Surge: The number of domestic flyers increased by 27% in 2023 compared to 2022. International passenger traffic grew by 18% during the same period.

Improved On-Time Performance (OTP): Delhi, Mumbai, and Bengaluru airports improved their OTP by over 15% through digitization and operational efficiency.

Cargo Efficiency: Airports handled a record 3.3 million metric tonnes (MMT) of cargo in 2023-24, marking a 12% increase from the previous year.

B. Technology-Driven Modernization:

Biometric Boarding (DigiYatra): Launched in 2022, DigiYatra uses facial recognition for faster check-ins at Delhi, Mumbai, Bengaluru, and Hyderabad airports. Planned expansion to 25+ airports by 2025.

Automation and Smart Technologies: Implementation of automated baggage systems and AI-powered crowd management tools. Real-time flight tracking and predictive analytics for better scheduling.

Sustainable Airport Infrastructure: Delhi and Bengaluru airports certified as carbon neutral. Use of solar energy, electric vehicles, and rainwater harvesting at major airports.

4. International Collaborations and Investments

A. Foreign Direct Investments (FDI):

Zurich Airport International AG (Switzerland): Developing the Noida International Airport with an investment of over ₹30,000 crore ($3.6 billion).

Fairfax India Holdings Corporation (Canada): Invested ₹5,000 crore in Bengaluru Airport (Kempegowda), boosting capacity and infrastructure.

Adani Group and GMR Group: Partnerships with global airport operators for technology and infrastructure upgrades.

B. Global Collaborations:

India-UAE Aviation Cooperation:

Expanded bilateral air services agreement to increase flight frequencies and connectivity.

Emirates and Etihad Airways collaborating with Indian airports on cargo and passenger operations.

Air Transport Agreement with the US: Enhanced direct flight connectivity, improving cargo and passenger traffic.

India-Japan Airport Collaboration: Technical cooperation on air safety, security, and operations.

The Massive airport modernization and expansion projects, including new terminals, runways, and cargo infrastructure, Technological upgrades like biometric boarding

(DigiYatra) and automated systems improving passenger experience have resulted in significant passenger and cargo traffic growth of over 18-20% YoY, with enhanced operational efficiency. Sustainability initiatives with carbon-neutral airports and green infrastructure projects, FDI and global partnerships are driving infrastructure expansion and boosting airport capacity.

Emerging Trends and Global Expansion

Several Indian infrastructure giants are expanding their footprint globally by taking on international road, port, airport, and railway projects:

L&T is involved in metro and rail projects in Saudi Arabia and Qatar.

Adani Ports has expanded operations to Sri Lanka and Australia.

IRCON International is executing railway projects in Malaysia, Nepal, and Algeria.

GMR Airports is developing airports in the Philippines and Indonesia.

Besides the public sector companies mentioned above, Indian private sector firms like **L&T, GMR, and IRCON** can help **develop roads, ports, and airport projects** in Guyana.

Urban Planning and Smart City Development

India has demonstrated significant expertise and commitment in urban planning and smart city development, particularly through the implementation of the Smart Cities Mission (SCM) launched in June 2015. This initiative aims to enhance urban living by providing efficient services, robust infrastructure, and sustainable solutions across 100 selected cities. As of December 13, 2024, the SCM has achieved substantial milestones.

Project Completion: Out of 8,075 planned projects, 7,380 have been completed, marking a 91% completion rate. The total investment for these projects stands at ₹1,47,704 crore.

Urban Infrastructure Developments:

The SCM has led to the creation and enhancement of various urban infrastructures:

Integrated Command and Control Centres (ICCCs): All 100 smart cities have operational ICCCs that utilize data-driven insights to improve city operations, including transportation, water supply, and waste management. During the COVID-19 pandemic, these centers functioned as war rooms, aiding in crisis management. For Public Safety Enhancements over 84,000 CCTV cameras, 1,884 emergency call boxes, and 3,000 public address systems have been installed to bolstered urban safety. Traffic

enforcement has improved with systems for red light violation detection and automatic number plate recognition.

Water Management: More than 17,026 kilometers of water supply systems are monitored using Supervisory Control and Data Acquisition (SCADA), reducing water loss and leakages.

Solid Waste Management: Technological integration in over 66 cities has optimized waste collection and route management. Approximately 9,194 vehicles are now RFID-enabled for automatic tracking, enhancing efficiency.

Transportation Infrastructure: Development of 1,740 kilometers of smart roads and 713 kilometers of cycle tracks has improved urban mobility and promoted sustainable transportation options.

Educational and Health Facilities: The mission has facilitated the creation of 9,433 smart classrooms, 41 digital libraries, 172 e-health centers, and the installation of 152 health ATMs, contributing to better education and healthcare services.

Notable Projects:

Dharavi Redevelopment: In 2022, the Adani Group secured a contract to redevelop Mumbai's Dharavi area, one of Asia's largest slums, with an investment of $619 million. The project aims to transform the area into a "world-class" district, though it faces challenges related to resident displacement and environmental concerns. Financial Times+1Reuters+1

Kumbh Mela Infrastructure: The 2025 Maha Kumbh Mela in Prayagraj witnessed the construction of a temporary megacity over 4,000 hectares to accommodate 660 million pilgrims. This included 200,000 tents, 250 miles of roads, and 30 pontoon bridges, showcasing India's capability in large-scale urban planning for mass events. The Guardian

Challenges and Environmental Considerations:

Despite these advancements, urban projects in India often encounter environmental and infrastructural challenges. For instance, Bengaluru, known as India's Silicon Valley, has experienced rapid urbanization leading to traffic congestion, water shortages, and environmental degradation. Additionally, projects like the Dharavi redevelopment and others have faced legal challenges concerning environmental impacts and land use. Business InsiderReuters

Overall, India's endeavours in urban planning and smart city development reflect a balanced approach of leveraging technological advancements and infrastructural investments to create sustainable and efficient urban environments, while also navigating the complexities associated with rapid urbanization and environmental sustainability.

Guyana can adopt India’s smart city models to manage its urban expansion.

Project Financing and Execution Support:

India has cultivated substantial expertise in the financing, development, and execution of oil, gas, energy, and infrastructure projects. This proficiency is evidenced by the successful completion of numerous large-scale ventures both domestically and internationally.

Project Financing and Execution Support in India:

The Indian financial ecosystem offers robust support for infrastructure projects through various mechanisms:

Consortium Lending: Major banks collaborate to provide substantial loans for large-scale projects. For instance, Bharat Petroleum Corporation Limited (BPCL) secured a ₹31,802 crore loan from a consortium of six banks led by the State Bank of India for its Bina Refinery expansion and petrochemical project.

Government Initiatives: Schemes like the Viability Gap Funding (VGF) support public-private partnerships by making projects commercially viable.

Specialized Financial Institutions: Entities such as the India Infrastructure Finance Company Limited (IIFCL) provide long-term debt for infrastructure projects.

Prominent Domestic Projects:

Paradip Refinery: Commissioned in 2016 by Indian Oil Corporation Limited (IOCL) in Odisha, this refinery has an installed capacity of 15 million tonnes per year. It produces various petroleum products, including petrol, diesel, LPG, and aviation turbine fuel, and features a zero-effluent discharge system.

Dabhol–Bangalore Natural Gas Pipeline: Completed in 2013 by GAIL (India) Limited, this 1,386-kilometer pipeline connects Dabhol in Maharashtra to Bangalore in Karnataka. It was constructed in 19 months with an investment of ₹4,500 crore and has a design capacity of 16 million cubic meters per day, facilitating the generation of 3,000 MW of electric power.

Numaligarh Refinery Expansion: Oil India Ltd plans to expand the Numaligarh refinery in Assam from 60,000 barrels per day (bpd) to 180,000 bpd by March 2027. The project includes laying a new crude oil pipeline to Paradip Port in Odisha, expected to be operational by December 2025, with an investment of ₹25,000 crore. Reuters

International Ventures:

Indian companies have also made significant strides globally:

Mozambique LNG Project: BPCL is investing in the Mozambique LNG project, expected to commence operations in early 2025. This venture aims to diversify India's energy sources and strengthen its global presence in the energy sector.

Russian Oil Projects: Oil India Ltd holds stakes in two Russian projects, with significant dividends anticipated. These investments underscore India's commitment to securing energy assets abroad.

Foreign Investments in India:

India's energy sector has attracted substantial foreign investments:

Saudi Aramco's Interest: Saudi Aramco is in discussions to invest in new refineries in India, seeking stable markets for its crude amidst shifting global dynamics. Reuters

German Investment: Germany's KfW's DEG unit plans to more than double its investments in India to $1 billion, focusing on energy and infrastructure projects, aligning with India's climate goals. Reuters

Shell, Chevron and ExxonMobil has established global energy hubs at Bangalore

India's adeptness in project financing and execution, supported by a comprehensive financial framework and strategic international collaborations, continues to drive significant advancements in the oil, gas, energy, and infrastructure sectors.

India's **National Infrastructure Pipeline (NIP)** provides a **template for large-scale project execution**.

Indian financial institutions (Exim Bank of India, NIIF) can be roped in to **fund projects in Guyana**.

Table 3.3. India-Guyana Collaboration: Sector-wise Challenges and possible Solutions

Sector	Sub-Sector	Guyana's Gaps / Challenges	India's Expertise & Solutions (Public & Private Sector)
Oil & Gas	Upstream (Exploration & Production)	Limited technical expertise in offshore exploration	ONGC Videsh (PSU), Oil India Ltd (PSU), Reliance,
		Lack of seismic data and drilling infrastructure	Field surveys by ONGC (PSU) and Oil India Ltd (PSU). Seismic Data Processing and Interpretation by ONGC. Computing hardware and services by CDAC
	Midstream (Transportation & Storage)	Inadequate pipeline network	GAIL (PSU) for pipeline construction, IOCl, BPCL HPCL (PSU) for storage solutions
		Limited oil & gas storage capacity	Storage terminals by IOCL (PSU), BPCL (PSU)
	Downstream (Refining & Petro-products)	No refining capacity	Refinery investments by IOCL (PSU), HPCL (PSU), BPCL (PSU), Reliance
		Lack of petrochemical production	Petrochemical plants by IOCL (PSU), HPCL-Mittal Energy
		Weak regulatory frameworks	Policy advisory from India's Petroleum & Natural Gas Regulatory Board (PNGRB)
Energy	Fossil Fuel – Generation	Dependence on diesel for power generation	NTPC (PSU), NHPC (PSU), Tata Power, Adani Power
		High generation costs	Fuel efficiency optimization by BHEL (PSU)
	Fossil Fuel – Transmission & Distribution	Aging or weak transmission grid	Power Grid Corporation of India Ltd (PGCIL) (PSU), REC (PSU), Sterlite Power

		High transmission losses	Smart metering & monitoring by EESL (PSU), private firms
	Renewable – Solar/Wind/Hydro Generation	Limited renewable capacity	Solar parks by NTPC Renewable Energy Ltd (PSU), Adani Green, ReNew Power
		Lack of technical expertise	Capacity building by IREDA (PSU), training by NTPC (PSU)
	Renewable – Transmission & Distribution	Inadequate infrastructure to integrate renewables	Grid modernization by PGCIL (PSU), SECI (PSU), Tata Power
		Limited access to off-grid renewable solutions	Distributed solar systems by EESL (PSU), Tata Power Solar
Infrastructure	Roads & Highways	Poor road network and connectivity	Road construction by NHAI (PSU), L&T, Ashoka Buildcon
		Lack of expressways and high-speed corridors	Expressways by NHIDCL (PSU), construction by Afcons, L&T
	Railways	No railway infrastructure	New rail network by Indian Railways (PSU), RITES (PSU), IRCON (PSU)
		Inefficient cargo transport	Dedicated freight corridors by DFCCIL (PSU), logistic hubs
	Sea Ports & Airports	Limited port handling capacity	Port development by JNPT (PSU), Adani Ports
		Inadequate airport infrastructure	Modern airport terminals by AAI (PSU), GMR, GVK
	Water, Sanitation & Flood Control	Inadequate flood management systems	Flood control by WAPCOS (PSU), NHP (PSU), RITES (PSU)
		Poor sanitation infrastructure	Water and sanitation projects by HUDCO (PSU), NBCC (PSU)
	Urban Infrastructure / Smart Cities	Lack of integrated urban planning	Smart City models by NBCC (PSU), Smart Cities Mission (Govt initiative)
		Insufficient waste and water management	Waste management plants by EESL (PSU), L&T, Tata Projects
	Housing (Economically Disadvantaged)	Housing shortage for low-income groups	Affordable housing under PMAY (Govt), HUDCO (PSU), NBCC (PSU)
		Informal settlements and slums	Slum redevelopment by NBCC (PSU), private firms
Digital Infrastructure	Connectivity & Telecom	Limited broadband penetration	BharatNet (PSU), BSNL (PSU), Reliance Jio, Airtel
		Weak digital infrastructure	E-governance platforms by NIC (Govt), TCS, Infosys
	Cybersecurity	Lack of strong cybersecurity frameworks	CERT-In (Govt), C-DAC (PSU), Infosys, Wipro
		Low data protection measures	Data security by NIC (Govt), public-private partnerships

Source: Authors estimates and propositions

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4. Sectoral Analysis – Potential Areas for Collaboration

4.1. Energy Sector: Current Performance and Opportunities

Guyana's investment policy framework is increasingly geared toward attracting high-quality foreign direct investment (FDI), especially in strategic sectors such as oil & gas, energy, transportation, and urban infrastructure—all areas where India holds proven technical expertise and operational experience. Since commencing oil production in 2020, Guyana has become a net crude exporter, swinging its trade balance into surplus and fuelling robust GDP growth. Yet, Guyana lacks domestic refining capabilities and continues to rely on petroleum product imports, offering a significant opening for Indian investment in refining infrastructure, petrochemical processing, and downstream energy logistics.
The establishment of a Natural Resource Fund to stabilize public finances from oil price volatility signals Guyana's commitment to long-term, sustainable fiscal management. This aligns with India's interest in energy security and strategic overseas investment, making joint ventures in oil exploration, storage, and value-chain development highly viable.

Guyana's electricity generation remains heavily reliant on imported diesel and heavy fuel oil, with 95% of energy generated from fossil fuels. This presents a timely opportunity for India-Guyana cooperation in renewable energy deployment—particularly solar, hydro, and bioenergy, sectors where India has excelled globally. India's experience in implementing low-cost solar parks, rural electrification, and smart grid infrastructure could help Guyana transition to a cleaner, more resilient energy matrix.

In parallel, India's engineering and construction capabilities can be leveraged to meet Guyana's urgent need for modernized transport infrastructure and urban development. The WTO's 2022 trade policy review of Guyana underscores the need for substantial investment in public transportation, roads, logistics, and affordable housing—areas that match India's capacity to deliver turnkey infrastructure projects under public-private partnerships (PPPs). Indian firms can also contribute to urban mobility solutions, green buildings, and smart city planning, enhancing the livability and efficiency of Guyana's expanding urban centres.

Despite a favourable FDI regime that provides income tax holidays and VAT exemptions, challenges remain in terms of bureaucratic procedures, limited stock market depth, and underdeveloped procurement systems. However, with the recent modernization of procurement thresholds and establishment of business support programs (e.g., the Green Business Technology Fund), the investment climate is improving. India can further contribute by sharing its experience in digital governance, entrepreneurship support systems, and SME scaling models, helping Guyana diversify its economy beyond oil.

Additionally, the two countries can collaborate under the CARICOM framework and South-South cooperation initiatives to foster mutual access to regional markets, technology transfer, and skill development. With Guyana's increasing engagement in global trade, and

India's growing presence in Latin America and the Caribbean, the time is ripe to forge a strategic economic partnership that delivers mutual benefit across key sectors.

Oil and Gas exploration and production of Guyana - current and forecast scenarios:

Guyana has rapidly emerged as a significant player in the global oil and gas industry since the discovery of substantial offshore reserves in 2015. As of early 2025, the nation produces approximately 674,000 barrels of oil per day (bpd), with production primarily from the Stabroek Block operated by ExxonMobil, Hess, and CNOOC. This output is projected to increase substantially, with estimates indicating production could reach between 1.2 million bpd and 1.5 million bpd by 2027. Such growth would position Guyana among the top oil producers globally, potentially accounting for approximately 1.5% of the world's total oil production, assuming global production remains around 100 million bpd.

The economic impact of this burgeoning oil sector is profound. Crude oil exports are projected to generate nearly $15 billion in net value by 2024, contributing to 5.7% of Guyana's Gross Domestic Product (GDP). This influx of revenue has facilitated significant infrastructure development and social programs, including direct cash transfers to citizens. However, the rapid economic transformation also presents challenges, such as managing inflation and ensuring equitable distribution of wealth.StatistaLatest news & breaking headlines

The following table summarizes key data on Guyana's oil production and economic impact:

Table 4.1 Guyana's oil production, oil export value and oil revenue as % of GDP

Year	Oil Production (bpd)	Crude Oil Export Value (USD)	Oil Revenue as % of GDP
2023	~400,000	N/A	N/A
2024	~650,000	~$15 billion	5.7%
2027	1.2M - 1.5M	N/A	N/A

Guyana's oil and gas sector is on a trajectory of rapid growth, with significant implications for both the national economy and the global energy market. Strategic management of this resource boom is crucial to ensure sustainable development and equitable prosperity for the Guyanese population.

4.1.1. Energy demand and supply challenges in Guyana

Over the past five years, Guyana's energy sector has faced significant challenges in balancing demand and supply. The nation's electricity generation has been predominantly reliant on imported fossil fuels, with approximately 97% of energy produced from heavy fuel oil and diesel as of 2021. This heavy dependence has resulted in some of the highest electricity costs in the Americas, averaging around $0.32 per kilowatt-hour, and has contributed to frequent and prolonged power outages. Guyana Energy Agency & Trade.gov

To address these issues, the Guyanese government has initiated several renewable energy projects aimed at diversifying the energy mix and reducing reliance on fossil fuels. Notable initiatives include the Guyana Utility Scale Solar Photovoltaic Program (GUYSOL), which plans to install a total of 33 megawatts (MW) of utility-scale solar photovoltaic farms across various regions. Additionally, solar-powered mini-grids have been deployed in hinterland

villages, and the Solar PV Home Energy Systems Project aims to provide 30,000 solar home energy systems to off-grid households. Guyana Energy Agency

Despite these efforts, the energy sector continues to grapple with infrastructural inefficiencies, including aging transmission lines that result in approximately 26% of electricity being lost during transmission and distribution. The table below provides an overview of key energy indicators over the past five years, highlighting the persistent challenges and the impact of recent initiatives:

Table 4.2 Guyana's energy installed capacity, peak demand and transmission & distribution losses.

Year	**Total Installed Capacity (MW)**	**Peak Demand (MW)**
2019	314	120
2020	320	125
2021	337	136
2022	350	150
2023	365	165

Sources: Guyana Energy Agency, Guyana Power and Light Inc

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This data underscores the gradual improvements in installed capacity and renewable energy integration. However, it also highlights the ongoing challenges in reducing transmission losses and meeting the growing energy demand. Continued investment in renewable energy infrastructure and modernization of the existing grid are essential to enhance energy security and sustainability in Guyana.

Guyana's energy /electricity sector has historically faced challenges of limited access, high cost, frequent outages, and dependence on imported fossil fuels. As of 2023, approximately 92% of the population had access to electricity, though reliability and cost

remain persistent concerns. The Guyana Power and Light (GPL) is the primary utility, responsible for generation, transmission, and distribution.

Table 4.3 Key Electricity Sector Indicators (2023)

Indicator	Value
Electrification Rate	92%
Installed Capacity	~415 MW
Peak Demand	~140 MW
Generation Mix	~90% fossil fuels, 10% renewable
Average Tariff	~US$0.30/kWh

Challenges in the Sector

- High Generation Costs: Heavy reliance on imported diesel and HFO leads to some of the highest electricity tariffs in the region.
- Grid Losses and Outages: Technical and commercial losses are around 27%.
- Low Renewable Penetration: Despite abundant solar, hydro, and biomass resources, renewables play a minor role.
- Underdeveloped Rural Electrification: Hinterland regions remain underserved.

Renewable Energy Potential and Projects

Guyana's geography and climate offer substantial potential for renewable energy:

- Solar: High solar irradiation (5.5–6.0 kWh/m²/day); several mini-grid projects underway in hinterland regions.
- Hydropower: Over 7,000 MW of potential; Amaila Falls (~165 MW) remains a flagship but stalled project.
- Biomass and Bagasse: Sugarcane processing offers cogeneration potential.
- Wind: Coastal wind speeds suitable for small-scale generation.

Flagship Programs and Policies

- Low Carbon Development Strategy (LCDS 2030): Positions renewables at the core of energy transformation.
- Gas-to-Energy Project (2025): Will use associated gas from offshore fields to generate 300 MW—expected to halve generation costs.
- Renewable Energy Transition Roadmap (2022–2035): Sets 70% non-fossil generation by 2030 as a target.

India's Experience: Lessons for Guyana

India has transformed its electricity sector through policy, technology, and financial innovation:

- Renewable Expansion: Installed 125+ GW of renewables by 2023, driven by auction mechanisms and solar parks.
- Rural Electrification: Achieved near-universal access through Saubhagya and Deen Dayal Upadhyaya Gram Jyoti Yojana.
- Smart Grids and Storage: Investments in grid balancing and battery storage—key for renewable integration.

Gujarat Solar Park Model: The Charanka Solar Park in Gujarat aggregates land, infrastructure, and transmission for utility-scale solar, reducing transaction costs. Guyana could adopt this approach in its coastal regions.

Table 4.4: Comparison – India and Guyana Electricity and Renewable Sector

Metric	Guyana (2023)	India (2023)
Total Capacity	415 MW	~400,000 MW
Renewable Share	~10%	32% (excluding hydro)
Avg. Tariff	US$0.30/kWh	~US$0.08/kWh
Electrification Rate	92%	~100%

Opportunities for India-Guyana Collaboration

- Solar Mini-grids: India's experience in deploying solar mini-grids can support hinterland electrification.
- Hydro Project Development: Technical collaboration on Amaila Falls and other small hydro projects.
- Battery Storage and Smart Grid Tech: Joint pilots in storage solutions for reliability.
- Training and R&D: Collaboration between TERI, NTPC, and Guyanese counterparts.

The transformation of Guyana's electricity sector hinges on its ability to diversify away from fossil fuels while expanding access and reliability. India's deep experience in renewables, grid integration, and rural electrification provides a rich foundation for bilateral cooperation and sustainable growth.

4.1.1. Sector Overview and Trends

Guyana's energy sector has long been characterized by underdeveloped infrastructure, historically characterized by high reliance on imported fossil fuels, low electrification rates in hinterland regions and a centralized grid system. As of 2023, around 90% of electricity generation was derived from heavy fuel oil (HFO) and diesel, resulting in electricity tariffs

among the highest in the region (US$0.30–0.35/kWh). Transmission and distribution are dominated by Guyana Power and Light Inc. (GPL), which suffers from high system losses (~27%) and frequent outages due to ageing infrastructure.

Electricity demand has been growing steadily at 5–7% per year, driven by rapid urbanisation, expansion in mining and manufacturing, and digitalization of services. Peak demand reached 180 MW in 2023, and is projected to exceed 300 MW by 2027, with total installed capacity currently around 415 MW.

4.1.2. Renewable Energy Potential and Transition Strategy

Guyana possesses considerable untapped renewable resources:

Hydropower: Technical potential of over 7,600 MW, anchored by the long-proposed Amaila Falls Project (165 MW).

Solar: High irradiation levels (5.5–6.0 kWh/m²/day); several mini-grids are being developed in hinterland areas.

Wind: Limited coastal potential; a 1.5 MW pilot wind farm is under development.

Biomass: Sugarcane processing offers cogeneration opportunities using bagasse.

Guyana's Low Carbon Development Strategy (LCDS) 2030 and Renewable Energy Transition Roadmap aim to raise the share of renewables to 70% by 2035.

India's expertise in decentralized solar, grid integration, and rural energy systems aligns well with Guyana's needs.

Key Projects and Initiatives

- Gas-to-Energy Project (Wales): A 300 MW power plant fed by offshore natural gas. Expected to halve electricity costs and facilitate renewable integration.
- Solar PV in hinterlands: Supported by IDB, India's EXIM Bank, and GOG funding.
- Energy Efficiency Program: Institutional retrofits, smart metering, and loss reduction initiatives.

4.1.3. Comparative Benchmarking: Regional and Global Comparisons

Compared to adjoining countries like Brazil and Venezuela and similar emerging oil economies like Suriname, Ghana, or Trinidad and Tobago, Guyana has a higher dependency on imported electricity fuels and slower renewable integration. However, its forest-based carbon credit economy is globally unique.

Table 4.5 Guyana's Regional and Global Comparisons on different parameters in energy

Country	Renewable Share (2022)	Electrification Rate	Power Losses (%)	Electricity Cost (US$/kWh)
Guyana	~10%	95% (urban); <50% (rural)	27%	0.30–0.35
India	~42%	~100%	~18%	0.07–0.10
Ghana	~30%	~85%	21%	0.15–0.18
Suriname	~40%	~90%	23%	0.20–0.25
Brazil	92%	97%	14%	0.153

Country	Renewable Share (2022)	Electrification Rate	Power Losses (%)	Electricity Cost (US$/kWh)
Venezuela	64%	99%	20.5%	0.11181

Sources: IRENA, IEA, National Utilities, World Bank

- Challenges in Energy Sector:
  - High generation costs and tariffs
  - Weak transmission-distribution network
  - Low rural energy access
  - Institutional and regulatory fragmentation
- Opportunities:
  - Diversification through solar and hydro
  - Regional energy trade (CARICOM grid integration)
  - Public-private partnerships in clean energy
  - India-Guyana tech and policy collaboration

4.1.4. India-Guyana Energy Collaboration Areas

Solar Mini-grids: Indian experience with decentralized systems can support rural electrification.

Hydro Development: Technical collaboration for Amaila Falls and micro-hydro projects.

Smart Grids and Storage: Pilots in battery storage and grid management.

Institutional Exchange: Involving NTPC, SECI, TERI, and counterparts in Guyana.

4.2. Oil and Gas Sector:

4.2.1 Emergence of the Oil Economy

Historically, Guyana was a net importer of fuel Guyana's offshore Guyana Basin and the inland Takatu Basin have attracted foreign companies such as Shell, Total and Mobil since the 1940s, who completed much geological investigations of the area and drilled a number of wells. In the Takatu Basin, 3 wells were drilled between 1981 and 1993, however they were dry or not found to be commercially viable.

Offshore oil exploration began in the 1950s, and 9 wells were drilled between 1965 and 1970, only one of which struck oil, Abary-1 well in the Kanuku license area. In the late 1980s, Mobil, Total, Guyana Exploration and BHP continued exploration in the region.

In the mid-2000s, CGX Energy attempted to spud a well but the rig was deterred by Surinamese gunboats claiming they were in Surinamese waters. United Nations International Tribunal for the Law of the Sea (ITLOS) determined the exact borders in September 2007 but no further wells were drilled until 2012.

As of 2020, Guyana has nine petroleum blocks under active leases, of which six have had active exploration. The Petroleum Division of the Guyana Geology and Mines Commission has the responsibility of monitoring exploration in Guyana. ESSO, a subsidiary of ExxonMobil, began exploring the off-shore region in 2008. As of March 2024, more than 30 discoveries of oil and gas have been made offshore Guyana with estimated reserves of about 11 billion barrels of oil equivalent.

Frontera Energy along with CGX in a joint venture in the Petroleum Prospecting License for the Corentyne block offshore Guyana have announced integrated results from the Kawa-1 exploration well drilled in 2021 confirming a light oil and gas condensate discovery. *The Kawa-1 discovery adds to the growing success story unfolding offshore Guyana and the integrated Kawa-1 well results further support our belief in the potentially transformational opportunity the joint venture has in one of the most exciting basins in the world.*

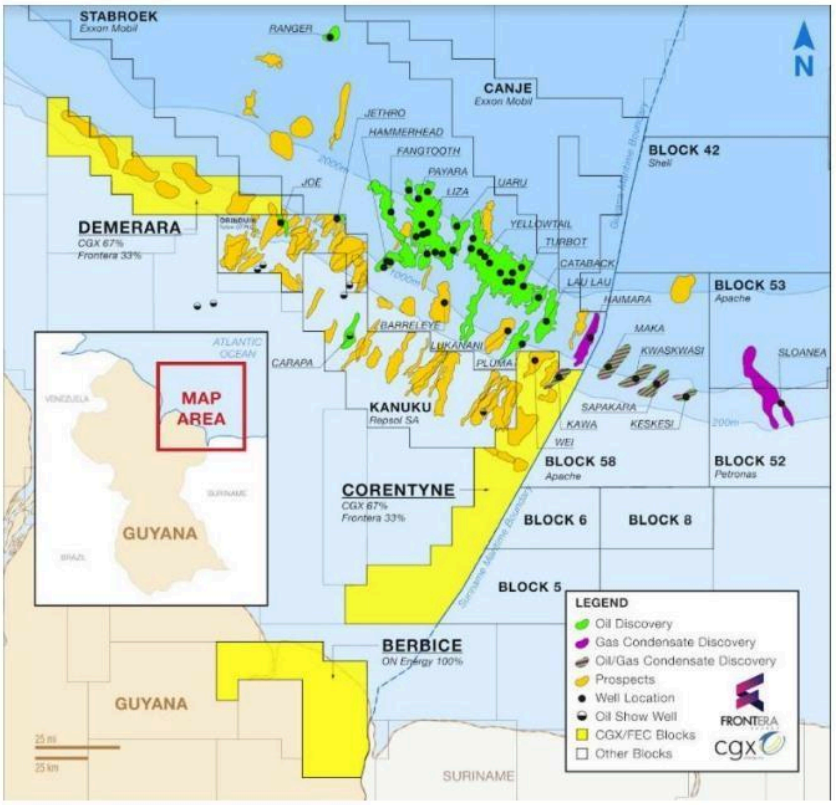

Figure 4.1: G*uyana acreage map; Source: Frontera Energy*

The discovery of significant offshore oil reserves in Guyana, particularly in the Stabroek Block operated by ExxonMobil and its partners Hess and CNOOC, has been a turning point for the country's economy. Since the first production in December 2019, Guyana's oil production has rapidly increased, reaching over 674,000 barrels per day (bpd) by 2024. By 2027, output is projected to exceed 1.3 million bpd, positioning Guyana as one of the top per capita oil producers globally.

There are concerns of large international companies getting an unfair share of ownership of oil royalties. Natural-resources watchdog group, Global Witness, reported that Guyana may have lost as much as $55 billion in potential revenue from negotiations that favored Exxon. Exxon refuted the claim based on unaccounted for costs of the high risk involved in exploring the "frontier hydrocarbon province". Global Witness withdrew its report in January 2021, redirecting its efforts to focus on fighting climate change.

Guyana announced new model petroleum contracts in 2022 to increase its share of revenue from oil production. The new contracts added a corporate tax and increased the royalty rate. However, the new terms do not apply to ExxonMobil's Stabroek Block, where all current crude oil production occurs.

In May 2015 ExxonMobil announced discovery of more than 90 meters of high-quality, oil-bearing reservoirs about 200 km off the coastline, considered to be one of the largest crude oil discoveries of the past decade. The Liza-1 well was drilled to 5,433 metres in 1,742 meters of water, and was the first well on the Stabroek block, which is 26,800 square km in area. Early estimates claimed the area contained 700 million barrels of oil (a total value of US$40 billion, international crude price at the time of discovery).

Liza Phase 1 project in the Stabroek block began producing crude 20 December 2019. Two more projects began production in February 2022 and November 2023.

Operated by ExxonMobil Guyana Limited (45%), with Hess Corporation (30%) and CNOOC (25%) as partners, the block spans 6.6 million acres and holds an estimated 11.6 billion barrels of oil. As of 2024, crude from the Stabroek Block remains the top-selling oil in Hess Corporation's global portfolio, averaging US$80.04 per barrel; surpassing production in the United States and Malaysia. The block went into arbitration following acquisition of HESS by Chevron and claim by ExxonMobil under first right of refusal.

The oil and gas exploration activity by Guyana created a new source of tension with neighbouring Venezuela. The 2015 discovery set off a round of acrimonies between Venezuela and its eastern border neighbour. Officials in Caracas, which has long had claims on Guyana's Essequibo region, have alleged that the concession is located in disputed waters (Fig. 4.2) This wasn't the first off-shore border dispute, as then-President Burnham had addressed the United Nations in 1968 over Venezuelan claims of area up to 12 miles from disputed territories. Prior to this, a border award was agreed upon in 1899 as the result of a case overseen by U.S. Chief Justice Melville Fuller.

Fig, 4.2 Venezuela claim on Guyana region (Source Venezuela's National Organization for Maritime safety)

TotalEnergies and QatarEnergy already have a presence in the Guyana Basin. TotalEnergies has a 35% stake in the ExxonMobil-operated Canje Block and holds a 25% interest in the Orinduik Block in a joint venture with QatarEnergy. TotalEnergies will be leading Suriname's first offshore development in the Gran Morgu field. When the deal with Guyana is finalized, TotalEnergies will have interests in seven blocks in the Guyana-Suriname basin.

The auction kicked off in 2022 (Fig 4.3) Guyana introduced its new model PSA with updated terms. The new PSA has a 10% royalty rate, up from the 2% in the widely criticized Stabroek PSA. The 75% cost recovery ceiling in the Stabroek PSA has been lowered to 65% in the new model contract.

The sharing of profits after cost recovery will remain 50/50 between the government and the contractor. Additionally, a corporate tax of 10% will be instituted, where there was none before.

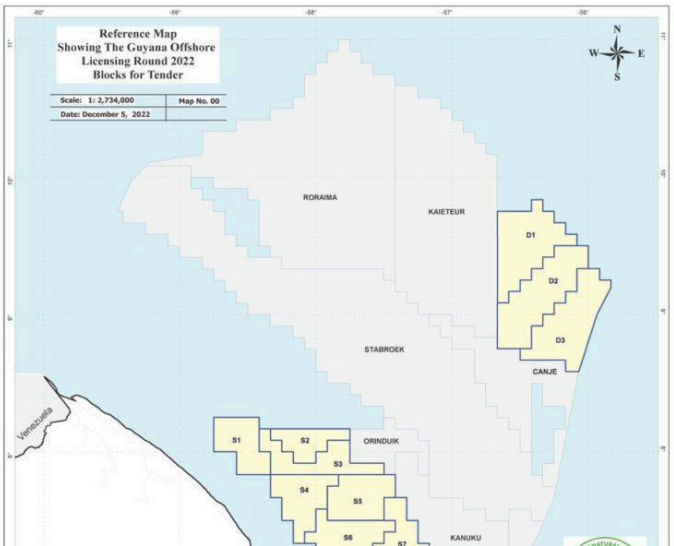

Fig.4.3 Map of the Guyana blocks which were put up for auction.

Guyana is seeking comments on its natural gas from public and is expected to incorporate acceptable comments into its strategy. ExxonMobil is being encouraged to shift its focus to gas, having lined up a series of oil projects that will take production offshore Guyana over 1.2 million bpd. Vice President Bharrat Jagdeo said Exxon would have to relinquish its gas discoveries if it is not interested in tapping them, so the government can pursue investment from interested parties. Exxon has been considering opportunities for standalone gas development offshore Guyana, and conducted appraisal drilling on its 2019 Haimara discovery a gas field situated near the Suriname border.

4.2.2. Fiscal and Economic Impacts

The establishment of the Natural Resource Fund (NRF) in 2019 provides a sovereign wealth mechanism for managing oil revenues. The government has allocated substantial oil receipts towards capital investment in infrastructure, education, and health. In 2024, oil revenues accounted for nearly 30% of the national budget. Guyana started spending revenues from its Natural Resource Fund (NRF) in 2022 after revamping legislation governing the account. It spent about US$607 million in 2021 and approved about US$1 billion for spending in 2023. The formula for withdrawals ensures there are savings every year after the first, and ties withdrawals only to inflows from the previous year. With about US$1.6 billion in expected royalties and oil sales from 2023, approximately US$1.16 billion will be legally allowable to support Guyana's 2024 budge

Table 4.6: Oil Revenue Contribution to Guyana's Budget

Year	Oil Revenue (US$ Billion)	% of Budget
2020	0.2	5%

2022	1.1	22%
2023	1.6	30%
2024	2.57	

Sources: Ministry of Finance, IMF (2023)

4.2.3 Regulatory and Institutional Framework

The Government has enacted the Petroleum Activities Act (2023) to update its regulatory oversight. Key institutions include:

- Ministry of Natural Resources: Policy oversight
- Guyana Geology and Mines Commission (GGMC): Technical and regulatory enforcement
- Natural Resource Fund: Fiscal stabilization and savings mechanism
- EPA: Environmental permitting and monitoring

India's own experience with regulatory bodies like the Directorate General of Hydrocarbons (DGH) and Oil Industry Safety Directorate (OISD) could support Guyana in institutional strengthening.

4.2.4 Benchmarking: Global Comparisons

Table 4.7 Key comparisons

Country	Oil Production (bpd)	Sovereign Wealth Fund	Local Content Policy	Key Challenges
Guyana	674,000	NRF (2021)	In place (2022)	Institutional capacity, environmental oversight
Norway	2.0 million	GPFG (US$1.4T)	Strong	Transitioning to renewables
Ghana	170,000	Stabilization Fund	Yes	Revenue volatility, capacity gaps
India	600,000	No national SWF	Yes (NDR)	Import dependence

Resource Governance Index (RGI), published by the Natural Resource Governance Institute (NRGI) assesses the quality of governance in the oil, gas, and mining sectors across various countries. The RGI evaluates countries based on three main components: Value Realization, Revenue Management, and the Enabling Environment.

Guyana's Performance: In the 2021 RGI, Guyana's oil and gas sector received an overall score of 56 out of 100, placing it in the "weak" performance band. This assessment reflects the country's nascent stage in oil production, which began in December 2019. Key findings include:

- Value Realization: Scored 53/100, indicating challenges in areas such as licensing processes and taxation.
- Revenue Management: Scored 56/100, highlighting the need for robust fiscal rules and transparent management of oil revenues.
- Enabling Environment: Scored 57/100, with particular concerns about government effectiveness and regulatory quality. Resource Governance+2Stabroek News+2Guyana Community Discussion Forums+2

Despite these challenges, Guyana has been recognized for its potential and competitiveness in the oil and gas sector. In 2022, IHS Markit ranked Guyana as the 10th most competitive jurisdiction globally for upstream exploration and production investment, ahead of countries like Brazil and Argentina. Guyana Times+2Caribbean News Service+2DPI+2

India's Context

India, while not a new entrant in the oil and gas sector, has faced its own set of challenges. The country has been working towards improving transparency and efficiency in its energy sector. However, specific scores or rankings for India in the 2021 RGI are not readily available in the provided sources.

Comparison with Other Producers

While detailed RGI scores for other countries are not specified in the provided sources, it's worth noting that governance quality in the oil and gas sector varies widely among nations. Established producers often have more mature regulatory frameworks, while newer producers like Guyana are in the process of developing and refining their governance structures.

In summary, the RGI provides a valuable framework for assessing and comparing the governance of the oil and gas sector across countries, highlighting areas of strength and opportunities for improvement.

4.2.5 Environmental and Social Governance (ESG)

Guyana faces increasing scrutiny over the environmental footprint of offshore oil production. The government is enhancing the environmental permitting process, including conducting cumulative impact assessments and marine baseline studies.

Adopting India's model of Compensatory Afforestation and integrating oil development with its Low Carbon Development Strategy (LCDS 2030) can provide a blueprint for green oil governance.

4.2.6 Strategic Role of Oil in National Development

Oil revenues have become central to Guyana's long-term development. Strategic uses include:

- Financing the Gas-to-Energy Project: Expected to reduce electricity costs by 50%
- Supporting diversification: Agricultural modernization, tourism, ICT
- Building fiscal buffers: Via the NRF for intergenerational equity

Gas to Power projects are the current focus of South American nations such as Argentina, Brazil and Bolivia switching to cleaner energy with gas infrastructure development.

4.7. Opportunities for India-Guyana Collaboration in Oil and Gas Sector

Guyana's oil sector has rapidly become the cornerstone of national transformation. With the right governance, environmental stewardship, and strategic partnerships—including with India—this resource can support broad-based and sustainable development. The oil and gas sector represents a critical area of strategic collaboration between India and Guyana, offering immense potential across the value chain—from upstream exploration to downstream refining and petrochemical development. Guyana, with its rapidly growing oil economy, is poised to become one of the leading oil producers in the Latin American and Caribbean region. With significant discoveries in recent years, especially in the Stabroek Block, the country is undergoing a transformation that requires international partnerships, capital investment, and technological expertise. Indian companies, with their robust capabilities across upstream, midstream, and downstream segments, are ideally positioned to support Guyana's ambitions and contribute to the sustainable development of its hydrocarbons sector.

These resources can be found and developed in joint ventures with Guyanese national companies and ONGC Videsh (OVL) which is already having presence in South America.

a) Upstream: Exploration and Production

Development Potential: The upstream segment encompasses exploration, and extraction of oil and gas resources. Guyana has emerged as a global hotspot in this area due to substantial offshore discoveries, especially in the ExxonMobil-operated Stabroek Block. With production already underway and multiple new discoveries being made, the sector is experiencing exponential growth. However, this rapid development demands skilled partners with technical prowess and operational experience in deep-water exploration and production.

Indian Expertise: India brings a wealth of knowledge and operational excellence in offshore oil and gas exploration. Public sector enterprises like ONGC Videsh and Oil and Natural Gas

Corporation (ONGC) have led successful projects in challenging offshore environments across Asia, Africa, and Latin America. ONGC Videsh, in particular, has a solid track record in managing international joint ventures, deep-sea drilling operations, and maintaining production in complex geological conditions. Indian companies can offer technical services such as seismic data interpretation, reservoir analysis, and offshore engineering, all crucial for optimizing Guyana's hydrocarbon extraction.

Collaborative Opportunities: Several promising areas exist for India–Guyana collaboration in upstream oil and gas, including:
Joint ventures with Guyanese and international firms to expand exploration and production activities in new offshore blocks.Technology transfer related to offshore drilling, seismic surveys (Acquisition, processing and Interpretation) enhanced oil recovery (EOR), subsea production systems, asset management and HPC.

Training programs and skill development initiatives to build local capacity in exploration and production, geosciences, offshore drilling operations, safety management and audit and environmental compliance. Such partnerships would not only boost production capabilities but also ensure that Guyana develops a technically proficient local workforce, creating long-term value for the country. Indian companies and institutions in these areas would be ONGC, OIL, DGH, and CDAC etc.

b) Midstream: Transportation and Storage

Development Potential: The midstream segment is the crucial link between production and refining or export. It involves the infrastructure necessary for the transportation and storage of oil and gas, including pipelines, ports, terminals, and storage tanks. Given Guyana's surging production levels, the current infrastructure needs significant expansion and modernization. There is an urgent requirement for investments in crude oil pipelines from offshore fields to the mainland, oil loading terminals, storage tanks, and marine infrastructure that can handle large volumes of crude oil exports.

Indian Expertise: India has extensive experience in building and managing complex midstream infrastructure. Companies such as Indian Oil Corporation (IOCL) and Petronet LNG operate some of the largest pipeline networks, oil terminals, and LNG regasification plants in Asia. These companies bring deep technical knowledge in pipeline engineering, port operations, and storage management. Additionally, they have demonstrated proficiency in Public-Private Partnerships (PPP), which could be replicated in Guyana's context to attract international investment while ensuring government oversight and participation.

Collaborative Opportunities: Potential areas of collaboration in the midstream sector include:
Infrastructure development, such as onshore and offshore pipelines for crude oil and gas, storage depots, and tank farms.
Construction of Floating Storage and Offloading (FSO) units, which provide an interim storage solution and reduce bottlenecks in oil exports. Port and terminal upgrades, including the development of new deep-water ports capable of handling large crude

carriers (VLCCs), thus enhancing Guyana's export capacity. By partnering with Indian companies, Guyana can rapidly expand its midstream capacity, reduce logistical bottlenecks, and enhance the overall efficiency and profitability of its oil exports.

c) Downstream: Refining, Petrochemicals, and Gas Processing

Development Potential: The downstream segment involves converting crude oil into refined products such as gasoline, diesel, aviation fuel, and petrochemicals. Currently, Guyana exports all of its crude oil due to the lack of local refining infrastructure. This presents a strategic opportunity to develop a domestic refining sector, thereby capturing more value locally and reducing dependency on imported refined products. Furthermore, Guyana can position itself as a hub for regional fuel supply and develop petrochemical industries that use oil by-products to manufacture fertilizers, plastics, and other industrial goods.

Indian Expertise: India's downstream sector is globally recognized for its scale, efficiency, and innovation. Industry leaders such as Reliance Industries, Indian Oil Corporation (IOCL), Bharat Petroleum Corporation Limited (BPCL) and HPCL operate some of the most advanced and integrated refinery and petrochemical complexes in the world. These companies have the capability to assist Guyana in designing, constructing, and operating greenfield refinery projects. Additionally, they can provide support in feasibility studies, project financing, environmental assessments, and operations and maintenance (O&M) services. Indian companies such as L&T, EIL, Adani are also experienced in infrastructure development.

Collaborative Opportunities: Key areas where India and Guyana can collaborate in the downstream sector include:
Establishing a national oil refinery in Guyana, tailored to process the country's specific crude type, with potential export capacity to neighboring countries.

Development of gas processing plants and associated infrastructure to handle natural gas associated with oil production, enabling power generation and industrial use. Creation of a petrochemical cluster using refinery by-products to produce essential industrial and agricultural inputs. Investment in marketing and distribution infrastructure, including retail outlets, fuel depots, and logistics networks to serve both domestic and regional markets. Such downstream investments would significantly boost Guyana's industrial base, generate employment, and enhance energy security. City Gas infrastructure development in Guyana is another area for Indian entities such as GAIL and PNGRB towards clean fuel.

The oil and gas sector offers one of the most dynamic and promising frontiers for India–Guyana economic collaboration. With India's well-established capabilities and Guyana's abundant resources, this partnership has the potential to drive long-term growth and prosperity for both countries. Strategic investments, joint ventures, and knowledge-sharing across upstream, midstream, and downstream segments will not only accelerate the development of Guyana's oil economy but also strengthen India's energy

security and global presence in the Western Hemisphere. This win-win framework can serve as a model for South-South cooperation in the 21st century energy landscape.

4.3. Guyana's Infrastructure Development Priorities (2025–2035)

Guyana stands at a pivotal point in its developmental trajectory. Bolstered by significant offshore oil discoveries, its economic landscape is rapidly evolving. The resulting fiscal gains are enabling the country to invest strategically in infrastructure development, aimed at enhancing connectivity, improving public services, and raising the overall standard of living. Guyana's infrastructure landscape is undergoing a significant transformation, fuelled by the recent surge in oil revenues and ambitious national development plans. Major priorities include road expansion, modernisation of seaports and airports, public transportation systems, and rural infrastructure. Over the next decade, Guyana is expected to channel a substantial portion of its oil revenue into developing key sectors such as transportation, water supply, sanitation, and housing. This report analyses the priority areas within these sectors and outlines the key initiatives and challenges shaping their future.

4.3.1. Transportation Infrastructure

Transportation network is a cornerstone of Guyana's economic and social development strategy. With an eye toward regional integration and internal connectivity, the government is focused on improving roads, ports, airports, and potentially rail-based systems. These efforts are crucial for reducing travel times, lowering logistics costs, and enhancing access to markets and services**.**

a. Road Networks

Guyana has an estimated 8,300 km of roads, of which less than 30% are paved. Road connectivity remains one of the most urgent priorities, particularly for linking remote interior regions with urban centers and trade hubs. The Georgetown–Lethem corridor, connecting Guyana to Brazil, is a critical artery for commerce and mobility. Improving access to mining zones and agricultural areas also remains essential.

Key Projects:

- East Coast Demerara Road Expansion: This ongoing project aims to ease urban congestion and accommodate the growing vehicular population.
- Linden–Lethem Road Development: Considered a strategic highway linking Guyana with northern Brazil, this road is vital for cross-border trade and hinterland development.
- Linden to Mabura Hill Road upgrade (US$190 million project, co-financed by the Caribbean Development Bank and UK-CIF) and the new Demerara River Crossing—an essential linkage between key commercial and residential areas.

Challenges: Maintenance issues persist due to high rainfall and inadequate drainage, causing frequent road deterioration. There is also a pressing need for more resilient engineering standards and long-term road asset management systems.

b. Port Infrastructure

Priority Areas: Ports are essential for supporting Guyana's increasing export volumes, particularly in oil, rice, sugar, and bauxite. With maritime trade expected to surge, the government has prioritized port modernization and capacity expansion.

Key Projects:

- Berbice Deepwater Port: This flagship project will serve oil exports, bulk shipping, and container traffic. It is expected to become a major logistics hub in the Guiana Shield region.
- Port Georgetown and New Amsterdam Expansion: Upgrading facilities, dredging waterways, and enhancing handling capacities are key to positioning the port for greater international trade.

These improvements will not only support oil exports but also promote broader trade diversification and supply chain resilience.

c. Airports

Priority Areas: Air transport infrastructure is vital in facilitating business travel, logistics for the oil and gas industry, and the growing tourism sector.

Key Projects:

- Cheddi Jagan International Airport (CJIA) Expansion: Upgrades include expanded terminal facilities, increased passenger capacity, and enhanced cargo handling systems for increased regional and international traffic.
- Ogle Airport Upgrades: This smaller but strategic airport is being upgraded for improved hinterland and regional connectivity and private charters.
- Regional Airport Development: Airports in Lethem, Bartica, and other interior regions are being prioritized to improve national cohesion and access to services.

d. Railways

Current Status: Guyana has no operational railway system. Public transport is informal, consisting mainly of minibuses and taxis. Guyana’s railway infrastructure is currently limited to legacy lines that are no longer in regular use. However, there is growing interest in reviving railway transport to support the bauxite and agricultural sectors. However, there have been talks about plans under consideration include reactivating the Georgetown–Burima line for cargo movement, particularly for heavy bulk commodities. Such developments could dramatically reduce transportation costs and offer a greener alternative to road transport.

e. Metro Rail/Urban Transit

Current Status: Guyana has no metro or light rail systems but increasing urbanization—especially in Georgetown—has sparked discussions on mass transit solutions.

Rationale for Metro or Light Rail: The East Coast Demerara (ECD) corridor, particularly from La Bonne Intention to Georgetown, is severely congested, with daily traffic snarls affecting commuters and commerce. Collaboration opportunity exit with India’s railway

and metro-rail expertise (e.g., Delhi Metro Rail Corporation) for urban transit feasibility studies.

Key Considerations:

- Nearly 90% of Guyana's population resides along the coastal plain, intensifying urban mobility needs.
- Infrastructure development on roads such as the Railway Embankment has exacerbated congestion, adding urgency to the search for alternatives.
- The Ministry of Public Works has already begun implementing short-term traffic management solutions, indicating political will to pursue sustainable mobility options.

Outlook: A light rail or Bus Rapid Transit (BRT) system along the ECD corridor is likely to gain momentum within the next 5 to 10 years as urban pressures increase.

4.3.2. Water Supply and Sanitation

With population growth and urban expansion, ensuring clean water access and effective sanitation systems is more urgent than ever. Waterborne diseases and inadequate infrastructure remain challenges in some regions, prompting a comprehensive national response.

a. Water Supply

Approximately 98% of the urban population has access to potable water; rural access stands at ~75%. Sewerage coverage is low, with Georgetown being the only major city with partial wastewater systems.

Priority Areas: Expanding clean water access to underserved rural and hinterland areas, while upgrading urban systems to ensure quality and efficiency.

Key Projects:

- Guyana Water Inc. (GWI) has launched several initiatives, including well rehabilitation, distribution network expansion, and the construction of new water treatment plants.
- Emphasis is placed on non-revenue water reduction, ensuring financial sustainability and resource conservation.

b. Sanitation Infrastructure

Priority Areas: Urban sanitation, particularly in Georgetown, remains a significant concern due to aging infrastructure and limited sewage coverage.

Key Projects:

- Georgetown Sewerage Upgrade: Plans are underway to modernize the city's existing systems, which currently lack the capacity to serve a growing urban population.
- Rural Sanitation Expansion: Extending sanitation services to rural and indigenous communities is a priority, including the replacement of pit latrines with environmentally friendly alternatives.

Public Health Impact: Improving sanitation is directly linked to reducing disease, improving hygiene, and supporting broader public health outcomes—making this an essential investment area.

4.3.3. Housing and Urban Development

Housing is a critical pillar of Guyana's infrastructure development agenda. Urban migration, coupled with an expanding expatriate community due to the oil boom, is putting pressure on housing stock and urban services.

a. Affordable Housing

Priority Areas: The government is prioritizing homeownership for low- and middle-income families through subsidized housing schemes and land allocations.

Key Projects:

- The Housing Development Programme is actively building new housing schemes in areas such as Providence, Better Hope, and East Coast Demerara.
- There is also a push to regularize land titles, enabling residents to access formal credit and services.

b. Urban Housing and Sustainable Planning

Georgetown Urban Planning: Population growth in Georgetown is driving demand for mixed-use developments, improved public infrastructure, and sustainable urban design.

Hinterland Focus: To reduce overdependence on the coast and alleviate urban overcrowding, the government is investing in housing and infrastructure development in the hinterland. These initiatives are designed to stimulate balanced regional growth and improve living standards in historically underserved areas.

Guyana's infrastructure development agenda for 2025–2035 reflects an integrated, forward-looking strategy to align with its growing economy and evolving societal needs. With significant funding now available from oil revenues, the country is in a unique position to implement transformative projects across transportation, water and sanitation, and housing sectors.

Strategic planning, public-private partnerships, and international collaboration—especially with countries like India—will be vital to delivering sustainable, inclusive growth. By prioritizing infrastructure, Guyana is not only addressing current gaps but also laying the foundation for a resilient and prosperous future. With oil revenues as a catalyst, Guyana is fast-tracking infrastructure expansion:

- **Roads**: <30% of 8,300 km are paved; major projects include **Linden–Mabura Hill Road** and the **Demerara River Crossing**.
- **Ports**: Strategic upgrades to Georgetown and New Amsterdam; a **deep water port in Berbice** is under development.
- **Airports**: CJIA is undergoing a US$150M expansion; secondary airports in Lethem and Ogle are being modernised.
- **Public Transit**: Currently informal; **urban rail feasibility studies** present an opportunity for Indo-Guyanese cooperation.

Urban Services and Housing

- **Water Access**: ~98% urban; ~75% rural
- **Sewerage**: Limited; mainly Georgetown

- **Housing**: A target of **50,000 house lots by 2030** under the Housing Drive Initiative India's Pradhan Mantri Awas Yojana (PMAY) this flagship housing scheme has delivered over 20 million affordable houses. Its model of demand aggregation, beneficiary-led construction, and subsidy-backed loans may guide Guyana's own initiatives.

Table 4.8: Infrastructure Development Indicators – Guyana and India (2023)

Indicator	**Guyana**	**India**
Road Density	5.5 km/100 km²	144 km/100 km²
Rail Network	None	67,956 km
Urban Housing Shortage	20,000+	~18 million
Access to Sanitation	~50%	~75%
Paved Roads Share	~30%	~71%

Collaboration Avenues

- **Smart Cities**: India's Smart Cities Mission offers templates for digital infrastructure and urban resilience planning. GIS planning, digital infrastructure, urban mobility
- **Road and Highway Construction**: India's experience in building highways (e.g., *Bharatmala*, PMGSY) offers learnings in design, cost efficiency, and quality control, Cost-effective tech.
- **Institutional Linkages**: Exchange between NHAI, NBCC (India), and Guyanese Public Works Ministry.
- **Affordable Housing**: Modular construction, training via NBCC and HUDCO
- **PPP Frameworks**: Adoption of **Hybrid Annuity Models** for infrastructure financing. India's hybrid annuity model (HAM) for roads could attract Indian contractors and developers.
- Technology Transfer: Prefabricated building technologies, GIS-based planning, and sustainable construction.
- Training and Capacity Building: Indian institutions like HUDCO and IRCON can assist with policy, technical training, and institutional development.

Infrastructure development in Guyana stands at a historic inflection point. India's proven capabilities in building inclusive, sustainable infrastructure through innovative financing and scalable design can serve as a guiding model for Guyana's national transformation.

Integrated Sectoral Roadmap for India-Guyana Partnership

Guyana stands at a transformative moment. Its rapid resource-led development and ambitious social goals require strategic partnerships to enhance institutional capacity,

technology transfer, and sustainable growth models. India brings deep, proven experience across:

- Energy transition and access
- Oil governance and green growth
- Infrastructure development
- Smart cities and affordable housing

Mutual cooperation frameworks—ranging from technical assistance and capacity building to joint ventures—can enable Guyana to leapfrog legacy challenges and position itself as a model for inclusive, low-carbon development in the region.

4.1.1 Infrastructure demand and supply challenges in Guyana

The infrastructure development in transportation (roads, ports, airports, railways, metro-rail), water supply, sanitation and housing sector are poised for significant expansion due to both public and private investment flooding into these sectors due to the growing oil and gas sector developments. Besides core sectoral development, opportunities exist for a range of support services and projects, including fabrication plants, cement factories, steel, ship building, construction and earth moving equipment, and engineering and construction services.

The GoG seeks to develop Guyana's infrastructure to meet the increasing demands of the oil and gas sectors and deliver more efficient road infrastructure to meet the demands of local businesses and citizens. Guyana's aging road network requires restoration and expansion to reach underserved populations in the interior. The GoG procurement system can benefit from digitization to permit digital submissions, foster transparency, reliability, and lifecycle cost analysis. The Ministry of Public Works is responsible for planning, creation and maintenance of major public civil works infrastructure throughout Guyana and is committed to plan, build and maintain a reliable, safe, efficient and cost-effective main road network and sea and river defence system to protect life and property; support the movement of people, goods and services; reduce the cost of transportation; promote economic growth and quality of life and protect the environment.

The Ministry of Public Works (MoPW) in Guyana invites qualified contractors, engineering firms, and consultancies to submit Expressions of Interest (EOI) for participation in upcoming infrastructure development projects. These projects are part of the Ministry's commitment to improving national connectivity, transportation efficiency, and public safety across key regions in Guyana. In October 2024, the Ministry invited competitive bid from experienced firms/ partners for various infrastructure projects, including:

Expansion and Rehabilitation of Major Roadways – Focused on improving traffic flow and road safety along critical routes, such as the East Bank Demerara and East Coast Demerara highways.

Bridge Construction and Upgrades – Construction of new bridges and reinforcement of existing ones to support increased transportation demands, particularly with projects like the new Demerara Harbour Bridge.

Drainage and Irrigation Systems – Upgrading and maintaining water management systems to prevent flooding and support agricultural sustainability in low-lying areas.

Port Development and River Transport – Enhancing Guyana's port facilities and river transport networks to facilitate greater trade and economic activity.

https://mopw.gov.gy/blog/expression-of-interest-5/expression-of-interest-eoi-infrastructur

e-development-projects-by-mopw-13

Guyana has high energy costs ($0.32 per kilowatt hour), an unreliable electrical grid, poor infrastructure, and the country is prone to flooding, particularly along the coastline, which sits below sea level. Foreign companies often find it expedient to partner with a local firm to help navigate the intricacies of the local market, especially if they are interested in bidding for public tenders. Many Indian firm have very good expertise and experience in planning and execution of such projects both within India and overseas in many countries and can explore the possibility of setting up joint ventures with Guyanese firm for these projects.

Potential collaboration opportunities in Oil & Gas, JVs, renewable energy (Solar , wind and Hydro), Geothermal and energy infrastructure development (Ports, pipelines , terminals and storage)

4.2 Technology and Innovation

In an era where technological advancement drives economic growth and societal development, fostering international cooperation in technology and innovation is paramount. India and Guyana, with their distinct yet complementary strengths, have a unique opportunity to collaborate in the realms of digital transformation, artificial intelligence (AI), high-performance computing (HPC), geosciences, and the establishment of innovation hubs. This section explores Guyana's technological needs, India's advancements in relevant technologies and energy frameworks, and potential avenues for collaboration, drawing upon the latest data from official sources and multilateral institutions.

Technological Needs of Guyana

Guyana, characterized by its diverse geography that includes coastal regions and remote hinterlands, faces significant challenges in establishing robust digital infrastructure. The disparity in connectivity between urban centers and indigenous communities in remote areas has led to a pronounced digital divide. To address this, the Guyanese government, in collaboration with the United Nations Development Programme (UNDP), initiated a program to establish over 200 Information and Communication Technology (ICT) hubs in indigenous regions. These hubs aim to provide residents with access to e-government services, market information, and educational resources, thereby empowering local communities and promoting inclusive development. https://www.undp.org/guyana/news/bridging-digital-divide-empowering-indigenous-regions-through-internet-connectivity-guyana

In November 2024, the Office of the Prime Minister of Guyana, through the National Data Management Authority and with support from the UNDP, launched the National Digital Readiness Assessment (DRA). This assessment evaluates the country's digital strengths and weaknesses across six pillars: connectivity, government, regulation, business, digital public infrastructure, and people. The insights gained are intended to inform policy design and guide Guyana's digital transformation journey. https://www.undp.org/guyana/press-releases/national-digital-readiness-assessment-launched

Artificial Intelligence (AI) presents another frontier for Guyana's technological advancement. While AI has the potential to drive sustainable development, its effective deployment requires foundational infrastructure, skilled human resources, and regulatory frameworks. The UNDP emphasizes the importance of building inclusive AI ecosystems, strengthening capabilities, and implementing solutions that benefit both people and the planet. https://www.undp.org/digital/ai

India's Advancements in Digital Infrastructure and AI

India has emerged as a global leader in digital public infrastructure, with its initiatives receiving commendation from international organizations such as the International Monetary Fund (IMF). The IMF's working paper titled "Stacking up the Benefits: Lessons from India's Digital Journey" highlights India's development of a world-class digital public infrastructure, which has significantly contributed to its sustainable development goals. https://timesofindia.indiatimes.com/indias-world-class-digital-infra-worth-emulating-by-many-nations-imf-paper/articleshow/99291639.cms

A cornerstone of India's digital transformation is the India Stack, comprising three layers: unique identity (Aadhaar), complementary payment systems (Unified Payments Interface - UPI), and data exchange platforms (DigiLocker and Account Aggregator). Aadhaar, launched in 2009, serves as a digital identity framework linking biometric and demographic data, facilitating direct transfer of payments to beneficiaries and reducing leakages. UPI, introduced in 2016, now powers a significant portion of global real-time transactions, with digital transactions rising from Rs 707.93 crore in 2016 to Rs 23.24 lakh crore in 2024.
https://timesofindia.indiatimes.com/indias-world-class-digital-infra-worth-emulating-by-many-nations-imf-paper/articleshow/99291639.cms

In the realm of AI, the Government of India launched the IndiaAI Mission, aiming to build a robust AI ecosystem by establishing high-performance computing infrastructure, enhancing data quality and AI models, and promoting indigenous AI technologies. The mission focuses on sectors such as healthcare, agriculture, and governance, with a budgetary allocation of Rs 2,000 crore for 2025-26. Key components include AI Centers of Excellence, the IndiaAI Innovation Centre, and initiatives for AI startups and skill development.

Collaboration Opportunities between India and Guyana

Digital Transformation

India's experience in building digital public infrastructure offers valuable insights for Guyana's digital transformation efforts. Collaborative initiatives could involve knowledge sharing on establishing unique digital identities, developing interoperable payment systems, and creating data exchange platforms. India's expertise in implementing Aadhaar and UPI can guide Guyana in designing systems tailored to its socio-economic context.

High-Performance Computing (HPC)

High-performance computing is critical for complex computations in various fields, including climate modelling, resource exploration, and scientific research. India's advancements in HPC infrastructure can serve as a model for Guyana. Collaborative efforts could focus on capacity building, technology transfer, and the establishment of HPC facilities in Guyana, enabling local researchers and institutions to undertake advanced computational tasks.

Geosciences

Given Guyana's rich natural resources and India's expertise in geosciences, there is significant potential for collaboration in this field. Joint research initiatives, technology transfer, and training programs can enhance Guyana's capabilities in resource exploration, environmental monitoring, and disaster management. India's experience in utilizing geospatial technologies and remote sensing can be particularly beneficial for Guyana's sustainable development.

Innovation Hubs

Establishing innovation hubs can foster entrepreneurship, research, and development in emerging technologies. India's experience in creating technology parks and incubators can inform the development of similar hubs in Guyana. Collaborative programs can include mentorship, funding opportunities, and exchange programs for startups and innovators, promoting a culture of innovation and facilitating the commercialization of new technologies.

The technological and innovation partnership between India and Guyana holds immense potential for mutual growth and development. By leveraging India's advancements in digital infrastructure, AI, HPC, and geosciences, and aligning them with Guyana's developmental needs, both countries can foster a collaborative ecosystem that drives sustainable development. Strategic initiatives focusing on knowledge sharing, capacity building, and joint ventures can pave the way for a transformative partnership, bridging technological gaps and promoting inclusive growth.

C-DAC, in collaboration with the Indian Ministry of External Affairs and the Caribbean Community Secretariat (CARICOM), has been involved in upgrading IT infrastructure and software at the CARICOM Secretariat in Guyana and its associated offices in Barbados and Jamaica. This project is part of a larger initiative by C-DAC to establish computer labs in various countries, and to offer various IT training programs. The PARAM series of HPC of CDAC can be used by Guyana in large date processing and training of their professionals.

4.4 Healthcare and Higher Education

The realms of healthcare and higher education are pivotal for the socio-economic advancement of any nation. For Guyana, strengthening these sectors is essential to improve public health outcomes and cultivate a skilled workforce capable of driving national development. India's extensive experience and expertise in both healthcare and education present valuable opportunities for collaborative initiatives that can benefit both countries. This section provides an overview of Guyana's health and education

systems, highlights India's advancements in these fields, and explores potential areas for bilateral cooperation.

Health System Overview in Guyana

Guyana, with a population of approximately 800,000 as of 2023, allocates 4.94% of its Gross Domestic Product (GDP) to current health expenditures. The country's health system is characterized by a mix of public and private providers, with the Ministry of Health overseeing the public sector. Efforts have been made to define and implement a Package of Essential Health Services (PEHS) to improve equitable access to quality health services.

Despite these initiatives, challenges persist. The health system faces issues related to infrastructure, human resources, and service delivery, particularly in remote areas. Non-communicable diseases and maternal health remain areas of concern, necessitating comprehensive strategies to address these health challenges.World Health Organization (WHO)

Education System Overview in Guyana

Education is a priority for Guyana, with significant investments aimed at improving access and quality. However, the system faces challenges in translating years of schooling into effective learning. Although the average Guyanese student is expected to complete 12.2 years of schooling, this equates to only 6.8 years of learning when adjusted for quality. The COVID-19 pandemic has further exacerbated these challenges, highlighting the need for resilient and adaptive educational strategies.

In response, the government has initiated reforms to enhance learning outcomes by investing in quality materials, teacher training, and upgrading school facilities. The introduction of smart classrooms, with support from the World Bank, exemplifies efforts to integrate technology into education delivery. World Bank Group

India's Expertise in Healthcare

India has made significant strides in healthcare, achieving reductions in maternal and newborn mortality and morbidity over the past decade. Investments in improving access to and promoting institutional births have contributed to a Maternal Mortality Ratio (MMR) of 130 per 100,000 live births as of 2016. World Health Organization (WHO)

The country has also established a robust pharmaceutical industry, meeting World Health Organization (WHO) global standards for vaccine regulation. India's commitment to traditional medicine is evident in its US$85 million contribution to the WHO Global Traditional Medicine Centre. Additionally, India's experience in managing maternal, child, and adolescent health challenges positions it to guide developing nations in crafting effective health programs. World Health Organization (WHO)

India's Expertise in Higher Education

India's higher education system is one of the largest globally, encompassing a diverse array of universities, colleges, and technical institutes. The World Bank partners with India to enhance education quality and learning outcomes, focusing on strengthening teacher performance and improving governance and quality assurance systems .World Bank Group

Initiatives such as the Multidisciplinary Education and Research Improvement in Technical Education Project aim to support research and innovation in climate change and sustainable energy, benefiting approximately 350,000 students. These efforts reflect India's commitment to equipping its youth with skills relevant to the evolving job market.World Bank Group Indian university both IITs and UPES can collaborate with University of Guyana and petroleum directorate to take up UG and PG courses in relevant areas (Oil & Gas, Advance engineering, Health sciences and Business).

Areas for Collaboration and Investment

1. Healthcare Services

India and Guyana have initiated collaborations in the healthcare sector, including agreements to supply affordable generic medicines to improve healthcare access in Guyana. Building on this foundation, further partnerships can be developed in areas such as telemedicine, leveraging India's advancements in digital health platforms to enhance healthcare delivery in remote regions of Guyana.SuperKalam: Your Personal Super Mentor

2. Educational Institutions

Collaborative efforts in education have seen the inauguration of the Caribbean's first digital school in Guyana, developed in partnership with an Indian company specializing in educational platforms. Expanding such initiatives can involve establishing joint research centres, student and faculty exchange programs, and twinning arrangements between Indian and Guyanese universities to promote knowledge sharing and academic excellence.richeskarayib.com

3. Skill and Capacity Building Programs

India's experience in implementing large-scale skill development programs can be leveraged to design and implement capacity-building initiatives in Guyana. Training programs for healthcare professionals, educators, and technical personnel can enhance the quality of services and education in Guyana. Additionally, scholarships and fellowships for Guyanese students to study in India can further strengthen human capital development.

The collaboration between India and Guyana in healthcare and higher education holds significant potential for mutual benefit. By leveraging India's expertise and experience, Guyana can address its challenges in these sectors, leading to improved public health outcomes and a more robust education system. Strategic partnerships, capacity-building initiatives, and knowledge exchanges can pave the way for sustainable development and strengthened bilateral relations.

4.5. Trade and Investment

The economic relationship between India and Guyana has evolved over the years, characterized by fluctuating trade volumes and emerging investment opportunities. As Guyana experiences rapid economic transformation, particularly due to its burgeoning oil and gas sector, there is significant potential to enhance bilateral trade and investment ties. This section examines the current trade dynamics, identifies high-potential investment sectors, and explores opportunities for expanding economic cooperation between India and Guyana.

Current Trade Dynamics

Trade between India and Guyana has seen notable fluctuations in recent years. In the fiscal year 2021-22, total bilateral trade amounted to US$223.36 million, with India's exports to Guyana at US$66.41 million and imports from Guyana at US$156.96 million. This marked a significant increase from US$46.97 million in 2020-21. However, during 2022-23, trade volumes dipped to US$66.37 million, aligning with average figures from previous years. Encouragingly, in 2023-24, trade rebounded to US$105.97 million, comprising US$99.36 million in exports and US$6.61 million in imports.

India's exports to Guyana primarily include refined petroleum products, pharmaceuticals, and machinery. Conversely, Guyana's exports to India have traditionally consisted of wood and wood products. The trade balance has generally favoured Guyana, largely due to India's importation of Guyanese crude oil in certain years. MEA India

Investment Sectors with High Potential

Guyana's economic landscape is undergoing a significant transformation, driven by the discovery and exploitation of substantial offshore oil reserves. This development has spurred growth across various sectors, presenting numerous investment opportunities:

1. Oil and Gas

The rapid expansion of Guyana's oil and gas industry has positioned the country as a key player in the global energy market. Real GDP growth reached 38.4% in 2023, with the non-oil economy growing by approximately 9.1%, reflecting broad-based expansion. The government's modernization plans and the unparalleled growth in the oil and gas sector have created avenues for investment in exploration, production, and ancillary services. IMF eLibrary+1World Bank+1IMF eLibrary

2. Infrastructure Development

The influx of revenue from the oil sector has enabled Guyana to invest heavily in infrastructure projects. The non-oil economy has seen substantial growth, driven mainly by expansion in the construction and services sectors, supported by strong public investment. This includes the development of roads, bridges, ports, and urban

facilities, offering opportunities for Indian construction and engineering firms.World Bank+1IMF+1

3. Agriculture and Agro-Processing

Agriculture remains a vital component of Guyana's economy, with significant production of rice, sugar, and other crops. The government is focused on modernizing the sector and expanding agro-processing capabilities to add value to agricultural products. India's experience in agricultural technology and processing presents opportunities for collaboration and investment.

4. Tourism

Guyana is rapidly emerging as a premier eco-tourism destination, recognized globally for its pristine forests, rich biodiversity, and cultural heritage. The tourism sector is the fourth-largest export earner, contributing approximately 2.3% to GDP and creating over 15,000 indirect jobs. In 2022, Guyana welcomed 288,322 visitors, generating $64.1 billion in revenue. Investment in eco-lodges, adventure tourism, and related infrastructure can capitalize on this growing market.newdelhihc.mission.gov.gy

5. Information and Communication Technology (ICT)

As Guyana seeks to diversify its economy, the ICT sector has been identified as a priority area. Investments in digital infrastructure, software development, and IT-enabled services can leverage India's expertise in this domain.

Opportunities for Expansion

To further enhance trade and investment relations between India and Guyana, several strategies can be pursued:

1. Trade Diversification

Expanding the range of traded goods and services can reduce dependency on a few commodities and balance the trade relationship. For instance, India can explore importing Guyanese agricultural products, while promoting exports of automobiles, textiles, and consumer goods to Guyana.

2. Investment in Value-Added Industries

Establishing joint ventures in agro-processing, manufacturing, and mining can add value to Guyana's raw materials, create jobs, and boost exports. India's experience in setting up industrial clusters can serve as a model for such initiatives.

3. Capacity Building and Skill Development

Collaborative programs focusing on education and vocational training can equip Guyanese workers with skills required in emerging industries. India's educational

institutions can partner with Guyanese counterparts to offer specialized courses and training programs.

4. Strengthening Trade Facilitation

Simplifying customs procedures, enhancing logistics, and improving regulatory frameworks can facilitate smoother trade flows. Both countries can work together to implement trade facilitation measures in line with international standards. UN Trade and Development (UNCTAD)

5. Leveraging Multilateral Agreements

Engaging in regional and multilateral trade agreements can open new markets and provide preferential access to goods and services. Both nations can collaborate within forums like the World Trade Organization (WTO) to advocate for favorable trade terms. World Trade Organization

Conclusion

The evolving economic landscapes of India and Guyana present a fertile ground for deepening trade and investment ties. By leveraging complementary strengths and fostering collaborative initiatives, both countries can achieve mutual economic growth and development. Strategic investments in key sectors, coupled with efforts to diversify trade and enhance capacity building, will pave the way for a robust and sustainable partnership.

FDI Policy and Sectoral Opportunities

The Government of Guyana (GoG) actively welcomes Foreign Direct Investment (FDI) across all sectors as a key lever for sustainable economic growth, diversification, and infrastructure modernization. In this context, India—given its vast expertise in infrastructure development, energy transition, and oil & gas services—is a natural and strategic partner for deepened collaboration.

An Open, Non-Discriminatory Investment Climate

Guyanese law ensures a level playing field for foreign investors, granting them full participation rights—including in the local stock market (albeit currently underdeveloped). Indian public and private sector enterprises can leverage this framework to engage in long-term, joint development projects, particularly in:

Oil and Gas Services & Infrastructure

Renewable and Conventional Energy Projects

Urban Transport and Housing

Smart Infrastructure and ICT

The Guyana Office for Investment (GOINVEST) serves as a one-stop facilitation agency, assisting foreign investors with company registration, land acquisition, and tax

concessions. These services present streamlined pathways for Indian institutions to enter and scale operations in Guyana's high-growth sectors.

Oil & Gas Local Content Framework – A Platform for Collaboration

The enactment of the Local Content Act (LCA) in December 2021 has established clear benchmarks for Guyanese participation in the oil and gas value chain. It mandates specific local content thresholds across 40 key services, such as:

90–100% Guyanese participation in logistics, accounting, and transport

5–25% in high-tech services like dredging and engineering

For India, this presents a valuable opportunity to co-create capacity through joint ventures, technology transfers, and upskilling programs that strengthen Guyana's domestic ecosystem while allowing Indian firms to fulfill local participation norms and expand regional footprints.

Ownership and Sectoral Entry Conditions

Guyana's constitution and the 2004 Investment Act guarantee equal rights for foreign and local investors, including in property ownership and company formation. However, in regulated sectors like oil and gas, aviation, and mining, licensing and compliance—though essential for sectoral stability—may require additional approvals, including from the Local Content Secretariat.

The LCA also sets ownership thresholds for oil-sector entities to qualify as "Guyanese-owned," including:

51% voting rights by Guyanese nationals

75% executive leadership

90% local non-managerial staffing

India's extensive experience with public-private partnerships (PPPs), model concession agreements (MCAs), and local development strategies makes it well-positioned to navigate and align with these requirements through structured collaborations with Guyanese firms.

Project Development, Business Facilitation & Land Access

While the GoG has taken major strides in investor facilitation, certain areas—such as company registration (which must be done in person)—still present operational bottlenecks. GOINVEST, however, plays a proactive role in guiding investors through procedures related to land acquisition, licensing, and municipal approvals. The Status of Aliens Act assures equal land rights for Indian investors, which is crucial for infrastructure development in sectors like:

Power generation and transmission

Urban housing and smart cities

Industrial parks and port logistics

Joint ventures with local companies are encouraged, not only to meet local content requirements but also to streamline regulatory navigation, build institutional trust, and accelerate project delivery.

Investment Governance and Strategic Screening

All investment agreements undergo review by the Guyana Revenue Authority (GRA) and are approved by the Minister of Finance, with oversight from sector-specific ministries. For oil and gas operations, the Local Content Secretariat ensures alignment with national policy goals.

India can contribute by sharing best practices in investment screening, project appraisal, and governance frameworks, thus enabling both countries to collaborate in building transparent, resilient infrastructure ecosystems.

Guyana's policy landscape is highly conducive to India–Guyana partnerships in oil & gas, renewable energy, smart urban infrastructure, and logistics. As both countries explore deeper South-South collaboration, a joint focus on capacity building, technology exchange, project co-financing, and climate-smart infrastructure can anchor a future-proof development partnership with shared long-term benefits.

India and Guyana share a longstanding relationship rooted in history, culture, and mutual cooperation. As both nations seek to expand economic ties, Guyana presents promising opportunities for Indian investors, especially in sectors like agriculture, renewable energy, manufacturing, oil and gas, and ICT. Understanding Guyana's business facilitation landscape is essential for Indian enterprises seeking to tap into this emerging South American market.

Streamlined Business Registration and Setup for Indian Investors

Guyana's Government (GoG) supports foreign investors through the Guyana Office for Investment (GO-INVEST), which provides facilitation services, including support for commercial registration and land acquisition. While business registration is currently in-person only, the process is generally swift—often taking less than a week. Indian companies looking to establish a local presence will find registration fees competitive, with locally incorporated firms paying approximately USD $300 and foreign-incorporated entities about USD $400.

Post-registration, Indian firms must acquire a Tax Identification Number (TIN) from the Guyana Revenue Authority (GRA). Employment of local Guyanese workers further requires compliance with Guyana's National Insurance Scheme, similar to India's EPF and ESI schemes.

For Indian firms exploring sectors such as oil and gas, telecommunications, banking, mining, and forestry, securing the necessary licenses from relevant sectoral authorities is mandatory. Notably, companies entering Guyana's oil and gas sector must apply for

a Local Content Certificate, which may take up to two months. This provides a unique opportunity for Indian companies to form joint ventures with local firms, a strategy that can ease licensing complexities and improve market entry.

Useful Links for Indian Businesses:

Business Registration: Guyana Deeds & Commercial Registry

Tax Compliance & TIN: Guyana Revenue Authority

Investment Support: GO-INVEST

Sector Licensing & Guidelines: Ministry of Tourism, Industry, and Commerce

Equal Treatment & Encouragement for Indian Investors

Under Guyana's Investment Act, Indian companies enjoy equal rights with local investors in acquiring land, repatriating profits, and accessing tax incentives. Despite Guyana not having a bilateral investment treaty (BIT) with India, the legal framework does not discriminate between domestic and foreign investors.

Additionally, Guyana maintains a liberal stance on land ownership and foreign company incorporation. Indian businesses are encouraged to explore public-private partnerships (PPPs) and privatization opportunities, with full rights to participate in the acquisition of state-owned enterprises.

Indian investors may also consider accessing tax holidays, VAT and import duty exemptions, and accelerated depreciation benefits—particularly for investments in renewable energy and green technologies, which align with Guyana's Low Carbon Development Strategy (LCDS).

Collaboration Through Local Partnerships and Advisors

To navigate Guyana's somewhat complex bureaucratic environment, Indian firms are strongly advised to engage local legal and tax consultants. These partners can help interpret regulatory requirements, manage municipal taxes (assessed by six local municipalities), and ensure compliance with sector-specific operational mandates.

The lack of a unified electronic portal for permits and licenses currently poses challenges, though the government is developing a digital single-window system. Meanwhile, Indian firms may find it beneficial to partner with experienced Guyanese companies to expedite procedures and reduce regulatory friction.

Investment Incentives:

India and Guyana enjoy strong historical and cultural ties, which are now expanding into meaningful economic cooperation. Guyana's investment framework offers attractive incentives that Indian businesses can leverage to access CARICOM and South American markets:

Uniform Incentives for Foreign Investors: Under the Investment Act of 2004, Guyana applies equal treatment for both local and foreign investors. Indian companies can benefit from duty-free import of capital equipment, tax holidays, and accelerated depreciation—particularly valuable for manufacturing, agri-processing, and pharmaceutical sectors.

Repatriation of Profits and Capital: Indian investors can fully repatriate capital, dividends, and profits, offering confidence in the business climate.

Renewable Energy Focus: With Guyana's Low Carbon Development Strategy (LCDS) at the heart of its industrial policy, Indian clean-tech firms in solar, hydro, and wind energy can access VAT and import duty exemptions as well as capital expenditure write-offs—ideal for Indian green energy firms looking to expand in the Western Hemisphere.

Stock Market Advantages: Indian financial institutions and fintech startups may explore partnerships or listings on the Guyana Securities Exchange, where dividends are tax-free and there are no capital gains taxes.

Next Step for Indian Firms: Engage GOINVEST (https://goinvest.gov.gy/) for investment facilitation and access to tax incentives.

Legal Regime & Regulatory Transparency

India-based investors in Guyana benefit from a common law legal system and a business-friendly legislative environment, though bureaucratic navigation still requires local insight.

Legal Consistency & Transparency: As a Commonwealth country, Guyana's legal and accounting practices (including IFRS standards) are familiar to Indian companies, particularly those already engaged in global trade.

Equal Treatment Under Law: Indian firms receive non-discriminatory treatment across all investment sectors. There are no ownership restrictions in most industries.

Judicial Independence: The judiciary operates independently from the executive, and business disputes can be settled through Guyana's commercial court or through international arbitration under the ICSID and New York Convention—providing reliable dispute resolution options for Indian conglomerates and SMEs.

Caution for New Entrants: While the policy framework is sound, Indian companies are advised to work with local legal counsel and tax advisors due to procedural opacity and overlapping regulatory jurisdictions.

Opportunity for Indian Legal-Tech or Consultancy Firms: Develop joint ventures with local Guyanese partners to offer compliance and advisory services, reducing barriers for new Indian entrants.

Industrial Policies & Sectoral Synergies

Guyana's development strategy emphasizes economic diversification, opening wide-ranging avenues for India-Guyana sectoral collaboration:

Agriculture and Agro-Processing: With Guyana prioritizing food security, Indian firms specializing in agri-tech, irrigation systems, seeds, fertilizers, and food processing equipment can find mutually beneficial partnerships. India's experience in smallholder farming transformation is highly relevant.

Energy Security: Guyana encourages investment in both traditional and renewable energy. India's public and private sector energy giants can co-invest in power generation, grid development, or oilfield services—especially given India's growing energy needs and technological strength.

Healthcare & Pharma: Given the lack of local pharmaceutical manufacturing, Indian pharma companies can explore greenfield investments or PPP models for drug production and healthcare infrastructure in Guyana and across CARICOM.

ICT & Digital Infrastructure: Indian firms in software development, fintech, and BPO can establish operational bases in Guyana, targeting both local service delivery and export-oriented IT services for Latin American and Caribbean markets.

Manufacturing & Light Industry: Guyana seeks to reduce reliance on imports—offering Indian SMEs incentives to set up assembly and production units for consumer goods, chemicals, building materials, and machinery.

Key Government Partners for Indian Firms:

Ministry of Tourism, Industry and Commerce: https://mintic.gov.gy/

National Procurement & Tender Administration: http://www.npta.gov.gy/

Guyana Power and Light (Renewables): https://gplinc.com/renewable-energy/

Legal Protections: Securing Indian Investments in Guyana

Guyana has taken robust steps to create a secure legal environment for foreign investors, and Indian businesses stand to benefit from a legal architecture that supports predictability, fairness, and long-term partnership.

Bilateral Investment Protection: While a specific India-Guyana Bilateral Investment Treaty (BIT) is currently under consideration, Guyana is a signatory to global conventions like the Multilateral Investment Guarantee Agency (MIGA) and ICSID, offering protection to Indian investors from expropriation, unfair treatment, or arbitrary government action.

Property Rights & Expropriation: Foreign investors, including Indian firms, are legally protected against unlawful expropriation. In rare cases of state acquisition (e.g., for public interest), Guyanese law ensures fair and prompt compensation, and affected parties have judicial recourse.

National Treatment Principle: Indian companies enjoy the same legal protections as domestic investors, reinforcing India's confidence in Guyana as a partner in South-South cooperation.

Tip for Indian Businesses: Prioritize registering your investment with GOINVEST to activate eligibility for protections and tax concessions under the Investment Act.

Dispute Settlement: Confidence Through Arbitration & Rule of Law

For Indian investors seeking reassurance on legal recourse, Guyana offers modern and increasingly reliable mechanisms for settling commercial and investment disputes:

Arbitration-Friendly Jurisdiction: Guyana is a signatory to the New York Convention, which facilitates international enforcement of arbitral awards. Indian companies entering joint ventures or PPPs can include international arbitration clauses in contracts.

ICSID Membership: Guyana is a member of the International Centre for Settlement of Investment Disputes (ICSID)—providing Indian investors access to neutral, third-party arbitration mechanisms in disputes with the state.

Commercial Court: A specialized Commercial Division within the High Court handles business disputes. However, Indian firms may still prefer arbitration due to local court delays.

Recent Trends: While formal legal mechanisms are sound, administrative bottlenecks and bureaucratic inertia occasionally cause friction. As such, dispute prevention through clear contracts, thorough due diligence, and local legal counsel is highly recommended.

Advisory for Indian Investors: Engage in early-stage contract vetting with local and Indian legal teams to ensure enforceability and compliance under Guyanese and international law.

Intellectual Property Rights (IPR): Protecting Indian Innovation in Guyana

As Guyana expands its tech, pharma, and manufacturing sectors, IPR protection becomes critical—particularly for Indian firms exporting branded goods, software, or proprietary technologies.

IP Law in Transition: Guyana has IPR laws covering trademarks, copyrights, and patents, but enforcement mechanisms are still evolving. Draft legislation to align with TRIPS and WIPO standards is under review.

Trademark & Patent Protection: Indian firms can register trademarks and patents in Guyana through the Commercial Registry. Though the process is manual and time-consuming, legal protections are enforceable once granted.

Challenges for Indian Companies: Limited digital infrastructure and lack of public awareness about IPR can lead to counterfeiting or unauthorized use, especially in pharmaceuticals and software.

Regional Leverage: Registering IP in Guyana can serve as a gateway to CARICOM-wide protection via regional treaties, increasing value for Indian companies targeting multiple Caribbean markets.

Opportunities for Indian Collaboration:

Partner with Guyanese authorities to offer technical assistance on IPR modernization.

Introduce IP-backed lending, licensing, and technology-transfer models.

Indian law firms can explore capacity-building initiatives with Guyana's Ministry of Legal Affairs.

Guyana's investment framework is built around its Low Carbon Development Strategy (LCDS) and industrial policies focused on:

Food and energy security

Infrastructure development

Green and inclusive growth

These priorities offer clear synergies with India's own development model, making Guyana a natural partner in South-South cooperation, particularly in renewable energy, agro-processing, pharmaceuticals, and ICT.

Key Incentives for Indian Investors

Guyana provides a favourable fiscal and regulatory environment for foreign investors, including Indian businesses:

Tax Holidays & Exemptions: Waivers on customs duties, corporate tax, excise tax, and VAT for qualifying investments.

Accelerated Depreciation: Particularly for renewable energy and infrastructure projects.

Free Repatriation: Full and unrestricted movement of capital, profits, and dividends under the Investment Act of 2004.

Equal Treatment: Both domestic and foreign investors are treated equally, creating a level playing field for Indian firms.

Dividend Advantage: Dividends from publicly listed companies are tax-free. No capital gains tax.

Access Point: The Guyana Office for Investment (GOINVEST) is the primary agency for facilitating applications and concessions. Visit site

Clean Energy Incentives – A Bilateral Win

Guyana prioritizes green energy partnerships in solar, wind, hydro, and bioenergy. Indian investors in renewable energy can benefit from:

VAT and import duty exemptions

Two-year capital expenditure write-offs

Accelerated capital depreciation

Potential feed-in tariffs for electricity sales

Point of Contact: Guyana Power and Light (GPL) for power purchase agreements: GPL renewable energy

Trade Facilitation & Emerging Zones

Though Guyana currently lacks formal Free Trade Zones (FTZs), two key initiatives could be relevant for Indian manufacturers and exporters:

Lethem FTZ (planned): Bordering Brazil, ideal for India-Latin America logistics strategies.

Wales Industrial Zone (in development): A government-backed initiative near Georgetown with strategic potential for agro-processing, fertilizers, and light industry.

In addition, Guyana is a signatory to the WTO's Trade Facilitation Agreement, ensuring smoother cross-border trade and customs procedures.

Performance Requirements & Data Localization

Minimal Restrictions: No requirements for local sourcing, export quotas, technology transfer, or local data storage.

Local Hiring Norms: Indian firms must comply with a rule that at least 80% of employees should be Guyanese—mirroring similar practices in India's own FDI approach.

Contractual Flexibility: Any performance or investment thresholds are specified in the investor's contract, negotiated upfront with GOINVEST.

Real Estate & Property Rights for Indian Investors

Due Diligence Is Key: While property rights are protected, title verification can be complex due to dual registries (Deeds Registry & Land Registry) and lack of digitization.

Legal Support Advised: Indian investors are encouraged to work with local legal counsel to navigate land acquisition and lease terms effectively.

Government-Owned Land: Most land is state-owned and available via lease—especially relevant for Indian agribusiness and industrial parks.

Intellectual Property Rights (IPR) – Risks & Opportunities

Legacy Legal Framework: Guyana's IPR laws are outdated and under-enforced, although it is a member of WIPO, and acceded to the Berne and Paris Conventions.

Patent/Trademark Delays: Registration can take six months or more, with limited enforcement. Indian firms in pharma, IT, media, and FMCG should register IP locally and monitor for counterfeits.

Modernization Potential: Indian legal and tech firms can collaborate with Guyanese counterparts on IPR digitization and enforcement systems.

WIPO Country Profile: Guyana IP Directory

Financial Sector & Capital Market Opportunities for India–Guyana Collaboration

Capital Markets – Untapped Potential for Indian Investment Banks & FinTech

Guyana's capital markets remain underdeveloped but open to reform, presenting a significant opportunity for Indian financial institutions:

Guyana Stock Exchange (GASCI) is self-regulated and supervised by the Guyana Securities Council.

Dividends from listed companies are tax-free, and there are no capital gains taxes, making equity investments attractive.

Few new listings in over a decade indicate an opportunity for Indian underwriters, advisors, and fintech firms to introduce SME platforms, digital exchanges, or structured products.

Indian institutions like SEBI, BSE, or NSE can support Guyana's efforts to deepen its capital markets via knowledge exchange, training, and technology.

Banking & Financial Services – High Potential for Indian Entry

Guyana has six commercial banks and two investment banks. Key features:

Open banking regulations – Foreign banks, including Indian ones, can operate with Bank of Guyana (BOG) approval.

No restrictions on foreigners opening bank accounts.

Credit is available on market terms, based on creditworthiness—not limited by nationality.

Indian banks (like SBI, EXIM Bank of India, or private sector players) could explore correspondent banking, export finance, or lines of credit to support Indian businesses operating in Guyana.

Challenges That Present Opportunities

Cash remains dominant – Though digital payments are rising, penetration is low in rural areas.

Slow credit disbursement – The sector is viewed as bureaucratic, creating space for Indian fintech and digital lenders to innovate.

Invoice factoring and working capital access are areas under legislative development—where Indian NBFC models can be adapted.

Foreign Exchange & Remittances – Liberal and Investment-Friendly

Fully convertible currency (GYD) with no repatriation restrictions for profits, capital, or royalties.

No waiting period for remitting investment returns.

No forced exchange of foreign currency—transactions can be done freely via authorized banks or cambios.

This makes Guyana a low-risk destination for Indian exporters, EPC firms, and service providers in terms of currency volatility and capital movement.

However, transactions over US $10,000 must be declared at entry or exit, in line with AML/CFT norms.

Sovereign Wealth Fund – India-Guyana Long-Term Strategic Cooperation

Guyana's Natural Resource Fund (NRF) is poised to grow beyond US $3 billion by end-2024, funded by oil revenues. Key points:

- Held at the Federal Reserve Bank of New York
- Guided by the Santiago Principles
- Includes governance safeguards for transparency and withdrawal limits

The Government of Guyana (GoG) is in the process of developing a formal investment policy—this opens a window for India to:

Offer technical assistance in long-term infrastructure investment, asset management, and social sector allocations

Explore joint investment platforms, potentially pooling NRF and Indian development finance (EXIM, NIIF, SIDBI) into priority sectors like green energy, education, or health

India's expertise in deploying sovereign capital toward developmental goals could make it a strategic partner in NRF governance design or project pipeline development.

Trade Dynamics between Guyana and India

The trade relationship between Guyana and India has experienced notable fluctuations in recent years. In the fiscal year 2021-22, total bilateral trade amounted to approximately US$223.36 million, with India's exports to Guyana at US$66.41 million and imports from Guyana at US$156.96 million. This marked a significant increase from US$46.97 million in 2020-21, largely due to crude oil imports from Guyana. However, in 2022-23, trade volumes declined to US$66.37 million, aligning with average figures from previous years. The subsequent fiscal year 2023-24 saw a resurgence, with trade reaching US$105.97 million, comprising US$99.36 million in exports and US$6.61 million in imports. India's primary exports to Guyana include pharmaceuticals, iron and steel, machinery, and apparel, while imports mainly consist of wood products, ores, and electrical machinery. This variability underscores the dynamic nature of the trade relationship and highlights the potential for further strengthening economic ties.

Potential Trade Expansion Opportunities

The evolving economic landscape presents multiple avenues for expanding trade between Guyana and India. Guyana's burgeoning oil and gas sector offers significant potential for Indian companies to engage in exploration, production, and related services. The signing of a Memorandum of Understanding (MoU) between the two nations aims to enhance collaboration across the hydrocarbon value chain, including crude oil sourcing, refining, and capacity building. Additionally, Guyana's focus on infrastructure development, agriculture, and healthcare aligns with India's expertise in these areas, creating opportunities for increased exports of machinery, technology, and pharmaceutical products. The cultural ties, with nearly 40% of Guyana's population being of East Indian origin, further facilitate deeper economic engagement. By leveraging these synergies, both countries can diversify and enhance their trade portfolios.

Investment Areas and Sectors with High Growth Potential

Guyana's rapid economic growth, driven by its oil discoveries, has opened several high-potential sectors for investment. The energy sector, particularly natural gas projects like the Gas-to-Energy initiative, offers opportunities for collaboration in power generation and infrastructure development. Renewable energy projects, including solar and hydropower, are also being prioritized, aligning with global sustainability trends. Beyond energy, the Information and Communications Technology (ICT) sector is expanding, with government initiatives aiming to transform Guyana into a knowledge-based economy. Opportunities in ICT include business process outsourcing, software development, and telecommunications services. The manufacturing sector, contributing significantly to non-oil GDP, is projected to grow, offering prospects in agro-processing, construction materials, and consumer goods. India's experience and capabilities in these sectors position it well to invest and collaborate with Guyana, fostering mutual economic benefits.

Guyana stands at a pivotal moment in its development journey, fuelled by newfound oil wealth and an ambitious vision for a green, sustainable future. An ILO report,

“Skills for Green Jobs in Guyana”, explores how the country can align its workforce development with the goals of the Green State Development Strategy: Vision 2040 (GSDS). This strategy envisions a low-carbon, climate-resilient economy that leverages Guyana’s rich endowment of natural resources—especially its vast forest cover and biodiversity. However, the transition to a green economy is not automatic; it demands a proactive approach to skills development, workforce transformation, and institutional alignment. Despite recent economic growth, Guyana faces critical gaps in its technical and vocational education and training (TVET) systems, which are not yet fully equipped to support emerging green sectors like renewable energy, sustainable agriculture, eco-tourism, and energy-efficient construction.

The report identifies several priority sectors that offer strong potential for green job creation. These include renewable energy—especially solar and hydro—agriculture using sustainable practices, forestry with ecosystem preservation, and eco-tourism that emphasizes conservation. In waste management and construction, opportunities exist to integrate cleaner technologies and methods that reduce environmental footprints. The challenge, however, lies in equipping the workforce with the right combination of technical skills, environmental awareness, and soft competencies like adaptability and systems thinking. Existing curricula often lack green modules, and institutional coordination among ministries and stakeholders remains fragmented. Furthermore, public-private collaboration, which is essential for responsive training programs and job creation, is underdeveloped. The need for gender-inclusive, youth-focused training pathways is also emphasized, given the disproportionate impact of unemployment and environmental change on vulnerable groups.

Addressing these challenges, the ILO recommends that Guyana adopt a national green skills strategy that promotes institutional synergy, modernizes the TVET framework, and embeds environmental sustainability in all levels of education and training. A central proposition is the development of multi-stakeholder platforms, bringing together ministries, the private sector, trade unions, and civil society to steer skills development and align it with the green economy agenda. For example, in the energy sector, skills related to solar panel installation, maintenance of micro-hydro systems, and grid integration are essential. In agriculture, understanding climate-resilient crops, organic inputs, and sustainable land management becomes crucial. Moreover, training in environmental impact assessment and sustainable procurement would be relevant across sectors. By embedding these green competencies into formal and informal learning, Guyana can future-proof its workforce and ensure the benefits of economic transformation are equitably shared.

Looking ahead, Guyana has already begun taking steps in this direction. Through partnerships like the Low Carbon Development Strategy 2030 (LCDS), and ongoing collaboration with international partners such as the ILO, UN PAGE, and India in renewable energy and capacity-building, the foundations for green growth are being laid. Public institutions like the National Training Agency (NTA) are increasingly tasked with revising certification standards to reflect green occupations. However, realizing the full potential of green jobs will require sustained investment,

coordination, and innovation in workforce planning. With careful alignment of education, environmental, and economic policies, Guyana has a unique opportunity to emerge not only as an oil-rich economy, but as a regional model for inclusive, sustainable development—one that secures both prosperity and planetary well-being for generations to come.

Fig.4 Guyana acreage map; Source: Frontera Energy

5. Feasibility & Impact Analysis

India-Guyana Collaboration in Energy and Infrastructure

The collaboration between India and Guyana in the energy and infrastructure sectors is poised to become a cornerstone of bilateral relations in the coming decade. Both countries, despite differing in geographic size and economic structure, share several strategic complementarities—Guyana as an emerging oil producer in the western hemisphere with abundant renewable resources, and India as a global energy consumer and infrastructure powerhouse with advanced technological capabilities and a growing appetite for global partnerships.

This section explores the feasibility and potential impacts of deeper India-Guyana collaboration in energy and infrastructure across four key dimensions: socio-economic development, trade and investment relations, technological exchange, and international diplomacy. The collaboration is not only viable—it is mutually beneficial and aligned with long-term development goals for both countries.

5.1 Feasibility of Collaboration

The feasibility of India-Guyana collaboration is underpinned by strong historical and diplomatic ties, reinforced by a significant Indian diaspora in Guyana. These human and cultural links create a strong foundation for economic partnerships.

From a logistical and economic standpoint, the collaboration is increasingly viable. India has been expanding its presence in Latin America and the Caribbean through South-South cooperation frameworks, and Guyana offers a promising entry point. The Guyanese government's pro-investment stance—evident through tax incentives, subsidies, and supportive regulatory agencies such as GO-Invest and the Guyana Energy Agency (GEA)—makes the country an attractive destination for Indian public and private sector investment.

In terms of sectors, India has deep expertise in solar power, hydroelectric projects, smart grid technologies, road and port development, and oil and gas exploration. Guyana, in turn, has massive untapped hydropower potential, over 87% forest cover (offering scope for green energy projects), and newly discovered offshore oil reserves in the Stabroek block. The opportunity for joint development, technology transfer, and co-investment is immense.

Moreover, the signing of Memorandums of Understanding (MoUs) and bilateral visits between Indian and Guyanese officials in recent years reflects high-level political will and growing momentum toward collaboration.

5.2 Socio-Economic Development

Guyana is at a critical inflection point in its development trajectory. With oil revenues expected to cross $70 billion over the lifetime of its petroleum reserves and an expanding sovereign wealth fund (Natural Resource Fund), the challenge lies not in the availability of capital but in channelling it toward inclusive and sustainable growth. Indian partnerships in energy and infrastructure could serve as catalytic levers in this process.

a. Renewable Energy Access

Indian companies—such as NTPC, ReNew Power, and Tata Power—have successfully executed large-scale solar and wind projects across Africa and Southeast Asia. Through knowledge-sharing and investment, similar models can be implemented in Guyana's hinterland communities, which still lack reliable access to electricity. This could drastically improve quality of life, education, healthcare delivery, and local enterprise development.

b. Job Creation and Skills Development

Collaboration projects in areas like transmission infrastructure, modular housing, road construction, and clean energy are expected to generate thousands of local jobs. Indian technical institutes such as the IITs and IIMs could also collaborate with the University of Guyana and the Guyana Institute of Energy and Environmental Studies (GIEES) to create vocational, engineering and management training programs, fostering a new cadre of energy and infrastructure professionals.

c. Urban-Rural Integration

With India's vast experience in smart city and rural electrification projects, it could support Guyana's urban development (especially around Georgetown and new oil-town corridors) while ensuring rural communities are not left behind. This will help reduce income disparities and spatial inequalities, contributing to more balanced national development.

5.3. Trade, Investment and Tech Relations

Energy and infrastructure collaboration between India and Guyana will likely accelerate trade, investment and technology flows between the two nations, creating a new axis of South-South economic cooperation.

a. Trade Expansion

India's demand for crude oil is projected to rise steadily through 2040, and Guyana could become a long-term strategic supplier. In return, India can export solar panels, electrical equipment, prefabricated housing units, cement, and engineering services. Trade in construction materials, technology, and even educational services is expected to grow.

b. Investment Channels

Indian energy companies (public and private) may invest in Guyana's energy grid expansion, downstream refining, and renewable energy deployment. Infrastructure giants such as Larsen & Toubro (L&T), IRCON International, and Shapoorji Pallonji could participate in roads, bridges, airports, and water management projects, facilitated through Guyana's National Procurement and Tender Administration Board (NPTAB) and investment incentives managed by GO-Invest.

c. Diaspora Investment

The Guyanese diaspora in India and Indian diaspora in Guyana—many of whom are entrepreneurs—could play a pivotal role in joint ventures and SME development, particularly in construction, logistics, and energy services.

4. Influence at International Fora and Multilateral Platforms

India-Guyana collaboration in energy and infrastructure has implications beyond bilateral gains—it could become a model for multilateral cooperation in the Global South.

a. South-South Cooperation

Both countries are vocal advocates for fairer global climate financing and development models that reflect the needs of developing nations. A successful partnership could be showcased at forums like the United Nations Framework Convention on Climate Change (UNFCCC), International Solar Alliance (ISA), and BRICS+.

India has already provided Guyana with concessional lines of credit and technical assistance through the Indian Technical and Economic Cooperation (ITEC) program. Expanding this collaboration to include joint carbon credit programs, climate-resilient infrastructure, and digital infrastructure for grid management could strengthen both countries' credibility and leadership within these platforms.

b. Climate and Energy Diplomacy

Guyana's Low Carbon Development Strategy (LCDS) and India's leadership in climate-resilient development align closely. Joint initiatives—such as green hydrogen pilots, grid interconnection studies, or blue carbon credit trading frameworks—could be co-presented at global summits, positioning both countries as innovators in sustainable development.

c. Strategic Geopolitical Positioning

Guyana's growing stature as an oil-producing nation and India's rising profile as a voice for the Global South suggest that their partnership could influence geopolitical conversations around resource sovereignty, inclusive growth, and responsible energy transitions.

Outlook: The Next Decade (2025–2035)

The India-Guyana partnership in energy and infrastructure holds transformative potential. Over the next 10 years, this collaboration can:

- Accelerate Guyana's oil & gas exploration, transmission, refining and energy transition by scaling up both fossil fuel and renewable energy investments.
- Improve national infrastructure, increasing connectivity, mobility, and logistics performance.
- Deepen trade and investment flows, particularly in high-value sectors.
- Enhance human capital through skills training, academic exchanges, and knowledge transfer.
- Boost both nations' credibility and leadership at international climate and development fora.

The foundation is already being laid through diplomatic engagement, technical cooperation, and commercial exploration. The task now is to operationalize this

vision through coordinated projects, robust institutional support, and sustained political will.

This strategic alignment between India and Guyana offers not only a shared path toward prosperity but also a collaborative blueprint for energy-rich developing nations seeking equitable, sustainable development in an increasingly complex global landscape.

Feasibility and Impact Analysis of Guyana's Petroleum Governance and Infrastructure Projects

1. Introduction

This document presents a comprehensive feasibility and impact analysis based on the **World Bank's 2019** report on the **Guyana Petroleum Resources Governance and Management Project**. The focus is on enhancing governance, capacity building, economic evaluation, and infrastructure development through the adaptation of international frameworks.

2. Project Scope and Objectives

2.1 Technical Assistance and Governance

The World Bank initiative aims to bolster transparency, governance, and institutional capacity in Guyana's oil and gas sector. While it does not directly finance petroleum extraction or infrastructure, the project supports all stages of the project cycle—from preparation to evaluation.

2.2 Strengthening Technical Capacity

A key objective is to enhance Guyana’s capacity for conducting technical feasibility studies, assessing economic and financial viability, and performing cost-benefit analyses, especially for petroleum and cross-border collaborations. These efforts are rooted in sustainability, accountability, and long-term development.

2.3 Legal and Regulatory Reforms

The project underpins reforms in Guyana's legal and regulatory systems to manage economic, social, technical, and environmental risks associated with resource extraction.

3. Environmental and Social Considerations

3.1 Environmental Sustainability

The project promotes responsible resource management and environmental safeguards, including carbon capture and storage (CCS) and innovations in climate-conscious technologies to minimize greenhouse gas emissions.

3.2 Institutional Training and Stakeholder Engagement

Training will support environmental and social impact evaluations, and the integration of inclusive engagement mechanisms. The goal is to ensure the involvement of local communities, vulnerable populations, and indigenous groups to maximize societal benefits like employment, community development, and public service improvement.

4. Financial Mobilization and Sector Reform

4.1 Diverse Funding Sources

The initiative supports mobilizing funds through public-private partnerships, climate finance, and sovereign wealth funds to maintain resilience and long-term governance.

4.2 Financial Sector Modernization

Guyana plans to amend its Financial Institutions Act, allowing foreign financial institutions to establish local offices. This reform aims to stabilize the sector and promote inclusive economic growth through enhanced transparency and governance.

5. Adapting Indian PPP Frameworks

India’s standardized documents, such as Model Concession Agreements (MCAs), Request for Qualification (RFQs), and Request for Proposal (RFPs), offer templates adaptable to Guyana’s infrastructure, energy, and oil & gas sectors.

5.1 Roads Sector

Indian MCA Summary:

- DBFOT model with a 25-year concession. DBFOT stands for Design, Build, Finance, Operate and Transfer. It's a type of Public-Private Partnership (PPP) where a private entity is responsible for designing, building, financing, operating, and maintaining a facility for a set period, after which it is transferred to the government.

- Government-led land acquisition.
- Toll-based revenue sharing.
- Defined risk allocation and performance standards.

Guyana Adaptation:

- Customize concession terms and land protocols.
- Tailor revenue and risk models.
- Define standards for local environmental conditions.

5.2 Railways Sector

Indian MCA Summary:

- 25-year DBFOT model.
- Government support in permits and land.
- Shared freight revenue.
- Government-retained operations, with private maintenance.

Guyana Adaptation:

- Transparent land processes.
- Revenue models incentivizing performance.
- Defined public-private operational roles.

5.3 Urban Infrastructure: Waste-to-Energy

Indian MCA Summary:

- Covers waste collection to energy generation.
- Revenue from energy sales and tipping fees.
- Environmental compliance requirements.

Guyana Adaptation:

- Define waste handling responsibilities.
- Sustainable revenue structures.

- Strict ecological compliance and community involvement.

5.4 General Adaptation Recommendations

- Engage stakeholders and align with local laws.
- Invest in public-sector capacity building.
- Integrate ESG criteria.
- Ensure contract flexibility for evolving needs.

6. Economic and Technical Feasibility Analysis

6.1 Importance of Economic Analysis

Projects using public funds should contribute to social welfare, not just profitability. Economic analysis aids in effective resource allocation, especially in developing countries.

6.2 Financial vs. Economic Analysis

- Financial Analysis: Focuses on investor returns using market prices.
- Economic Analysis: Adjusts for taxes, subsidies, and distortions to reflect societal impact using shadow pricing.

7. Economic Principles and Tools

7.1 Core Concepts

- Opportunity Cost: Value of the best alternative foregone.
- Shadow Pricing: Reflects true cost or benefit.
- Externalities: Unpriced societal impacts like pollution or education.

7.2 Social Welfare Considerations

Development goals include poverty alleviation, job creation, and environmental protection, necessitating a social cost-benefit approach.

8. Project Definition and Institutional Context

8.1 Defining a Project

Projects should be viewed as integrated packages including policy reforms, institutional changes, and infrastructure.

8.2 Least-Cost and Cost-Effectiveness Analysis

Select the most efficient alternatives considering institutional and regulatory contexts. Economic analysis quantifies net societal benefits based on real, inflation-free values.

9. Cost and Benefit Identification

9.1 Cost Types

- Capital Costs: Infrastructure, training, equipment, land, etc.
- Operating Costs: Salaries, utilities, recurring expenses.
- Negative Externalities: Pollution, congestion, displacement.

9.2 Benefit Types

- Direct: Increased productivity, savings.
- Non-Market: Health, education, mortality reduction.
- Positive Externalities: Knowledge spillovers, environmental gains.

10. Economic Evaluation of Transport Projects

10.1 Sector Importance

Transport is vital for reducing costs, connecting markets, and enabling development.

10.2 Unique Characteristics

- Large externalities.
- Long lifespan and upfront investment.
- Indirect impacts like rural access.

10.3 Benefit Measurement

- Vehicle Operating Cost (VOC) Savings.
- Time and Safety Improvements.
- Environmental Impact Valuation.
- Mode Shifts and Induced Demand.

10.4 Cost Treatment

- Convert costs to economic terms.

- Include external and life-cycle costs.

10.5 Sensitivity and Risk Analysis

- Test key variables like traffic and fuel costs.
- Use switching value and Monte Carlo simulations where applicable.

Through a combination of institutional reform, stakeholder engagement, economic analysis, and adaptation of global best practices, Guyana can effectively harness its petroleum and infrastructure potential. The outlined approach ensures technical feasibility, economic efficiency, and sustainable development that benefits the entire nation.

Guyanese Authorities and Research Institutions in Energy, Infrastructure and Support Policies

Guyana, a resource-rich nation on the northern coast of South America, is undergoing a historic transformation driven by energy exploration, infrastructure development, and increased foreign direct investment. The country's expanding oil and gas sector, coupled with growing international interest in renewable energy and sustainable infrastructure, has led to the establishment and strengthening of several key institutions. These organizations collectively manage the oversight, regulation, research, and policy implementation processes in energy, infrastructure, trade, and investment. This section explores the roles, functions, and support policies of Guyanese authorities, agencies, and research institutions in shaping the nation's energy and infrastructure sectors.

1. Ministry of Public Works (MPW)

The Ministry of Public Works is central to Guyana's infrastructure development strategy. As the primary entity responsible for national transportation and public works, MPW is instrumental in constructing and maintaining roads, bridges, ports, airports, and public buildings.

Key Functions:

- **Transportation Infrastructure:** The Ministry oversees the planning and implementation of key projects that enhance connectivity and logistics throughout Guyana. These include coastal and hinterland road networks, bridges

like the new Demerara River Bridge, port expansions, and the modernization of Cheddi Jagan International Airport.

- **Energy Linkages:** Although not a direct energy regulator, MPW supports energy infrastructure through transportation projects that incorporate energy-efficient systems, such as electric vehicle (EV) charging stations and energy-saving technologies in public facilities.
- **Project Management and Financing:** MPW collaborates with international financial institutions, such as the IDB and World Bank, to secure funding and technical assistance for national projects.

Support Policies: The Ministry provides a platform for public-private partnerships (PPPs), offering procurement opportunities and support mechanisms for domestic and international infrastructure contractors. In collaboration with the Ministry of Finance, it also contributes to national infrastructure investment strategies.

2. Ministry of Natural Resources (MNR)

In Guyana, the Ministry of Natural Resources (MNR) is responsible for the development and regulation of the energy, oil, and gas sector. Specifically, the MNR's Petroleum Management Programme oversees the exploration, development, and production of petroleum resources.

The Ministry formulates and implements policies related to the utilization and management of Guyana's natural resources, including oil and gas.

The **Department of Energy** within the Ministry of Natural Resources (MNR) is responsible for the management of the hydrocarbon sector in the Cooperative Republic of Guyana to optimize the value proposition for Guyanese through the adoption of efficient and effective modalities, transparency, balance, and pursuance of an evidence-based approach to decision making.

Petroleum Management Programme:

This program within the MNR focuses on regulating, managing, and monitoring the oil and gas industry to ensure responsible resource development.

Local Content Secretariat:

The Local Content Secretariat, also within the MNR, ensures that companies operating in the oil and gas sector comply with the Local Content Act. While the

MNR is the primary lead, other entities like the Guyana Energy Agency (GEA) and the Environmental Protection Agency (EPA) play important roles in the sector. The Ministry of Energy is the apex body responsible for policy formulation, regulation, and strategic oversight of Guyana's rapidly evolving energy sector. With the offshore oil boom in full swing and an increasing focus on renewables, the Ministry's role has grown exponentially.

Key Functions:

- **Policy and Regulation:** The Ministry develops policies on oil and gas exploration, refinery development, transmission infrastructure, and the integration of renewables.
- **Licensing and Compliance:** It grants licenses for exploration and production, monitors compliance with local laws, and enforces environmental and operational standards.
- **Sustainable Energy Promotion:** The MOE leads efforts to expand renewable energy deployment via national solar projects, microgrids for hinterland communities, and wind/hydropower feasibility studies.

Support Policies: The Ministry offers various fiscal and non-fiscal incentives to stimulate investment in clean energy. These include tax holidays, VAT exemptions, and import duty waivers on renewable energy equipment. Investors in solar, wind, and bioenergy projects may also qualify for grants under the Low Carbon Development Strategy (LCDS).

3. Guyana Energy Agency (GEA)

Operating under the Ministry of Energy, the Guyana Energy Agency (GEA) is the country's dedicated energy regulator. GEA's role in promoting sustainable energy use and monitoring the fuel trade is vital in transitioning Guyana to a low-carbon economy.

Key Functions:

- **Energy Efficiency:** GEA spearheads public campaigns and private-sector consultations to promote energy conservation. It sets efficiency standards and oversees appliance labeling systems.

- **Fuel Import Monitoring:** As a regulatory body, GEA manages the import and distribution of petroleum products, ensuring quality control and fair pricing.
- **Research and Development:** GEA collaborates with other institutions in piloting renewable energy technologies, including solar farms and biodiesel initiatives.

Support Policies: GEA offers subsidies and incentives for solar panel installations, home energy efficiency upgrades, and green building retrofits. It also facilitates partnerships for rural electrification through solar hybrid systems.

4. Guyana Office for Investment (GO-Invest)

GO-Invest serves as the government's one-stop-shop for promoting and facilitating domestic and foreign investments. With a special emphasis on energy, infrastructure, and agriculture, GO-Invest is a crucial gateway for international investors entering Guyana.

Key Functions:

- **Investment Promotion:** GO-Invest markets Guyana as an investment destination, highlighting its strategic location, natural resource wealth, and stable political environment.
- **Investor Facilitation:** The agency supports investors throughout the project lifecycle, from licensing and land acquisition to regulatory clearances and labour recruitment.
- **Export Assistance:** GO-Invest also supports local firms aiming to export goods such as construction materials, processed timber, and renewable energy equipment.

Support Policies: Investors in infrastructure and energy are eligible for:

- Tax holidays under the Income Tax Act and Investment Act.
- Customs duty waivers on capital machinery.
- Access to subsidized financing for projects aligned with the LCDS. GO-Invest also facilitates projects financed by climate funds and carbon credit revenue.

5. National Procurement and Tender Administration Board (NPTAB)

The NPTAB ensures transparent and fair procurement practices for all public infrastructure and energy-related projects. It is integral to ensuring competitive access to government contracts for both local and international firms.

Key Functions:

- **Oversight and Governance:** NPTAB sets rules for government procurement and ensures adherence to international best practices.
- **Tender Management:** The Board manages bid solicitations and evaluations for roads, energy infrastructure, public housing, and utility systems.
- **Capacity Building:** NPTAB works with ministries to train procurement officers and prevent fraud and corruption in public tenders.

Support Policies: The Board encourages the participation of small and medium-sized enterprises (SMEs) by offering simplified procurement guidelines and technical assistance. Projects funded by international development agencies also go through NPTAB, which helps coordinate compliance.

6. Guyana Geology and Mines Commission (GGMC)

The GGMC is responsible for regulating the exploration and development of mineral and petroleum resources. With the emergence of Guyana as a major oil-producing country, the Commission's regulatory responsibilities have grown significantly.

Key Functions:

- **Petroleum Sector Management:** GGMC grants exploration and production licenses, conducts geological surveys, and maintains a national database of petroleum blocks.
- **Environmental Stewardship:** It enforces environmental standards for upstream operations, working closely with the Environmental Protection Agency (EPA).
- **Revenue Monitoring:** GGMC ensures that royalties and licensing fees are collected and disbursed according to legislation.

Support Policies: GGMC facilitates investor access to geological data and offers policy guidance for exploration, extraction, and environmental compliance. It is actively involved in discussions on offshore development, flaring limits, and decommissioning plans.

7. Guyana National Bureau of Standards (GNBS)

The GNBS plays a vital role in setting technical standards across industries, including energy and infrastructure, helping ensure the quality and safety of imports, exports, and domestic production.

Key Functions:

- **Technical Standards Development:** GNBS develops guidelines and benchmarks for construction materials, energy systems, and safety protocols.
- **Inspection and Certification:** It certifies equipment used in renewable energy installations, ensuring compliance with global benchmarks such as ISO standards.
- **Trade Facilitation:** The Bureau supports exporters by certifying goods and conducting quality control audits.

Support Policies: GNBS allows duty-free import of certified energy-efficient appliances and construction inputs that meet international specifications. This encourages the adoption of green technologies and reduces energy costs for consumers and businesses.

8. The University of Guyana (UG)

The University of Guyana (UG), through its **Institute of Energy and Environmental Studies** (IEGS), leads in research, innovation, and capacity building for the energy and infrastructure sectors.

Key Functions:

- **Applied Research:** UG conducts research in solar, wind, hydropower, energy storage, and green building practices.
- **Policy Development:** The institute partners with ministries and international donors to develop science-based policies, particularly for renewable energy and climate change.
- **Human Resource Development:** UG produces engineers, environmental scientists, and energy professionals critical to Guyana's sustainable development goals.

Support Policies: Through its partnerships, UG attracts grant funding from agencies like the UNDP, CDB, and USAID to support training programs and pilot projects. It also collaborates with private firms on internships and skill development for energy infrastructure.

Policy Framework and Economic Context

Guyana's economic growth, powered by the oil boom, has created an enabling environment for energy and infrastructure investments. The government's **Low Carbon Development Strategy (LCDS)** is the cornerstone policy guiding green investments and the use of carbon credits.

Macroeconomic Overview:

- **GDP Growth:** Between 2020 and 2024, Guyana achieved robust GDP growth averaging above 20% annually, driven by oil production. Non-oil GDP also expanded, averaging 9–12% annually.
- **Inflation and Currency:** Inflation averaged 3.2% between 2020–2024. The exchange rate remained stable at GYD $208.5 to USD $1.
- **Foreign Exchange and Investment Climate:** Guyana's Natural Resource Fund held $1.7 billion as of June 2023 and is projected to accumulate over $73 billion in revenue from oil production over the next two decades.
- **Carbon Credit Revenues:** In 2022, Guyana sold 30% of its carbon credits for $750 million. Proceeds fund renewable energy, biodiversity, and low-emission infrastructure.

Support Policies Across Institutions:

- **Tax Incentives:** Widespread tax waivers and exemptions are offered for clean energy and infrastructure inputs.
- **Subsidies:** Direct subsidies exist for solar systems, energy-efficient appliances, and green construction materials.
- **Local Content Act (LCA):** Enforces a 40-service-line requirement for local procurement in the oil and gas industry.

- **Public Investment Program:** Focuses on sea defence, hinterland infrastructure, urban housing, and workforce development.

Guyana's energy and infrastructure sectors are undergoing transformative growth, underpinned by a sophisticated ecosystem of institutions that manage regulation, investment promotion, research, and sustainable development. Authorities like the Department of Energy and the Ministry of Public Works provide strategic direction and policy coherence, while agencies such as GO-Invest and GEA drive investment and energy efficiency. The University of Guyana, along with technical bodies like GNBS and GGMC, ensure that research and standards keep pace with rapid industrial growth.

Together, these institutions form a cohesive framework that not only regulates and facilitates current activities but also lays the foundation for a future that is energy-secure, resilient, and inclusive. For investors, developers, and policymakers, understanding the roles and interconnections of these entities is critical to engaging effectively in Guyana's dynamic development landscape.

India's Current and Future Capabilities and Strengths in Energy and Infrastructure Development

India has emerged as a global leader in energy and infrastructure development, showcasing a robust track record in project financing, design, and execution. The breadth and depth of India's expertise in this domain present a unique and timely opportunity for Guyana—a country poised for transformational growth, particularly in energy, transport, urbanization, and digital infrastructure.

As Guyana seeks strategic partners to realize its development ambitions, India's comprehensive capabilities position it as a natural and reliable ally. From renewable energy deployment and grid modernization to public-private partnerships (PPPs) and sustainable urban development, India offers a powerful set of tools and experiences that can directly support Guyana's economic, environmental, and social goals.

1. India's Current Capabilities and Strengths in Energy Development

a) Leadership in Renewable Energy

India is one of the world's largest renewable energy markets, particularly in solar and wind power. With an installed solar capacity exceeding 45 GW as of 2024 and a broader ambition to reach 500 GW of non-fossil energy by 2030, India has

demonstrated remarkable scalability and cost-efficiency in the sector. This makes India's solar and wind project development models highly relevant for Guyana, which is exploring avenues to diversify its energy mix and reduce dependence on fossil fuels.

In practical terms, Indian expertise in decentralized solar systems, off-grid solutions for rural communities, and utility-scale renewable energy parks can be directly replicated or adapted to Guyana's geography and demography. India's firms, such as ReNew Power, NTPC, and Adani Green, have accumulated significant international project experience, including in South America and Africa.

b) Grid Infrastructure and Modernization

India has made considerable investments in grid enhancement and integration to support renewable energy sources. With a focus on grid reliability, capacity expansion, and smart grid deployment, India's knowledge is transferable to Guyana's evolving grid system, which currently faces challenges related to scale, reach, and load stability.

Guyana could benefit from Indian models of grid integration, particularly where distributed generation and microgrid systems can support remote and underserved areas.

c) Advancements in Energy Storage and Smart Systems

Energy storage technologies are increasingly critical to balance the intermittency of renewables. India's accelerated R&D and deployment in battery storage, especially in lithium-ion and emerging alternatives like flow batteries, position it to offer solutions to Guyana's energy reliability challenges.

India's advances in smart metering, digital grid controls, and predictive maintenance—spearheaded by state utilities and private sector firms—could help Guyana build a more resilient and intelligent power infrastructure.

2. Infrastructure Development Capabilities

a) Urban and Smart Infrastructure

India's Smart Cities Mission, launched in 2015, has catalyzed large-scale investments in integrated urban infrastructure. From e-governance platforms and digital utilities to

transport hubs and waste management systems, India's holistic approach to urban transformation has relevance for both urban and peri-urban regions in Guyana.

Indian firms are adept at delivering cost-effective and replicable infrastructure, using modular construction, localized resource planning, and data-driven service delivery. Guyana's expanding towns and cities could particularly benefit from this model as urban migration increases.

b) Transportation and Logistics

India's massive rail, road, and port infrastructure offers a broad spectrum of capabilities—from highway construction under the *Bharatmala* program to modern rail development via the National High-Speed Rail Corporation. India's integrated multimodal transport systems are designed to reduce logistics costs, improve connectivity, and stimulate regional trade.

For Guyana, where intra-country and cross-border connectivity is a development priority, Indian expertise in constructing all-weather roads, railways, inland ports, and bridges under challenging topographies will be of immense value.

c) Digital Infrastructure and E-Governance

India has made major strides in digital connectivity, rolling out over 2.5 million kilometers of fiber optics across rural and urban regions. The BharatNet and Digital India initiatives have brought millions online, fostering digital literacy, inclusion, and innovation.

Guyana's efforts to enhance e-governance, improve access to public services, and build a knowledge-based economy could be significantly enhanced by drawing upon Indian practices in software platforms, cybersecurity, digital ID systems, and 5G readiness.

3. Project Financing and Execution Expertise

a) Robust Financing Ecosystem

India has developed an extensive financial architecture to support infrastructure and energy development. Instruments such as the National Infrastructure Investment Fund (NIIF), the India Infrastructure Finance Company Limited (IIFCL), and

Export-Import Bank of India (EXIM) offer a blend of concessional loans, guarantees, and equity financing.

For Guyana, this ecosystem represents a good example of system design for capital and technical support. Indian financing is often more accessible and flexible compared to traditional Western donors, with South-South collaboration at the core of India's development diplomacy.

b) Public-Private Partnerships (PPPs)

India is among the leading implementers of PPPs, with experience across sectors such as roads, ports, energy, and urban utilities. The Indian government offers frameworks for viability gap funding (VGF), annuity-based revenue models, and hybrid annuity models—tools that could be adapted for Guyana's infrastructure roadmap.

As Guyana seeks to balance public sector investment with private sector efficiency, India's PPP experiences, model concession agreements and advisory capabilities offer a proven template.

c) Timely and Cost-Efficient Project Execution

Indian engineering and construction giants such as NBCC (India) Limited, a Navaratna Enterprise of the Government of India with operations spread across India and overseas, pioneer in PMC (Project Management Consultancy, EPC (Engineering Procurement & Construction) and RE (Real Estate), Larsen & Toubro (L&T), GMR, and Tata Projects are globally recognized for their capacity to deliver large-scale projects on time and within budget. Whether it's housing complex development, airport construction, metro rail systems, or energy pipelines, these firms operate with scalability and logistical efficiency.

Such competencies are especially relevant for Guyana's ambitious but resource-constrained development targets, ensuring cost control and operational excellence.

4. Future Capabilities and Emerging Strengths (2025–2030)

a) Green and Sustainable Infrastructure

India's emphasis on climate-resilient and low-carbon development will deepen in the coming years, in line with its commitments under the Paris Agreement. Initiatives in

green building, electric mobility, and waste-to-energy projects will be further scaled up.

This focus aligns well with Guyana's Low Carbon Development Strategy (LCDS), offering synergies for knowledge exchange and joint ventures in sustainable housing, eco-transport, and nature-based infrastructure.

b) New Energy Technologies: Hydrogen, EVs, and Offshore Wind

India is making bold moves in emerging sectors such as green hydrogen, offshore wind, and electric vehicles. By 2030, India aims to become a global hub for hydrogen production and usage, especially in industrial and transportation sectors.

Guyana can align with India on pilot projects, particularly in green ammonia, hydrogen blending in natural gas, and EV fleet transition. Offshore wind, though nascent, holds promise for Guyana's coastal energy diversification.

c) Regional and Global Outreach: Africa, Caribbean, and Latin America

India is scaling its development engagement across Africa and the Caribbean through bilateral cooperation, multilateral forums (like the India-CARICOM Joint Commission), and investments in regional banks. The lines of credit, technical assistance, and training programs offered to countries in these regions are increasing in scope and generosity.

Guyana, as a CARICOM member, is well positioned to attract Indian concessional finance and project assistance under these platforms, especially with its oil-driven macroeconomic stability.

5. Technology Transfer, Capacity Building, and Institutional Partnerships

India's support to partner countries extends beyond hard infrastructure. A strong emphasis is placed on human capital development through scholarships, training programs, and institutional twinning.

For Guyana, partnering with Indian technical institutions (such as IITs, TERI, or the National Institute of Solar Energy) can help build local capacity in engineering, renewable energy, public works, and regulatory governance. Twinning programs, student exchanges, and vocational training can create a new cadre of Guyanese professionals equipped to manage complex infrastructure and energy projects.

6. Indian Government Policies and Incentives: Replicable Models for Guyana

India’s policy environment is both enabling and innovation-driven. From the National Solar Mission to the FAME scheme for electric vehicles and the AMRUT program for urban rejuvenation, India provides an integrated policy framework that links incentives with sustainable outcomes.

Guyana can draw from these policy templates as it crafts its own regulatory frameworks for infrastructure and energy—particularly in renewable energy auctions, electricity market reforms, and urban planning codes. Joint policy dialogues and expert missions could support this policy transfer.

Additionally, India’s schemes such as PMAY for affordable housing, the Ujjwala scheme for clean cooking, and biofuel development policies show how socio-economic inclusivity can be embedded into large-scale infrastructure planning.

A Transformative Partnership for the Next Decade

India's robust capabilities in energy and infrastructure development—backed by financial depth, execution prowess, and a strong innovation ecosystem—offer Guyana a strategic partner at a pivotal moment in its growth journey. As Guyana seeks to modernize its energy systems, expand its transportation and digital infrastructure, and create sustainable urban spaces, India can serve as both mentor and collaborator.

The synergy between Guyana’s needs and India’s strengths is particularly evident in the following areas:

- **Oil and gas exploration**, transportation & storage, refineries, etc.
- **Renewable energy deployment**: Fast, affordable, and scalable solutions with local job creation.
- **Infrastructure development**: Integrated planning of roads, ports, housing, and cities.
- **Financing and PPP models**: Structured financing that balances economic and social returns.
- **Digital transformation**: Leveraging Indian platforms for e-governance and citizen services.
- **Human capital**: Building a skilled workforce for infrastructure management and maintenance.

Over the next ten years, a structured and sustained collaboration between India and Guyana could be instrumental in reshaping Guyana's economic landscape, improving quality of life, and enhancing regional influence. Whether through bilateral agreements, South-South partnerships, or joint ventures, the India-Guyana partnership in energy and infrastructure stands as a model for inclusive, innovative, and sustainable development.

Potential Guyanese Partners for India-Guyana Trade, Investment & Technological Collaborations

India and Guyana share strong historical and cultural ties, shaped significantly by the Indian diaspora in Guyana and bolstered by mutual interests in development and economic growth. In recent years, these shared interests have translated into increasing diplomatic engagements, technical cooperation, and economic partnerships. A strategic area for deepening bilateral relations lies in collaborative ventures across sectors such as energy, infrastructure, agriculture, digital innovation, and education. As Guyana undergoes rapid transformation fuelled by its oil and gas boom, there is a growing demand for technological know-how, infrastructure support, and sustainable development models—areas in which India can be a highly effective partner.

In this context, identifying and aligning with suitable **public and private sector entities** in Guyana is crucial. Similarly, understanding the **geographical regions** with high investment potential provides Indian companies and government agencies with clarity on where and how to engage for maximum impact.

1. Public Sector Partners in Guyana: Gateways to National Projects

The public sector in Guyana plays a dominant role in the initiation and facilitation of large-scale infrastructure and energy projects. For Indian entities seeking long-term investment opportunities, engaging with these institutions ensures access to priority projects, streamlined regulatory pathways, and greater impact.

a) Ministry of Public Infrastructure (MPI)

The Ministry of Public Infrastructure is central to Guyana's national development framework. It is tasked with planning and implementing large-scale infrastructure projects—ranging from transport and public utilities to energy and construction.

- **Indian Collaboration Prospects**: Indian public agencies such as **National Highways Authority of India (NHAI)**, **Rail Vikas Nigam Ltd. (RVNL)**, and **RITES** can offer expertise in road and railway infrastructure development. Additionally, **NBCC Ltd**. and **CPWD (Central Public Works Department)** could contribute to urban planning and public building design.

- **Key Areas of Engagement**:

  Highway and expressway design and construction

  Urban road expansion projects in Georgetown and New Amsterdam

  Renewable energy installations along transport corridors (solar street lighting, EV charging points)

b) Guyana Energy Agency (GEA)

GEA is Guyana's central regulatory and planning body for energy. It leads the country's shift towards a diversified and cleaner energy mix.

Indian Collaboration Prospects: India's leading renewable energy companies such as **Tata Power**, **Adani Green Energy**, and public institutions like **NTPC**, **IREDA**, and **REC** could offer strategic partnerships for:

Clean energy transitions

Grid modernization

Off-grid solar electrification for rural areas

Technology Transfer: India's successful execution of large-scale solar and wind projects can be adapted for Guyana's environmental and geographic conditions.

c) Guyana Power and Light (GPL)

As the national electricity utility, GPL is central to Guyana's energy delivery system.

Indian Collaboration Prospects: Indian companies such as **BHEL**, **L&T**, and **Sterlite Power** can support:

Grid digitization and smart metering

Thermal and gas-fired plant construction

Expansion of transmission lines to remote regions

d) Ministry of Finance

The Ministry of Finance is instrumental in structuring public-private partnerships (PPPs), development financing, and managing foreign investments.

Indian Collaboration Prospects: Institutions like **EXIM Bank of India**, **SBI**, and **IDFC Bank** can extend lines of credit, structured project finance, and risk mitigation services for Indian-led infrastructure and energy projects in Guyana.

e) Guyana Office for Investment (GO-Invest)

GO-Invest acts as the principal agency facilitating foreign direct investment (FDI) and trade partnerships.

Indian Collaboration Prospects:

Organizing India-Guyana business forums

Providing support for joint ventures and legal incorporation

Navigating Guyana's business climate for Indian SMEs

2. Private Sector Players in Guyana: Key Engines of Growth

The private sector in Guyana is increasingly active, particularly in energy, construction, agriculture, and services. Indian companies can engage through joint ventures, technology partnerships, and infrastructure investments.

a) Guyana Oil Company (GUYOIL)

As the leading petroleum distributor, GUYOIL is a strong candidate for collaboration in downstream energy infrastructure.

Indian Collaboration Prospects:

Joint ventures with **Indian Oil Corporation (IOC)** or **ONGC Videsh** for LPG, refining, and fuel distribution

Development of LNG terminals with **Petronet LNG**

b) Guyana Sugar Corporation (GUYSUCO)

GUYSUCO holds vast tracts of agricultural land and has the potential to become a hub for bioenergy development.

Indian Collaboration Prospects:

Development of ethanol plants and biomass gasifiers with companies like **Dalmia Bharat** or **India Glycols**

Agricultural machinery and drip irrigation solutions from **Mahindra Agribusiness** and **Jain Irrigation Systems**

c) Demerara Harbour Bridge Corporation (DHBC)

Responsible for critical infrastructure like the Demerara Bridge, DHBC is a prime entity for joint projects in transportation and civil engineering.

Indian Collaboration Prospects:

Bridge engineering and modular design with **L&T**, **NBCC**, and **Hindustan Construction Company**

d) Private Energy Developers

With the government's push toward privatization in energy, many local firms are entering renewable energy.

Indian Collaboration Prospects:

Rooftop and utility-scale solar installations with **ReNew Power** or **Waaree Energies**

Hybrid mini-grids and energy management systems in rural areas

e) Local Construction and Engineering Firms

These firms form the backbone of Guyana's ongoing urban expansion and infrastructure rollout.

Indian Collaboration Prospects:

EPC contracts with firms like **NBCC Ltd**. **Shapoorji Pallonji**, **Tata Projects**, or **Afcons Infrastructure**

Joint ventures in public housing, commercial real estate, and water infrastructure

f) Commercial Banks and Financial Institutions

Guyana's local financial institutions can play a significant role in co-financing projects and facilitating capital flow.

Indian Collaboration Prospects:

Tie-ups with **ICICI**, **EXIM Bank**, and **SBI** to create specialized funds for infrastructure and green energy

Insurance collaboration with **New India Assurance** for infrastructure risk coverage

3. Educational and Research Institutions: Building Knowledge Partnerships

a) University of Guyana

Guyana's leading academic institution offers programs in engineering, energy systems, and natural sciences.

Indian Collaboration Prospects:

Student exchange programs with **IITs**, **NITs**, **IIMs, UPES** and **TERI University**

Joint R&D in areas like green building design, low-cost housing models, and solar engineering

b) Guyana Geology and Mines Commission (GGMC)

GGMC manages and monitors the country's mineral wealth and offers an avenue for sustainable mining partnerships.

Indian Collaboration Prospects:

Joint exploration programs with **Vedanta**, **Coal India**, or **NALCO**

Environmental assessment and safety training programs

4. High-Potential Investment Sectors

Beyond energy and infrastructure, several other sectors present lucrative opportunities for Indo-Guyanese collaborations.

a) Agriculture and Agro-processing

Guyana's Advantage: Fertile land, water availability, and exportable crops (rice, sugar, coconut, fruits)

India's Contribution:

Agri-tech innovation

Processing plant development

Cold chain logistics and warehousing

Target Regions: Berbice, Pomeroon-Supenaam, and Essequibo Coast

b) Tourism and Hospitality

Guyana's Advantage: Ecotourism appeal (Kaieteur Falls, Iwokrama), heritage sites, and cultural diversity

India's Contribution:

Investment in eco-lodges and boutique resorts

Development of tourism infrastructure and digital booking platforms

Target Regions: Kaieteur National Park, Bartica, Lethem, and coastal towns

c) Digital and Telecommunications Infrastructure

Guyana's Challenge: Limited internet penetration and digital divide

India's Contribution:

Fiber optics and 5G rollout with **BSNL**, **Jio**, and **Sterlite Technologies**

Smart city solutions and government e-services

Target Regions: Georgetown, New Amsterdam, and rural outreach zones

5. Key Regions in Guyana for Sectoral Collaboration

Understanding the geographic distribution of opportunities helps in localized planning:

i) Georgetown:

Capital city and economic hub

Suitable for digital infrastructure, housing, water projects, and smart city development

ii) New Amsterdam:

Port and trading town

Ideal for industrial parks, warehousing, and port modernization

iii) Essequibo Region:

Rich in natural resources

Best suited for renewable energy (solar, wind), agriculture, and eco-tourism

iv) Berbice:

Agricultural heartland

Focus on agri-tech, food processing, and ethanol production

v) Lethem and Rupununi:

Strategic border town with Brazil

Logistics hub and suitable for solar electrification and tourism

A Blueprint for a Transformational Partnership

The future of India-Guyana collaboration rests not just in traditional diplomacy but in the ability of both nations to forge deep-rooted, multi-sectoral partnerships grounded in innovation, sustainability, and inclusive growth. As Guyana transitions from an oil-rich frontier economy into a diversified and modern society, India—armed with decades of development experience, a vast industrial base, and a vision of South-South cooperation—can serve as both a partner and a catalyst in this transformation.

By focusing on targeted **public and private partnerships**, investing in **strategic regions**, and supporting key **sectors** like energy, infrastructure, agriculture, education,

and digital transformation, Indian companies and institutions can unlock enormous opportunities for shared prosperity.

In doing so, the India-Guyana partnership can evolve into a model for how developing economies collaborate—not through dependency but through mutual investment in capabilities, innovation, and growth.

Acquisition of assets, joint research and development in the field of energy and infrastructure

The acquisition of assets, joint research and development (R&D) collaborations, and leveraging Indian expertise with Guyanese financial resources can indeed be a critical part of the long-term strategy for the growth of Guyana's energy and infrastructure sectors. The focus should be on fostering Guyana's self-sufficiency, promoting technological advancements, and creating sustainable value through these collaborations.

Here are the key considerations and possibilities for such acquisitions and R&D set-ups under a Guyana-India collaboration:

1. Acquisition of Assets

Acquiring assets related to energy infrastructure, oil and gas, renewable energy technologies, and large-scale infrastructure can be part of a broader strategy to foster sustainable economic growth in Guyana.

a) Oil and Gas Infrastructure

Why Acquisition Makes Sense: Guyana's rapidly expanding oil and gas sector will require substantial infrastructure for exploration, production, transportation, and storage. Indian companies with expertise in offshore drilling, pipeline construction, and terminal operations (e.g., **ONGC Videsh**, **IOCL**) could acquire or form joint ventures with existing foreign-owned assets.

Target Assets:

Offshore Oil Platforms and **Oil and Gas Exploration Assets**: Foreign companies already involved in exploration in the **Stabroek Block** and other fields may be open to divesting part of their stakes or entering into joint ventures with Indian partners to jointly develop resources.

Oil Storage and Transportation Infrastructure: The infrastructure involved in crude oil storage and transportation, such as terminals and pipelines, could be an important area for joint ventures or acquisitions by Indian companies.

Long-term benefit for Guyana: Acquiring or forming joint ventures in these critical

assets will provide Guyana with access to advanced technologies, ensure local ownership and participation in energy extraction and management, and help build local expertise in the energy sector.

b) Renewable Energy Assets and Infrastructure

Why Acquisition Makes Sense: As Guyana focuses on diversifying its energy sources, renewable energy assets like solar and wind farms will play a crucial role in the country's energy transition. Indian expertise in renewable energy projects could lead to acquisitions of smaller foreign-owned renewable energy projects operating in Guyana.

Target Assets:

Solar and Wind Power Projects: Foreign-owned companies that have set up renewable energy projects in Guyana (such as solar power plants) may be open to joint ventures with Indian firms experienced in large-scale renewable energy projects.

Hydropower Infrastructure: Guyana has significant hydropower potential, and there may be opportunities to acquire existing hydropower plants or build new ones with Indian involvement.

Long-term benefit for Guyana: Acquisition of these renewable energy assets will enable Guyana to enhance its energy security, reduce dependence on fossil fuels, and move toward a sustainable, diversified energy matrix. With Indian expertise, this shift can be accelerated while creating green jobs and promoting environmental sustainability.

c) Port and Transportation Infrastructure

Why Acquisition Makes Sense: To support oil exports and growing trade, Guyana needs a robust and modern port infrastructure. Indian companies with expertise in port management and logistics could acquire or partner with foreign-owned assets involved in port development and expansion.

Target Assets:

Port Operations and Infrastructure: Acquisition of stakes in foreign-operated port terminals such as **Port of Georgetown** could help Guyana expand its capabilities to manage increased oil exports and trade activities.

Logistics and Transportation Companies: Companies operating in the logistics and shipping sectors (to support oil exports and general trade) can also be targets for acquisition or joint ventures with Indian partners.

Long-term benefit for Guyana: Acquiring strategic transportation infrastructure and

port assets will not only improve Guyana's trade capacity but also ensure that Guyana maintains control over critical supply chains. Indian expertise in infrastructure development can contribute to modernizing port facilities, improving logistics, and creating new economic hubs.

2. Joint Research and Development (R&D) in Energy and Infrastructure Technologies

Joint R&D efforts between India and Guyana can focus on creating innovative, locally-adapted solutions for energy production, infrastructure development, and sustainability. With India's technological expertise and Guyana's financial resources, R&D initiatives can address both countries' energy needs while creating long-term socio-economic benefits.

a) Renewable Energy and Energy Efficiency Technologies

Why Joint R&D Makes Sense: Guyana has committed to transitioning to renewable energy sources, and India is already a leader in renewable energy innovation (e.g., solar power, wind energy, energy storage solutions). Joint R&D efforts can focus on developing energy-efficient technologies and scaling up renewable energy solutions that are suited to Guyana's specific needs.

Areas for R&D:

Solar Power Innovations: Solar technologies, including solar photovoltaics, solar water heating, and off-grid solar solutions, can be adapted for rural and isolated regions in Guyana.

Wind Energy: R&D into wind turbines and systems that are suited to Guyana's geographical and environmental conditions.

Smart Grids and Energy Storage: Development of energy storage solutions and smart grid technologies to integrate intermittent renewable energy sources and improve the resilience of Guyana's energy grid.

Long-term benefit for Guyana: By investing in R&D for energy technologies, Guyana can not only achieve its renewable energy targets but also become a regional leader in sustainable energy technologies. Additionally, such collaboration can lead to the creation of jobs and capacity building in Guyana's energy sector.

b) Oil and Gas Technologies

Why Joint R&D Makes Sense: As Guyana's oil and gas sector expands, it will need innovative solutions to maximize efficiency, minimize environmental impacts, and improve safety standards. India's oil and gas expertise could be leveraged to develop

R&D programs focused on new exploration and extraction technologies.

Areas for R&D:

Enhanced Oil Recovery (EOR): Research into advanced extraction techniques for recovering oil from existing fields.

Carbon Capture and Storage (CCS): Developing cost-effective and efficient methods for capturing and storing CO2 emissions from the oil and gas sector.

Offshore Drilling Technology: Joint innovation on advanced offshore drilling technologies to improve efficiency, safety, and reduce environmental impact.

Long-term benefit for Guyana: Joint R&D in oil and gas technologies would allow Guyana to improve the productivity of its oil fields while reducing the ecological footprint of extraction activities. Furthermore, developing and implementing such technologies locally would create job opportunities and ensure long-term energy security for the country.

c) Infrastructure Development Technologies

Why Joint R&D Makes Sense: With Guyana's rapid urbanization and infrastructure needs, R&D can focus on building sustainable and resilient infrastructure, particularly in areas prone to flooding or other climate impacts. Indian firms with expertise in infrastructure technology (e.g., smart cities, sustainable construction) can collaborate with Guyanese institutions to develop solutions suited to local conditions.

Areas for R&D:

Climate-Resilient Infrastructure: Research into materials and designs that enhance the resilience of buildings and infrastructure to climate-related events such as floods and storms.

Smart Cities: Developing smart city technologies, including smart transportation, water management, and waste management systems.

Affordable Housing Technologies: R&D on affordable and sustainable housing solutions, particularly for Guyana's growing urban population.

Long-term benefit for Guyana: Joint R&D in infrastructure technologies will ensure that Guyana's urbanization is carried out sustainably and in a climate-resilient manner. These innovations can help Guyana leapfrog traditional infrastructure development methods and create smart, future-proof cities.

3. Potential Assets for Acquisition or Joint Ventures in Guyana

While Guyana's oil and gas sector is largely dominated by foreign companies, there

are existing assets and projects in energy and infrastructure that could be targets for Indian collaboration or acquisition. In the long term, the following categories of assets might be considered for acquisition or joint ventures under the Guyana-India partnership:

a) Oil and Gas Exploration and Production Assets

Current Foreign Ownership: Foreign firms like **ExxonMobil**, **Hess**, and **Chevron** dominate exploration and production.

Opportunities: Indian companies such as **ONGC Videsh** and **Oil India Limited (OIL)** could consider acquiring minority stakes or forming joint ventures in exploration and production fields. This would allow for a deeper Indian involvement in Guyana's growing oil sector while retaining majority ownership and control with Guyanese stakeholders.

b) Renewable Energy Projects

Current Foreign Ownership: Several international firms have set up small renewable energy projects (solar, wind) in Guyana.

Opportunities: Indian companies like **Tata Power** and **Suzlon Energy** could potentially acquire stakes in or partner with existing renewable energy ventures in Guyana, scaling up capacity and innovation.

c) Infrastructure Projects

Current Foreign Ownership: Large infrastructure projects (ports, roads, bridges) may have foreign investments (mainly from the U.S. and Chinese firms).

Opportunities: Indian firms like **Larsen & Toubro (L&T)**, **Tata Projects**, and **Reliance Infrastructure** could consider joint ventures or acquisitions in infrastructure projects to improve port facilities, roads, and other critical infrastructure.

Long-Term Benefits for Guyana

The strategic collaboration between **Indian expertise** and **Guyanese financial resources** offers significant long-term benefits for Guyana:

Technological Upgradation: Through R&D and joint ventures, Guyana can access cutting-edge technologies in energy extraction, renewable energy, and infrastructure, contributing to the country's sustainable development.

Economic Diversification: The acquisition of energy and infrastructure assets, coupled with R&D collaboration, will help Guyana diversify its economy, reduce dependency on oil, and invest in a sustainable future.

Job Creation and Capacity Building: Local workforce training, the development of local skills, and the establishment of research centers will foster local capacity, creating employment and knowledge transfer opportunities for Guyanese citizens.

Self-Sufficiency: Guyana can take control of its energy and infrastructure destiny by reducing reliance on foreign firms, thereby ensuring long-term sovereignty over its natural resources and development trajectory.

By focusing on these strategic acquisitions and R&D initiatives, Guyana can harness its newfound wealth in the oil sector to build a diversified, resilient, and prosperous economy with a strong foundation in energy and infrastructure.

Joint ventures/ partnership in the development of technology; exchange of Know-How; skill training programs

The collaboration between Guyana and India, particularly in the fields of energy, infrastructure, and technological development, presents numerous opportunities for **joint ventures (JVs)**, **partnerships**, and **capacity-building initiatives**. These collaborations can leverage Indian technological expertise and Guyanese financial resources, while focusing on sustainable development and local empowerment. Below are several potential **joint ventures, partnerships, and initiatives** that could contribute to the socio-economic development of Guyana:

1. Joint Ventures in Renewable Energy Technology Development

a) Solar Energy Projects

Potential JV Partners: Indian firms like **Tata Power Solar**, **Suzlon Energy**, and **Luminous Power Technologies**.

Focus Areas: Development, installation, and maintenance of **solar energy systems** in rural and remote regions of Guyana. This could include **off-grid solar solutions**, **solar power plants**, and **solar-powered water pumping systems** for agriculture.

Exchange of Know-How: India has considerable expertise in scaling solar energy projects, particularly in off-grid solar installations. Guyanese partners can acquire knowledge in **solar panel manufacturing**, **grid integration**, and **energy storage solutions**.

Socio-Economic Impact: This JV will promote renewable energy access, reduce reliance on fossil fuels, and contribute to reducing energy poverty in rural areas. It also creates jobs and supports **sustainable agricultural practices** by providing

affordable energy.

b) Wind Energy Projects

Potential JV Partners: **Suzlon Energy** or **Gamesa Wind** (both prominent Indian players in wind energy).

Focus Areas: Development of **wind farms** in regions of Guyana with favorable wind conditions. This could also involve **offshore wind energy solutions** or **hybrid solar-wind systems** for energy security.

Exchange of Know-How: Indian companies can share expertise in the development and optimization of **wind turbine technologies**, **wind site assessment**, and **energy storage**.

Socio-Economic Impact: Wind energy projects will reduce reliance on imported oil, increase renewable energy generation, and support Guyana's energy transition while creating employment in installation, operation, and maintenance.

c) Biomass and Bioenergy

Potential JV Partners: Indian companies involved in **biomass energy** and **waste-to-energy** solutions such as **Bharat Heavy Electricals Limited (BHEL)** or **Ramky Enviro Engineers**.

Focus Areas: Utilizing Guyana's agricultural waste (e.g., sugarcane bagasse, rice husks) for **biomass power generation**, as well as establishing **biofuel production** plants.

Exchange of Know-How: India's expertise in **bioenergy technology**, including **biogas**, **waste-to-energy**, and **energy from agricultural residues**, can be transferred to Guyana.

Socio-Economic Impact: This will contribute to **waste management**, **clean energy production**, and **job creation** in rural communities, while offering sustainable alternatives to fossil fuels.

2. Joint Ventures in Infrastructure Development

a) Smart Cities and Urban Infrastructure

Potential JV Partners: Indian companies like **NBCC Ltd**. **Larsen & Toubro (L&T)**, **Tata Projects**, and **Reliance Infrastructure**.

Focus Areas: Developing **smart cities**, **smart transportation systems**, **urban mobility solutions**, and **water and sanitation systems** in Guyana. This could involve **integrated infrastructure systems** like **smart grids**, **intelligent transportation**, and **digital governance systems**.

Exchange of Know-How: Indian firms can provide expertise in **smart city development**, **green building technologies**, **urban planning**, and **public-private partnerships** (PPP) for large infrastructure projects.

Socio-Economic Impact: The JV would contribute to Guyana's rapid urbanization with **sustainable, technology-driven urban solutions**, improving the quality of life, mobility, and energy efficiency in urban areas.

b) Ports, Logistics, and Transport Infrastructure

Potential JV Partners: **Adani Ports**, **L&T Infrastructure**, or **Indian Oil Corporation (IOC)**.

Focus Areas: Modernization of **port infrastructure**, **logistics hubs**, **railway systems**, and **highway networks**. Indian partners can help optimize **port operations**, improve **transportation networks**, and build **logistical hubs** to support the oil and gas industry.

Exchange of Know-How: India's vast experience in building **transportation networks**, **port management**, and **logistical optimization** can be used to enhance Guyana's infrastructure capacity.

Socio-Economic Impact: A robust infrastructure system will facilitate trade, energy exports, and better connectivity within Guyana. Additionally, the JV can enhance Guyana's global competitiveness in the oil, agricultural, and manufacturing sectors.

3. Joint Ventures in Technology and Innovation

a) Information Technology (IT) and Digital Transformation

Potential JV Partners: **Wipro**, **Tata Consultancy Services (TCS)**, **Infosys**, and **Tech Mahindra**.

Focus Areas: Establishing **digital infrastructure**, **smart solutions**, **data centers**, and offering **IT services** such as **cloud computing**, **big data analytics**, and **cybersecurity**.

Exchange of Know-How: India's highly advanced IT industry can offer Guyana solutions for **digital transformation** of government services, **e-governance**, **public health systems**, **e-education**, and **smart agriculture**.

Socio-Economic Impact: This partnership can help Guyana leapfrog into the **digital economy**, supporting e-commerce, improving access to education and healthcare, and driving innovation. Additionally, it can lead to job creation in the **tech sector**, **data science**, and **digital skills**.

b) Research and Development Centers in Energy and Infrastructure Technologies

Potential JV Partners: Indian research institutions such as **Indian Institute of Technology (IIT)** or **Indian Institute of Petroleum** could collaborate with Guyanese academic institutions like the **University of Guyana**.

Focus Areas: Creating **R&D centers** focused on energy solutions, smart infrastructure, **oil and gas technologies**, and **climate-resilient infrastructure** in Guyana.

Exchange of Know-How: This JV could result in **joint R&D programs** on topics such as **renewable energy solutions**, **energy storage systems**, and **advanced building materials**. Indian research expertise in **carbon capture** and **energy efficiency technologies** could be shared with Guyanese partners.

Socio-Economic Impact: Localizing **R&D** in Guyana will help reduce dependency on foreign expertise, create a culture of innovation, and contribute to sustainable solutions that fit Guyana's needs.

4. Joint Skill Development and Training Programs

a) Vocational Training in Energy, Infrastructure, and Technology

Potential JV Partners: **National Skill Development Corporation (NSDC)** of India, **Indian Renewable Energy Development Agency (IREDA)**, and Guyanese government or universities.

Focus Areas: Establishing **vocational training centers** to train Guyanese youth and workers in fields like **solar energy installation**, **construction skills**, **ICT**, **smart city management**, and **oil and gas industry technologies**.

Exchange of Know-How: Indian institutions can offer expertise in setting up skill development centers that meet **international certification standards**. Furthermore, they can offer **train-the-trainer programs**, so that Guyanese can eventually run these programs locally.

Socio-Economic Impact: This JV will contribute to **human capital development**, reduce unemployment, and equip Guyanese workers with the skills needed to fill jobs in the rapidly growing energy and infrastructure sectors, leading to **economic empowerment**.

b) Educational and Exchange Programs

Potential JV Partners: **Indian Universities** like **UPES (University of Petroleum and Energy Studies)**, **IITs**, and **Indian Institutes of Management (IIMs)** could

partner with the **University of Guyana**.

Focus Areas: Academic exchanges, **research collaborations**, **joint degree programs** in energy, infrastructure, and sustainable development, and **online learning programs** to build local capacity.

Exchange of Know-How: Indian universities can offer cutting-edge academic content and training methods for Guyanese students and faculty, focusing on subjects like **energy management**, **sustainable infrastructure**, and **smart cities**.

Socio-Economic Impact: This initiative will **raise the educational standards** in Guyana, produce skilled graduates ready to work in the energy, technology, and infrastructure sectors, and promote long-term **economic diversification**.

5. Joint Ventures in Manufacturing and Industrial Development

a) Manufacturing of Clean Energy Equipment

Potential JV Partners: Indian firms like **Tata Power**, **BHEL**, and **Suzlon** could establish manufacturing facilities in Guyana for clean energy equipment (e.g., **solar panels**, **wind turbines**, **battery storage systems**).

Focus Areas: Setting up **clean energy manufacturing units** and **assembly plants** in Guyana for local use and export to other Caribbean nations.

Exchange of Know-How: Indian companies will provide technological expertise in manufacturing **renewable energy equipment**, and the local workforce can be trained in **production techniques** and **quality control**.

Socio-Economic Impact: This will create **manufacturing jobs**, reduce import dependency, and position Guyana as a regional hub for renewable energy equipment production, boosting local **industrial growth**.

Joint ventures, partnerships, and capacity-building initiatives between India and Guyana in the fields of **renewable energy**, **infrastructure**, **technology development**, and **skills training** can yield immense benefits for both countries. By capitalizing on India's technological expertise and Guyana's growing financial resources from the oil sector, these collaborations can create lasting socio-economic improvements for Guyana, including **job creation**, **skills development**, **sustainable energy solutions**, and **innovative infrastructure**. Moreover, these efforts will contribute to Guyana's overall **economic diversification** and ensure that the country can build a more sustainable and resilient future for its people.

Chapter 6 Strategic Recommendations for India-Guyana Cooperation in Energy and Infrastructure

6.1 Introduction

This chapter presents a comprehensive suite of strategic recommendations that build upon the preceding analyses of Guyana's energy and infrastructure sectors. These recommendations aim to translate potential into actionable partnerships between India and Guyana, focusing on sustainability, technological transfer, institutional strengthening, and inclusive development. As Guyana continues its economic transformation spurred by oil discoveries and infrastructure expansion, India's technical expertise and development experience offer a valuable blueprint for shaping a resilient and inclusive national development trajectory.

The India-Guyana partnership should be governed by three foundational principles: the creation of mutual economic value, the advancement of sustainable and equitable growth, and the promotion of resilient governance mechanisms. By anchoring their engagement in these principles, both countries can ensure that the collaboration yields tangible and lasting benefits.

6.2 Strategic Vision for Partnership

The envisioned India-Guyana collaboration in energy and infrastructure should be structured around a strategic vision that emphasizes mutual growth, sustainability, and institutional alignment. The primary goal is to leverage Guyana's natural resource endowment and India's robust capacity in energy, engineering, and public-private partnerships to drive development outcomes that are equitable, climate-resilient, and nationally inclusive.

Both countries should frame their cooperation within the larger objectives of the Sustainable Development Goals (SDGs) and the Paris Agreement. The collaboration must prioritize long-term socioeconomic transformation over short-term commercial returns, enabling Guyana to harness its resource wealth without compromising its ecological integrity or social cohesion.

6.3 Recommendations by Sector

6.3.1 Energy Sector

The energy sector remains the cornerstone of Guyana's development agenda. Therefore, the collaboration must focus on enhancing energy security, diversifying the energy mix, and integrating renewable sources, while simultaneously improving reliability and affordability.

India and Guyana should begin by creating bilateral working groups to identify opportunities for joint investment in oil refining, oil storage, and midstream logistics infrastructure. These efforts should be supported by feasibility studies and market analysis

jointly undertaken by Indian public sector undertakings (PSUs) and Guyanese government agencies.

The establishment of a modular oil refinery in Guyana, developed with support from Indian companies, would serve to reduce Guyana's reliance on imported petroleum products while enhancing national energy independence. In return, India can pursue oil-for-equity arrangements that ensure long-term supply stability, thus reinforcing its national energy security.

In the realm of renewable energy, the two countries should prioritize large-scale deployment of solar energy systems, particularly in Guyana's hinterland and underserved communities. By adopting India's Gujarat Solar Park model, Guyana can reduce its dependence on imported diesel and expand rural electrification. Furthermore, India can support Guyana in operationalizing the long-delayed Amaila Falls Hydropower Project by contributing project management expertise, technical designs, and concessional financing through Indian financial institutions.

To modernize Guyana's national power grid, Indian firms such as the Power Grid Corporation of India should be engaged to audit and upgrade the transmission network. Joint pilot projects in smart grid technologies and battery storage solutions can be launched in urban and peri-urban areas to reduce system losses and improve power reliability. These collaborations should be institutionalized through a Guyana-India Renewable Energy Task Force that facilitates regular policy dialogue, fast-tracks project approvals, and monitors implementation.

Policy support and capacity building will be critical to sustaining the energy transition. India should assist Guyana in drafting a comprehensive renewable energy roadmap that includes targets, incentives, and implementation milestones up to 2035. This can be complemented by technical training programs for Guyanese professionals offered by institutions such as the National Thermal Power Corporation (NTPC), The Energy and Resources Institute (TERI), and the Indian Institutes of Technology (IITs).

6.3.2 Oil and Gas Sector

Guyana's oil and gas sector is rapidly expanding and requires robust partnerships to ensure that its development aligns with global best practices. India can support Guyana across the upstream, midstream, and downstream value chains.

In upstream operations, India's ONGC Videsh should be invited to collaborate on exploration and production in newly identified offshore blocks. Joint bidding and consortia formation can facilitate risk-sharing and capacity building for Guyana. Training and technical exchanges in areas such as seismic data interpretation, deep-water drilling, and safety protocols should be formalized to help Guyana develop a local cadre of petroleum engineers and regulatory experts.

In the midstream segment, infrastructure development for transportation and storage should be prioritized. Indian companies such as Indian Oil Corporation and Larsen & Toubro (L&T) should be involved in designing and building pipelines, storage depots, and Floating Storage and Offloading (FSO) units. These projects will reduce logistical bottlenecks and enhance export efficiency.

On the downstream front, Guyana should commission a feasibility study for establishing a national refinery, with participation from Indian public and private sector refiners such as Bharat Petroleum Corporation Limited (BPCL), Reliance Industries, and Mangalore Refinery and Petrochemicals Limited (MRPL). The downstream segment could also be expanded to include petrochemical production, based on successful Indian models in Gujarat and Tamil Nadu.

From a governance perspective, India's Directorate General of Hydrocarbons and Oil Industry Safety Directorate can offer technical assistance in setting up robust licensing, safety, and regulatory frameworks for Guyana. Institutional training in environmental compliance, contract oversight, and revenue management should also be pursued through twinning programs.

6.3.3 Infrastructure Sector

The quality and reach of infrastructure in Guyana are essential to achieving economic diversification and spatial equity. India can play a transformative role by providing technical know-how, financing support, and project execution capabilities.

In the transport and logistics sector, Indian engineering and consulting firms such as IRCON International and RITES Limited should be commissioned to prepare and implement feasibility studies and detailed project reports for priority corridors. Projects such as the Linden–Lethem Road, the Berbice Deep-Water Port, and urban flyovers in Georgetown should be executed in phases, with strong emphasis on environmental and social safeguards.

Urban development is another area of critical importance. Guyana should initiate a Smart Cities Pilot in Georgetown using Indian expertise in integrated urban planning, digital governance, and green construction. This pilot can serve as a model for future urban transformation across other towns.

Affordable housing remains a national priority. Indian companies such as Tata Housing and National Buildings Construction Corporation (NBCC) should be engaged in delivering prefabricated housing solutions tailored to Guyana's climate and cultural needs. These initiatives will support inclusive urbanization and address the housing deficit.

In the water and sanitation subsector, India's Jal Jeevan Mission offers a replicable model. Through technical cooperation, Guyana can upgrade its drinking water supply, sewerage systems, and wastewater treatment plants. These projects should be financed through blended instruments combining public funds, international aid, and Indian concessional loans.

Resilient infrastructure development should be guided by digital integration and climate adaptation. India's BharatNet program can inform the rollout of broadband infrastructure in Guyana's rural regions, supporting education, e-governance, and commerce. Flood management systems and early warning infrastructure should also be introduced to safeguard economic assets from climate-induced disasters.

6.3.4 Investment and Financing Mechanisms

Effective financing is the cornerstone of infrastructure delivery. India and Guyana should explore innovative instruments to mobilize private capital, share risks, and ensure financial sustainability.

To this end, a dedicated India-Guyana Infrastructure Investment Fund should be created. This fund can pool capital from Indian and Guyanese public institutions, private investors, and multilateral agencies. It should prioritize commercially viable projects with high developmental impact.

Public-private partnerships (PPPs) should be leveraged to drive infrastructure delivery. Guyana should adopt and adapt India's successful PPP models, including the Design-Build-Finance-Operate-Transfer (DBFOT), Hybrid Annuity Model (HAM), and Toll-Operate-Transfer (TOT) frameworks. Guyanese officials should undergo specialized training in contract negotiation, performance monitoring, and financial risk management.

Engagement of the diaspora and local SMEs will be critical to ensuring inclusive growth. Guyana's Indian diaspora and Indian entrepreneurs in Guyana should be incentivized to invest in construction, energy services, and manufacturing. Supplier development programs and regional industrial clusters should be established to promote local content and job creation.

6.3.5 Institutional and Policy Cooperation

Sustaining long-term cooperation requires strong institutions and aligned policy frameworks. Therefore, it is recommended that India and Guyana establish a Joint Ministerial Commission on Energy and Infrastructure. This high-level platform should review implementation progress, resolve bottlenecks, and identify emerging priorities.

To broaden participation, a Guyana-India Strategic Dialogue Platform should also be launched. This platform would involve think tanks, research institutions, business chambers, and civil society organizations in shaping bilateral initiatives and tracking outcomes.

Legal and regulatory reforms in Guyana should be supported through technical assistance. Revisions to procurement laws, investment promotion frameworks, and public finance management systems will increase investor confidence and operational efficiency. Indian experts can assist in designing legal instruments that incorporate ESG considerations.

Furthermore, technical and vocational education must be aligned with sectoral needs. India's National Skill Development Corporation (NSDC) can collaborate with Guyanese authorities to establish a Center of Excellence for Infrastructure and Renewable Energy. This center can offer certification programs, workshops, and online courses to upskill Guyana's workforce.

6.4 Monitoring and Evaluation Framework

For strategic recommendations to yield desired outcomes, a robust monitoring and evaluation (M&E) system must be instituted. Key performance indicators should be established to measure project completion rates, investment mobilization, job creation, and improvements in energy access and infrastructure quality.

Annual joint review missions should be conducted to evaluate progress, identify implementation challenges, and recommend mid-course corrections. These missions should involve officials from both governments, development partners, and independent evaluators.

To promote transparency and accountability, a public-facing dashboard should be developed. This online platform would display real-time information on bilateral projects, financing flows, timelines, and impact assessments, thereby encouraging citizen engagement and investor confidence.

6.5 Roadmap for Implementation (2025–2035)

The following implementation roadmap outlines phased milestones to operationalize the strategic recommendations:

Between 2025 and 2026, bilateral task forces should be launched, and pilot projects in solar energy, smart grid infrastructure, and urban housing should commence. By 2027, oil and gas infrastructure partnerships should expand, and the first phase of roads, ports, and housing projects should be completed. From 2030 to 2032, Guyana should operationalize a national refinery, integrate renewables to cover at least 60% of its energy mix, and deepen bilateral trade in construction materials, refined fuels, and clean energy technologies. By 2033 to 2035, Guyana should emerge as a regional hub for energy innovation and sustainable infrastructure development, supported by India's continued collaboration in policy and technical areas.

6.6 Conclusion

The India-Guyana strategic partnership holds transformative potential for addressing development gaps, fostering innovation, and setting global benchmarks in South-South cooperation. The success of this partnership will depend on consistent political commitment, adaptive institutional frameworks, and inclusive stakeholder participation.

By investing in robust governance mechanisms, financing solutions, and local capacity building, both countries can co-create a future defined by energy security, infrastructure excellence, and equitable prosperity. In this shared journey, India and Guyana not only strengthen bilateral ties but also pave the way for a more just and sustainable global development paradigm.

Market Potential and Investment Opportunities for India in Guyana's Energy and Infrastructure Sectors

India and Guyana share a historic and growing bilateral relationship rooted in shared democratic values, development priorities, and increasing economic engagement. Guyana's oil windfall and infrastructure drive, combined with India's proven capabilities in project execution, engineering, and renewable energy, create a conducive platform for strategic cooperation.

Sector-Wise Market Potential

Oil and Gas

- Upstream: Exploration and support services remain largely foreign-operated. Indian firms (e.g., ONGC Videsh, Oil India Ltd.) can seek equity stakes and service contracts.
- Midstream: Pipeline infrastructure is limited. Opportunities exist in crude evacuation, gas monetisation, and storage development.
- Downstream: Prospects for modular refineries and LNG infrastructure.

Renewable Energy

- Solar: National targets aim for 400 MW by 2030. Rooftop solar, mini-grids, and rural electrification offer scalable models.
- Hydropower: Amaila Falls and other river systems hold 700+ MW potential. India's NHPC could support feasibility and engineering.
- Wind and Biomass: Coastal areas have viable wind corridors; biomass can utilise agricultural waste.

Electricity and Grid Modernisation

- Opportunities in smart metering, transmission system upgrades, and microgrid deployment in hinterland regions.

Infrastructure and Transport

- Roads: Scope for Indian EPC contractors to enter Guyana's expanding road development space through PPP or government-to-government models.

- Housing: India's affordable housing ecosystem provides end-to-end solutions (design, technology, finance).
- Urban Mobility: Metro feasibility, EV policy advisory, and public transit innovations.

Table 6.1: Priority Investment Areas for Indian Companies in Guyana

Sector	Specific Opportunity	Potential Indian Partners
Solar Power	Mini-grids, EPC, Tech Transfer	NTPC, Tata Power, ReNew Power
Oil & Gas	Equipment, Drilling, JV	ONGC Videsh, Engineers India Ltd.
Roads & Highways	Design & Construction	L&T, IRB Infra, Afcons
Ports	Modernisation	Essar Ports, Adani Ports
Railways	Track laying, Signalling, Rolling stock supply	RITES, IRCON International, BEML
Metro Rail	Urban mass transit planning, Rolling stock	DMRC, Titagarh Rail Systems, Alstom India
Housing	Affordable Housing	NBCC, Mahindra Lifespaces

Policy and Institutional Support

Guyana

- Investment Act 2004 provides generous tax holidays, duty-free imports for capital goods.
- Guyana Office for Investment (GO-Invest) acts as a single-window clearance.

India

- Lines of Credit from Exim Bank of India.
- Duty-Free Tariff Preference Scheme for LDCs (Guyana qualifies).
- ITEC and training programs in power, urban planning, and civil engineering.

Studies and Precedents

- India's LoC in Suriname and Ghana: Infra, water supply, and rural electrification.
- Solar PV installation in St. Lucia and Guyana under ISA initiatives.

Strategic Investment Models

- Joint Ventures: Encourage Indo-Guyanese partnerships through risk-sharing structures.
- Government-to-Government (G2G): Leveraging diplomatic ties for turnkey infra or energy projects.
- Technology Parks: Establish R&D and incubation hubs focusing on clean energy and infrastructure tech.

With the right blend of public-private engagement and policy harmonisation, India's participation can be transformational for Guyana's energy and infrastructure narrative.

Collaborative Framework, Institutional Linkages, and Strategic Recommendations

As Guyana seeks to leverage its resource wealth for national development, strategic partnerships with experienced nations like India can play a critical role. The success of such partnerships depends on structured frameworks, institutional linkages, and a shared roadmap for cooperation.

Institutional Architecture for Collaboration

In Guyana

- Guyana Office for Investment (GO-Invest): Central facilitator for investment approvals, incentives, and investor services.
- Ministry of Natural Resources: Governs oil & gas exploration, mining, and energy regulation.
- Ministry of Public Works: Oversees transportation and public infrastructure projects.
- Guyana Energy Agency (GEA): Responsible for energy planning and renewable energy promotion.

In India

- Ministry of External Affairs (MEA): Coordinates development partnerships and Line of Credit (LoC) frameworks.
- Ministry of Power and MNRE: Facilitate energy cooperation.
- National Infrastructure and Investment Fund (NIIF) and Exim Bank of India: Key financial enablers for overseas investments.

Existing Collaborative Platforms

- International Solar Alliance (ISA): Both India and Guyana are members, providing a platform for solar project funding, training, and innovation.
- IBSA and ITEC Programs: Guyanese officials have benefited from Indian technical and skill training programs.
- CARICOM-India Partnership: Facilitates multi-country cooperation on digital, energy, and infrastructure initiatives.

Strategic Recommendations

A. Policy and Institutional Mechanisms

- Bilateral Energy and Infrastructure Task Force: To align policy objectives, remove bureaucratic bottlenecks, and review ongoing projects.
- Fast-Track Investment Clearance Cell: For Indian investments in critical sectors like oil, housing, and roads.
- Joint Innovation Fund: Promote R&D in biofuels, battery storage, and sustainable infrastructure.

B. Financing and Project Execution

- Blended Finance Models: Combine Exim Bank LoCs, private equity, and local financing to de-risk large projects.
- Pilot Projects: India could support small-scale demonstration projects in smart grids, prefabricated housing, and EV infrastructure.

C. Capacity Building and Knowledge Exchange

- Institutional Linkages: MoUs between IITs/NITs and University of Guyana in urban planning, water systems, and civil engineering.
- Skill Development: Short-term technical missions, e-learning platforms, and trainers' training in renewable energy and construction technologies.

Case Study: Indo-African Collaboration in Kenya's Power Sector India's LoC-funded transmission projects, paired with training programs, significantly improved local technical capacity. A similar model can be adopted in Guyana.

8.5 Roadmap for Deepening Engagement

Phase	Timeline	Key Activities
Short-Term	2025	High-level bilateral task force, feasibility studies, stakeholder dialogues
Medium-Term	2025–2028	Execution of 3–5 major energy and infra projects, training programs, trade facilitation
Long-Term	2029–2035	Establish joint R&D hubs, permanent economic dialogue mechanism

A forward-looking, mutually beneficial partnership between India and Guyana could serve as a model for South-South cooperation in sustainable development.

Strategic Recommendations:

1. Set up a Guyana-India Energy Partnership for oil, gas, and renewables.

2. Facilitate Indian Investments in Infrastructure, including highways, railways, deepwater ports, airports and smart urban planning.
3. Develop a Bilateral Skill Development Program for energy, oil refining, and infrastructure sectors financing & development
4. Leverage India's Infrastructure Financing Models to accelerate project execution in Guyana.

   By leveraging India's strengths, Guyana can accelerate its development in a sustainable, inclusive, and efficient manner while ensuring long-term economic prosperity.

3.3 . Trade and Investment Flow Analysis:

- Review the volume of trade, investments, and collaborations between Guyana and India in relevant sectors.
- Identify key areas of growth in the bilateral trade and potential untapped opportunities.

Financial Mechanisms for Mobilizing Guyana's Petrodollars for Investment in India-Guyana Joint Ventures

Guyana's petrodollar inflows from its oil exports present an opportunity to mobilize capital for investment in key sectors such as oil & gas, renewable energy, and infrastructure. India, despite being a capital-deficit country, has strong expertise in project execution, technology, and human capital, making it an ideal partner for joint investments.

Below are suitable financial mechanisms and instruments that can help Indian companies leverage Guyana's financial surplus for joint ventures (JVs) and infrastructure investments:

1. Sovereign Wealth Fund (SWF)

Mechanism

- Guyana has established the Natural Resource Fund (NRF), its sovereign wealth fund (SWF), to manage oil revenues for long-term economic development.
- Indian companies and financial institutions can collaborate with Guyana's NRF to create a dedicated investment vehicle for financing energy and infrastructure projects in Guyana.
- India's expertise in SWF collaborations (e.g., partnerships with Abu Dhabi Investment Authority (ADIA) and Norway's SWF) can serve as a model.

Proposed Action

India-Guyana Infrastructure & Energy Fund: A co-managed fund where Guyana's NRF invests capital, and Indian firms bring technology, project execution, and management expertise.

Managed Investments via NIIF: Guyana's SWF can invest in India's National Investment and Infrastructure Fund (NIIF) to finance energy and infrastructure projects jointly.

2. India-Guyana Joint Investment Fund (JGIF)

Mechanism

- Establish a bilateral investment fund pooling capital from Guyana's surplus petrodollars and India's financial institutions (Exim Bank of India, SBI, LIC, NIIF, etc.).
- The fund can provide equity financing, debt financing, and blended finance models for projects in both countries.

Proposed Action

Co-investment in Renewable Energy Projects (Solar, Hydropower, Wind)
Joint Financing for Oil & Gas Refineries and Petrochemical Plants
PPP Model for Large-Scale Infrastructure (Roads, Ports, Smart Cities)

3. Guyana's Investment in India's Infrastructure Bonds

Mechanism

- Guyana's government and NRF can invest in India's Infrastructure Bonds issued by entities like National Highways Authority of India (NHAI), Indian Railways Finance Corporation (IRFC), and Power Finance Corporation (PFC).
- These bonds provide long-term, stable returns while financing Indian infrastructure projects that can supply technology and expertise to Guyana.

Proposed Action

Green Bonds: Guyana's NRF invests in India's Green Energy Bonds to finance renewable energy projects that benefit both nations.
Municipal Bonds for Smart Cities: Guyana can invest in urban infrastructure projects in India while learning best practices for its own city planning.

4. Public-Private Partnerships (PPP) and Project Finance

Mechanism

- Indian companies can structure Public-Private Partnership (PPP) models with Guyanese entities for infrastructure and energy projects.
- Using Project Finance Models, Guyanese petrodollars can be invested in revenue-generating projects in roads, ports, airports, and refineries.

- Indian companies (L&T, GMR, Tata, NTPC, ONGC, Reliance, Adani) can lead projects with Guyanese capital backing.

Proposed Action

Hybrid Annuity Model (HAM) for Road and Port Projects Build-Operate-Transfer (BOT) for Large Infrastructure Projects Viability Gap Funding (VGF) for Renewable Energy Projects

5. Direct Foreign Investment in Indian Firms & Special Purpose Vehicles (SPVs)

Mechanism

- Guyana's government and private sector can directly invest in Indian companies operating in the oil & gas, energy, and infrastructure sectors.
- Special Purpose Vehicles (SPVs) can be jointly created in tax-efficient jurisdictions for financing and managing cross-border projects.

Proposed Action

Guyana Invests in Indian Oil & Gas Firms (ONGC, IOCL, RIL) for Knowledge Transfer
SPVs for Renewable Energy & Infrastructure Projects in Guyana with Indian Firms

6. Credit Enhancement & Loan Syndication via EXIM Bank of India

Mechanism

- Exim Bank of India can extend long-term credit lines to Guyana-backed projects, allowing Indian companies to execute large-scale developments.
- Guyana's NRF can guarantee loans to Indian firms investing in Guyana.

Proposed Action

Credit Line for Indian EPC Firms Developing Guyanese Infrastructure
Loan Syndication for Large-Scale Energy Projects

7. Guyana-India Energy & Infrastructure Development Bank

Mechanism

- A dedicated bilateral bank can be created to finance joint projects.
- The bank can issue infrastructure bonds, energy development bonds, and blended finance options for sustainable investments.

Proposed Action

Energy Transition Fund for Green Hydrogen & LNG Development
Joint Financing for Offshore Oil & Gas Exploration

Financial Mechanisms for India-Guyana Collaboration

Mechanism	How It Works	Target Sectors	Benefits
Sovereign Wealth Fund Collaboration	Guyana's NRF invests in Indian infrastructure & energy projects	Oil & Gas, Renewable Energy, Roads, Smart Cities	Uses Guyana's petrodollars for long-term investment returns
India-Guyana Joint Investment Fund (JGIF)	Bilateral fund to finance projects	Infrastructure, Refining, Energy	Direct capital infusion into priority sectors
Infrastructure Bonds	Guyana invests in Indian government-backed bonds	Transport, Energy, Smart Cities	Stable returns for Guyana, funds India's infrastructure growth
Public-Private Partnerships (PPP) & Project Finance	Indian companies execute projects using Guyanese funding	Roads, Ports, Airports, Urban Development	Ensures quality execution, long-term revenue sharing
Direct Investment & SPVs	Guyana directly invests in Indian firms & SPVs	Oil & Gas, Infrastructure, Solar, Hydropower	Strengthens bilateral investment ties
Credit Enhancement & Loan Syndication	EXIM Bank of India facilitates financing	Energy, Infrastructure, Technology	Reduces risk for Indian firms investing in Guyana
Bilateral Energy & Infrastructure	Dedicated India-Guyana bank funds projects	LNG, Refining, Roads, Renewable Energy	Long-term sustainable investment financing

Mechanism	How It Works	Target Sectors	Benefits
Development Bank			

Strategic Recommendations for Implementation

1. Establish a High-Level India-Guyana Financial Cooperation Task Force to operationalize investment mechanisms.
2. Fast-Track the Creation of the India-Guyana Joint Investment Fund (JGIF) to channel investments efficiently.
3. Facilitate Direct Investment by Guyanese SWF in Indian Infrastructure Bonds for stable, long-term returns.
4. Enable Exim Bank of India to Provide Credit Enhancements for Indian Investments in Guyana to de-risk projects.
5. Leverage Public-Private Partnerships (PPPs) for Large-Scale Infrastructure and Energy Projects with Indian firms leading execution.

By implementing these financial mechanisms, Guyana can effectively deploy its petrodollars, while India can leverage its technical expertise and project execution capabilities to create a win-win partnership for long-term economic growth.

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Chapter 7. Investment Environment in Guyana

Guyana presents a dynamic and evolving investment environment, fueled by its prolific offshore oil discoveries and complemented by proactive efforts to diversify the economy. The Government of Guyana (GoG) views foreign direct investment (FDI) as a crucial engine for economic growth and is actively fostering a business-friendly climate across key sectors such as agriculture, energy, infrastructure, ICT, and tourism.

Funding, Infrastructure, and Climate Strategy

While the GoG initially faced challenges in mobilizing external capital for infrastructure development, this is rapidly changing due to substantial oil revenues. With the Natural Resource Fund (NRF) expected to exceed $3 billion by the end of 2024, Guyana is well-positioned to deploy best international practices such as public-private partnerships (PPPs), sovereign wealth-backed infrastructure funds, and infrastructure bonds to fund both physical and social infrastructure sustainably.

Under Budget 2025, Guyana has prioritized strengthening agriculture, energy security, and education. The Gas-to-Energy project and other infrastructural works are expected to dramatically reduce electricity costs and improve connectivity. Guyana's Low Carbon Development Strategy (LCDS) underscores its commitment to climate-smart development while monetizing environmental assets through mechanisms like carbon credit markets.

Foreign Investment Policy

The GoG is open to investment in nearly all sectors, with emphasis on renewable energy, ICT, agro-processing, and tourism. GOINVEST, the government's investment promotion agency, supports foreign investors through tax incentives, business registration, and liaison with regulatory bodies. In the oil and gas sector, the Local Content Act mandates that companies meet specific thresholds for local hiring and procurement.

Property Rights and Foreign Ownership

Guyana allows foreign ownership of property and enterprises, though some sectors—such as small- and medium-scale mining—limit foreign participation. To circumvent this, the government encourages joint ventures between local and foreign firms, facilitating technology transfer while maintaining local equity.

However, the process for acquiring land can be complex and bureaucratic.

Solution: Guyana should accelerate the creation of a digital unified land registry and establish a single-window clearance system to streamline property transactions and ensure transparent ownership verification.

Legal, Regulatory, and Investment Framework

While Guyana's regulatory environment is rooted in sound legislation, businesses often encounter slow, opaque processes across multiple ministries.

Solution: The GoG should fully implement an electronic single-window system for investment approvals and licensing, along with a central investment coordination unit to reduce inter-agency friction.

Though regulatory frameworks are based on international norms (e.g., IFRS, WTO compliance), the inconsistent enforcement and interpretation of tax laws by the GRA has been a frequent investor concern.

Solution: Institutional reforms within the GRA, including the digitalization of tax services, taxpayer charter enforcement, and capacity building for staff, are urgently needed.

Dispute Settlement and Arbitration

Guyana is a signatory to the ICSID and New York Conventions, and it enforces international arbitration decisions. However, long delays in court decisions and lack of judicial capacity hamper contract enforcement.

Solution: Guyana must increase judicial staffing, introduce commercial fast-track courts, and promote alternative dispute resolution (ADR) through legislative support and awareness programs.

Financial Sector and Capital Markets

Guyana's banking sector is stable and well-capitalized, yet access to credit remains a constraint due to conservative lending practices and limited financial instruments.

Solution: The government should support credit guarantee schemes, invoice factoring legislation, and incentivize venture capital and private equity participation through regulatory enhancements.

The local stock market remains underutilized, with no new listings in over a decade.

Solution: The Guyana Securities Council should undertake capital market reforms, ease listing requirements for SMEs, and attract foreign institutional investors by modernizing trading platforms.

Investment Incentives

Guyana offers generous tax holidays, VAT exemptions, and accelerated depreciation—applicable equally to domestic and international investors. The GoG also supports clean energy investment under the LCDS. However, many investors report a lack of clarity or delays in obtaining concessions.

Solution: GOINVEST should publish an interactive investment portal outlining eligibility criteria, timelines, and application status updates in real-time.

Bilateral Treaties and Trade

Guyana maintains several bilateral investment treaties and double taxation agreements. It continues to uphold WTO principles and benefits from trade preferences with CARICOM, the EU, and others. To further strengthen investor confidence, Guyana should consider pursuing bilateral investment treaties (BITs) with high-investment countries like the United States and India.

Intellectual Property and Property Rights

IP protection remains weak due to outdated laws and poor enforcement.

Solution: Guyana must modernize its IP legislation in line with TRIPS standards, create a dedicated IP tribunal, and build enforcement capacity within customs and the judiciary.

Additionally, a significant percentage of land lacks proper titling, making transactions risky.

Solution: Implementation of a national cadastre system and land title regularization programs should be prioritized.

Labour Market and Workforce Development

Guyana faces a tightening labour market and skills shortage, particularly in technical fields. High emigration rates compound this issue.

Solution: The GoG should invest in vocational training, ICT education, and establish skill-based immigration pathways to attract qualified labour from the Caribbean and Commonwealth.

The informal economy and limited social safety nets hinder broader economic participation.

Solution: The government should formalize informal sectors through incentives, introduce portable benefits, and expand unemployment insurance gradually.

State-Owned Enterprises and Privatization

Guyana's SOEs often compete with private firms for resources, and the privatization process is criticized as opaque and politically biased.

Table 8.1: SELECTED SOCIO-ECONOMIC INDICATORS for Guyana											
INDICATORS		2020		2021		2022		2023		2024	
1	NATIONAL ACCOUNTS AGGREGATES										
1.1	Growth Rate of Real GDP (2012 Base) (%)	43.5		20.1		63.3		33.8		43.6	
1.2	GDP at Current Basic Prices (US$M) (2012 Base)	4,940.10		7,434.90		14,799.80		16,254.20		23,352.00	
1.3	GNP at Current Basic Prices (US$M) at 2012 Base	4,895.10		7,379.60		13,457.90		14,674.20		20,957.00	
1.4	Per Capita GDP (US$) at 2012 Base	6,900.50		10,301.60		19,077.10		21,513.30		30,654.60	
1.5	Per Capita GNP (US$) at 2012 Base	6,845.60		10,229.10		17,347.40		19,483.50		27,587.70	

1.6	Gross National Disposable Income (US$M) at Current Purchaser's Price	5,867.10		8,805.50		14,514.20		16,337.20		22,435.50	
2	EXTERNAL TRADE AND FINANCE (US$M)										
2.1	BOP Current Account Balance		935.3		1,995.00	3,805.90		1,679.90		6,065.70	
2.2	Imports of Goods and Non-Factor Services (G&NFS)		4,239.40		7,233.30		7,405.40		11,555.40		12,974.00
2.3	Exports of Goods and Non-Factor Services (G&NFS)	2,791.30		4,627.10		11,497.00		13,644.70		20,541.00	
2.4	Resource Balance		1,448.00		2,606.20	4,091.50		2,089.30		7,567.30	
2.5	Imports of G&NFS/ GDP (%) at 2012 Base		85.8		97.3		50		69.9		55.6
2.6	Exports of G&NFS/ GDP (%) at 2012 Base	56.5		62.2		77.7		82.6		88	

2.7	Net International Reserves of Bank of Guyana	680.6		810.8		932.4		896.4		1,010.10	
2.8	External Public Debt Outstanding	1,320.80		1,392.80		1,571.90		1,775.40		2,239.00	
3	PRICES, WAGES AND OUTPUT										
3.1	Rate of Inflation (% Change in the Consumer Price Index)	0.9		5.7		7.2		2		2.9	
3.2	Public Sector Monthly Minimum Wage in G$	70,000.00		74,900.00		80,892.00		86,150.00		94,765.00	
3.3	% Growth Rate	-		7		8		6.5		10	
3.4	Electricity Generation (in M.W.H) ('000)	902.6		958.8		1,030.30		1,179.90		1,384.80	
4	POPULATION AND VITAL STATISTICS										
4.1	Mid-Year Population ('000)	770		773		775.8		778.4		780.9	
4.2	Population Growth Rate (e.o.p)	0.4		0.3		0.4		0.3		0.3	

4.3	Net Migration Rate (per 1,000 persons)	6.9		7.9		16.6		16.8		36.8	
4.4	Visitor Arrivals ('000)	86.5		173.8		288.3		319		371.3	
4.5	Crude Birth Rate (per 1,000 persons)	20		21.8		23.6		23.4		19.5	
4.6	Crude Death Rate (per 1,000 persons)	6.1		5.5		8.7		7.6		8.2	
4.7	Crude Marriage Rate (per 1,000 persons)	4.4		6		5.2		4.6		4.9	
4.8	Infant Mortality Rate (per 1,000 live births)	9.1		9.3		10		10		7	
4.9	Under 5 Mortality Rate (per 1,000 live births)	11.1		11.4		13		14		8	
5	HEALTH AND EDUCATION										
5.1	Public Expenditure on:										
5.1.1	Education as % of National Budget	15.6		16		13.4		11.8		12.4	

Notes:

1) . . . indicates data not available.

2) The 2024 figures are estimates in some instances and subject to revision.

3) National Accounts Aggregates were revised for 2023

4) Crude birth, death and marriage rates for 2024 are preliminary. Crude death and marriage rates for 2023

were revised.

5) The External Trade and Finance Section for 2023 reflects updated data from the Bank of Guyana.

6) Number of Physicians per Ten Thousand Population for 2023 was revised.

7) Net migration rate for 2024 is preliminary.

8) The mid-year population estimates for 2022 to 2024 were done prior to the 2022 Census. As such, these

figures are subject to revision upon the release of the 2022 Census data.

9) Serious crimes for 2022 and 2023 have been revised.

10) Electricity generation was revised for 2020, 2021, and 2023

Source: Bureau of Statistics, Bank of Guyana, Ministry of Education, Ministry of Health, Ministry of

Home Affairsand Ministry of Finance

Budget Speech Appendices

Solution: The GoG should adopt international best practices in privatization—such as independent transaction advisors, pre-announced evaluation criteria, and public auction mechanisms—to enhance transparency and competitiveness.

Responsible Business Conduct and ESG

Although not yet mandated, RBC and ESG practices are gaining traction, especially among multinationals. However, enforcement of labor and environmental laws remains weak in remote areas.

Solution: The GoG should establish independent compliance monitoring bodies, especially in the mining and agriculture sectors, and promote voluntary ESG disclosures.

Political and Security Climate

While politically stable, Guyana struggles with high crime rates, particularly in smuggling-prone areas.

Solution: Strengthening community policing, border surveillance, and judicial reforms to speed up prosecutions can improve investor confidence.

Climate Action and Sustainability

Guyana is a global leader in forest conservation and climate financing. The LCDS and participation in CORSIA and REDD+ have positioned Guyana as a model for nature-based solutions. Continued investment in climate-resilient infrastructure, renewable energy, and green financing mechanisms will bolster this leadership.

With its oil wealth, Guyana is transitioning from a capital-seeking to a capital-surplus economy. To leverage this transformation, Guyana must pair its natural endowments with institutional reforms, capacity building, and strategic partnerships. Proactively addressing regulatory bottlenecks, labour shortages, land access, and weak IP enforcement will help Guyana unlock its full investment potential. A commitment to transparency, sustainability, and inclusive growth will position Guyana not only as a regional hub but as a global investment destination.

Table 8.2: GROSS DOMESTIC PRODUCT AT 2012 PRICES BY INDUSTRIAL ORIGIN (G$ Millions)

Industry	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Agriculture, forestry and fishing	2,11,234	2,19,803	2,36,671	2,44,364	2,17,221	2,44,734	2,60,963	2,59,670	2,70,445	2,45,915	2,74,666	2,93,545	3,25,865
Growing of sugar cane	13,420	11,494	13,304	14,220	11,292	8,450	6,440	5,677	5,469	3,571	2,895	3,705	2,899
Growing of rice	41,562	46,142	54,935	60,677	48,432	55,525	54,352	54,901	57,532	45,710	49,408	52,041	56,874
Growing of other crops	1,05,691	1,10,618	1,16,262	1,18,709	1,11,795	1,33,986	1,49,136	1,49,522	1,59,461	1,43,823	1,65,786	1,72,581	1,91,459
Raising of livestock	20,564	21,236	21,832	23,028	21,697	21,196	26,127	25,201	26,455	28,880	30,868	34,239	42,669
Forestry	17,554	18,517	21,473	19,060	14,040	15,224	15,430	14,821	13,614	15,149	17,076	18,734	19,598
Fishing	12,444	11,796	8,865	8,670	9,965	10,353	9,478	9,548	7,914	8,782	8,633	12,244	12,366

Mining and quarrying	1,00,988	1,09,494	93,781	1,04,567	1,57,978	1,46,388	1,51,122	1,67,155	6,74,849	9,23,069	19,56,413	28,10,962	43,82,774
Bauxite	12,965	12,159	11,303	8,841	9,391	9,677	11,582	11,784	6,925	6,721	8,212	6,532	9,696
Gold	82,392	90,363	72,786	84,723	1,33,869	1,22,796	1,15,746	1,19,255	1,09,963	93,738	91,364	81,165	81,532
Other mining and quarrying	5,235	6,597	9,155	9,009	11,925	9,322	14,737	15,811	9,062	16,807	26,235	35,629	53,632
Petroleum and gas; and support services	397	375	537	1,994	2,793	4,593	9,057	20,305	5,48,899	8,05,804	18,30,602	26,87,637	42,37,914
Manufacturing	49,950	54,046	57,187	57,752	48,373	49,105	50,208	57,568	52,634	54,524	56,276	72,757	82,604
Sugar	11,907	10,198	11,804	12,617	10,019	7,497	5,713	5,037	4,852	3,168	2,569	3,287	2,572
Rice	9,898	12,082	15,376	15,734	10,972	13,911	14,564	18,415	17,366	14,572	15,906	18,332	20,882
Other manufacturing	28,145	31,766	30,008	29,401	27,382	27,697	29,931	34,116	30,415	36,784	37,801	51,138	59,150
Electricity supply	3,905	4,029	4,286	4,447	4,727	4,755	4,921	5,265	5,328	5,580	6,116	6,988	8,283
Water supply and sewerage	2,556	2,473	2,755	2,437	2,942	3,074	3,190	3,234	3,494	3,241	3,304	3,630	3,708
Construction	63,366	66,801	65,485	62,238	65,793	69,007	71,021	73,205	68,591	88,309	1,11,506	1,46,958	1,92,199
Services	3,57,054	3,63,004	3,73,286	3,71,821	3,81,080	3,91,745	4,03,182	4,19,928	3,80,278	4,25,530	4,62,295	5,12,710	5,50,913
Wholesale and retail trade and repairs	81,866	76,300	75,458	66,128	67,410	71,754	74,509	78,234	56,082	75,857	87,926	95,955	1,02,768
Transport and storage	29,738	31,680	33,319	34,417	34,913	35,098	36,763	39,299	27,447	35,841	39,141	46,094	49,776

Accommodation and food services	2,915	3,081	3,121	3,127	3,245	3,410	3,684	3,886	2,224	3,406	4,527	5,129	5,622
Information and communication	18,678	19,274	20,751	20,827	20,955	21,495	22,166	22,388	23,629	23,752	25,674	29,639	30,750
Financial and insurance activities	34,649	38,087	40,383	43,015	44,216	44,823	46,702	49,114	50,448	54,848	56,937	63,115	71,539
Real estate activities	71,724	72,614	73,459	74,379	75,220	76,067	76,976	77,874	78,125	80,767	83,813	86,410	89,280
Professional, scientific and technical services	3,948	4,064	3,974	3,986	4,155	4,461	4,683	4,864	3,775	4,749	5,707	8,052	10,587
Administrative and support services	49,734	51,490	53,777	54,906	57,539	59,360	60,430	63,949	62,078	66,697	74,401	90,409	98,855
Public administration	30,758	32,072	33,121	34,065	35,147	36,101	36,985	38,985	39,435	40,362	42,252	43,293	44,267
Education	19,292	19,742	20,537	21,412	21,897	22,085	22,477	22,757	20,505	21,472	22,526	24,487	26,602
Human health and social work	7,985	8,684	9,418	9,570	10,283	10,846	11,309	11,943	12,349	12,740	13,217	13,515	13,922
Arts, entertainment and recreation	3,032	3,107	3,124	3,124	3,175	3,246	3,365	3,455	2,017	2,286	2,822	3,083	3,182
Other service activities	2,735	2,809	2,842	2,865	2,925	2,999	3,135	3,180	2,164	2,752	3,352	3,528	3,764
Less FISIM	15,451	17,651	18,386	20,266	21,545	20,700	20,370	21,911	21,698	23,442	22,734	25,832	31,534

GDP at basic prices	7,73,602	8,01,998	8,15,066	8,27,361	8,56,567	8,88,107	9,24,238	9,64,114	14,33,921	17,22,728	28,47,840	38,21,719	55,14,814
Taxes less subsidies on products	56,725	58,663	60,109	53,830	58,176	60,797	66,807	79,979	64,140	75,845	89,850	1,08,765	1,28,278
Total GDP at purchaser prices	8,30,326	8,60,661	8,75,176	8,81,192	9,14,743	9,48,904	9,91,044	10,44,093	14,98,061	17,98,572	29,37,691	39,30,484	56,43,092
Non-oil GDP at purchaser prices	8,29,930	8,60,287	8,74,638	8,79,198	9,11,950	9,44,311	9,81,988	10,23,788	9,49,162	9,92,769	11,07,089	12,42,847	14,05,178

Table 8.3: CENTRAL GOVERNMENT FINANCIAL OPERATIONS (G$ Millions)

	ACTUAL 2023	**BUDGET 2024**	**REVISED 2024**	**BUDGET 2025**
Total Revenue	**5,97,931.9**	**7,17,837.2**	**7,84,589.1**	**10,24,487.0**
Revenue	**3,82,107.5**	**4,27,267.9**	**4,37,662.7**	**4,54,620.4**
Tax	3,66,615.0	4,08,462.1	4,20,180.3	4,34,120.4
Income taxes	2,11,826.9	2,41,798.9	2,49,208.3	2,52,638.9
Value Added and Excise Taxes	1,03,787.0	1,10,938.5	1,12,747.3	1,20,018.0
Trade taxes	34,755.1	39,402.1	38,928.9	42,062.1
Other	16,246.0	16,322.5	19,295.8	19,401.4
Non-tax	15,492.5	18,805.8	17,482.4	20,500.0
Private sector	11,154.4	10,705.8	13,188.9	13,000.0
Public enterprise & BOG	4,338.1	8,100.0	4,293.5	7,500.0
NRF Withdrawal	**2,08,421.8**	**2,40,059.5**	**3,29,854.3**	**5,12,436.7**
GRIF Inflows	**1,590.4**	**6,750.0**	**4,008.7**	**16,280.0**
Carbon Credit Inflows	**5,785.5**	**43,733.3**	**13,036.3**	**41,122.0**
Total expenditure	**8,04,148.8**	**11,21,129.7**	**11,63,767.2**	**13,50,014.6**
Current expenditure	**3,82,329.5**	**4,54,954.3**	**5,17,682.6**	**6,12,334.0**
Non-interest expenditure	3,69,989.6	4,34,809.9	5,00,723.9	5,87,951.9
Personal emoluments	1,04,938.3	1,21,445.0	1,22,583.1	1,45,549.7
Other goods and services	1,12,794.8	1,35,529.5	1,69,486.3	1,90,056.5
Transfer Payments	1,52,256.5	1,77,835.4	2,08,654.5	2,52,345.7
Interest	**12,339.8**	**20,144.3**	**16,958.7**	**24,382.2**

External	8,117.2	13,629.9	10,425.0	15,218.6
Domestic	4,222.6	6,514.5	6,533.6	9,163.6
Primary balance	**12,117.9**	**(7,542.0)**	**(63,061.2)**	**(1,33,331.5)**
Current balance	**(221.9)**	**(27,686.4)**	**(80,019.9)**	**(1,57,713.7)**
Capital Revenue	**26.6**	**26.6**	**27.1**	**28.0**
Capital Expenditure	**4,21,819.4**	**6,66,175.4**	**6,46,084.6**	**7,37,680.6**
Overall Balance before Grants	**(2,06,217.0)**	**(4,03,292.4)**	**(3,79,178.1)**	**(3,25,527.6)**
Grants	**3,274.4**	**7,375.8**	**2,769.6**	**7,681.7**
HIPC relief	-	-	-	-
Original	-	-	-	-
Enhanced	-	-	-	-
CMCF	-	-	-	-
MDRI	-	-	-	-
Other	3,274.4	7,375.8	2,769.6	7,681.7
Projects	3,172.0	6,920.7	2,766.4	6,134.6
Non-projects	102.4	455.1	3.2	1,547.1
Overall Balance after Grants	**(2,02,942.5)**	**(3,95,916.6)**	**(3,76,408.5)**	**(3,17,845.9)**
Financing	**2,02,942.5**	**3,95,916.6**	**3,76,408.5**	**3,17,845.9**
Net External Borrowing	48,042.6	2,06,394.1	92,637.6	2,99,722.6
Disbursements of Loans	60,505.2	2,22,367.7	1,08,180.6	3,22,445.0
Debt Repayments	12,462.7	15,973.6	15,543.0	22,722.3
Net Domestic Borrowing	1,54,900.0	1,89,522.6	2,83,770.9	18,123.3
Overall Deficit as a % of GDP	**(5.8)**	**(8.5)**	**(7.3)**	**(5.9)**

Figures:G$ Millions
Source: Ministry of Finance

Table 8.4: BALANCE OF PAYMENTS ANALYTIC SUMMARY (US$ Millions)

ITEM		ACTUAL 2023	BUDGET 2024	REVISED 2024	BUDGET 2025
A	**Current Account**	**1,679.9**	**7,853.1**	**6,065.7**	**2,306.2**
1.0	**Merchandise (Net)**	**6,496.3**	**13,230.8**	**12,978.8**	**10,770.2**
	1.1 Exports (f.o.b.)	13,132.4	18,703.9	19,792.4	19,781.7
	1.1.1 Bauxite	*79.6*	*163.2*	*94.8*	*214.0*
	1.1.2 Sugar	*24.9*	*35.5*	*19.4*	*38.9*
	1.1.3 Rice	*211.7*	*320.0*	*254.8*	*325.2*
	1.1.4 Gold	*808.6*	*901.8*	*990.0*	*1,132.0*
	1.1.5 Timber	*20.7*	*31.4*	*20.0*	*22.0*
	1.1.6 Crude Oil	*11,581.5*	*16,821.5*	*17,993.2*	*17,609.4*
	1.1.7 Other	*188.2*	*202.5*	*163.3*	*170.5*
	1.1.8 Re - exports	*217.2*	*228.1*	*256.9*	*269.8*
	1.2 Imports (c.i.f.)	(6,636.0)	(5,473.1)	(6,813.6)	(9,011.6)
	1.2.1 Fuel & Lubricants	*(1,265.7)*	*(1,357.3)*	*(1,203.1)*	*(1,317.7)*
	1.2.2 Other	*(5,370.3)*	*(4,115.8)*	*(5,610.6)*	*(7,693.9)*

2.0	**Services (Net)**	**(5,987.1)**	**(6,453.4)**	**(7,806.3)**	**(9,413.7)**
	2.1 Factor	*(1,580.0)*	*(2,149.6)*	*(2,394.9)*	*(2,466.6)*
	2.2 Non Factor (Net)	*(4,407.1)*	*(4,303.8)*	*(5,411.4)*	*(6,947.1)*
3.0	**Transfers**	**1,170.7**	**1,075.8**	**893.2**	**949.8**
	3.1 Official	*0.5*	*2.2*	*0.0*	*7.4*
	3.2 Private	*1,170.2*	*1,073.6*	*893.2*	*942.3*
B	**Capital Account**	**(1,732.0)**	**(7,733.1)**	**(5,940.4)**	**(1,744.9)**
1.0	**Capital Transfers**	**15.2**	**33.2**	**13.3**	**29.4**
2.0	**Medium and Long Term Capital (Net)**	**(1,612.5)**	**(7,704.8)**	**(6,043.3)**	**(1,745.2)**
	2.1 Non - Financial Public Sector Capital (Net)	(402.8)	(261.9)	(484.4)	1,336.7
	2.1.1 Disbursements	*267.3*	*1,066.5*	*575.3*	*1,546.5*
	2.1.2 Amortization	*(64.0)*	*(79.7)*	*(77.7)*	*(109.6)*
	2.1.3 Other	*(606.1)*	*(1,248.7)*	*(982.0)*	*(100.2)*
	2.1.3.a SDR Allocation	-	-	-	-
	2.1.3.b Natural Resource Fund	*(1,608.2)*	*(2,402.9)*	*(2,568.0)*	*(2,564.1)*
	2.1.3.c Natural Resource Fund Withdrawal	*1,002.1*	*1,154.3*	*1,586.0*	*2,463.9*
	2.2 Private Sector (Net)	(1,209.8)	(7,442.9)	(5,558.8)	(3,081.9)
	2.2.1 Foreign Direct Investment (Net)	*(1,141.9)*	*(7,385.4)*	*(5,497.3)*	*(3,018.6)*
	2.2.2 Portfolio Investment (Net)	*(67.9)*	*(57.5)*	*(61.5)*	*(63.3)*
3.0	**Short Term Capital**	**(134.7)**	**(61.5)**	**89.6**	**(29.1)**
C	**Errors and Omissions**	**16.1**	**0.0**	**(11.5)**	**0.0**
D	**Overall Balance**	**(36.0)**	**120.0**	**113.8**	**561.3**
E	**Financing**	**36.0**	**(120.0)**	**(113.8)**	**(561.3)**
1.0	**Bank of Guyana Net Foreign Assets**	**36.0**	**(120.0)**	**(113.8)**	**(561.3)**
2.0	**Change in Non-Financial Public Sector Arrears**	-	-	-	-
3.0	**Exceptional Financing**	-	-	-	-
	3.1 Debt Relief				
	3.2 Balance of Payments Support				

	3.3 Debt Forgiveness 3.4 Debt Stock Restructuring					

Figures: US$ Millions
Source: Ministry of Finance, Bureau of Statistics,
and Bank of Guyana

	ACTUAL AND PROJECTED NATURAL RESOURCE FUND:								
	Table 8.5: INFLOWS AND OUTFLOWS (US$'000)								
	ITEM	ACTUAL	ACTUAL	BUDGET	REVISED	BUDGET	INDICATIVE	INDICATIVE	INDICATIVE
		2022	2023	2024	2024	2025	2026	2027	2028
A	INFLOWS	12,71,767	17,03,836	24,56,392	27,12,330	25,90,553	29,60,178	33,67,567	41,62,206
1	Petroleum Revenue Deposits	12,54,260	16,17,000	23,98,830	25,70,989	25,02,950	28,73,959	32,69,483	40,50,809
	Government Share of Profit Oil	10,99,105	13,98,909	20,78,921	22,22,962	21,62,383	24,70,250	28,31,089	34,86,281
	Royalties	1,55,155	2,18,091	3,19,909	3,48,026	3,40,567	4,03,709	4,38,394	5,64,528
2	Nominal Return	17,506	86,836	57,562	1,41,342	87,603	86,219	98,084	1,11,397
	Interest Income	17,506	86,836	57,562	1,41,342	87,603	86,219	98,084	1,11,397
	Capital Gains	-	-	-	-	-	-	-	-
B	OUTFLOWS	6,07,647	10,02,130	11,54,250	15,86,000	24,63,890	24,02,655	27,36,563	30,79,061
1	Withdrawal Amount	6,07,647	10,02,130	11,54,250	15,86,000	24,63,890	24,02,655	27,36,563	30,79,061
	NRF Opening Balance	6,07,647	12,71,767	19,73,473	19,73,473	30,99,803	32,26,467	37,83,990	44,14,994
	NRF Closing Balance	12,71,767	19,73,473	32,75,614	30,99,803	32,26,467	37,83,990	44,14,994	54,98,140
	MEMORANDUM ITEMS:								
	Withdrawal Ceiling	6,07,647	10,02,130	11,54,250	15,86,150	24,63,890	24,02,655	27,36,563	30,79,061

Note: Withdrawal ceiling for 2024 adjusted in accordance with the
Fiscal Enactments (Amendment) Act 2024
Figures: US$'000
Source: Ministry of Finance, Ministry of Natural Resources,
and Bank of Guyana

8.6: Guyana Electricity Generation: 2022

Primary energy consumption (quads)	Electricity generation (percentage)	Forecast (Electricity generation (percentage))	Lower Confidence Bound (Electricity generation (percentage))	Upper Confidence Bound (Electricity generation (percentage))
0.00	0.7%			
0.03	98.4%	98.4%	98.4%	98.4%
0.06		196.0%	196.0%	196.0%

Data source: U.S. Energy Information Administration, International Energy Statistics
Note: Other renewables contain solar and biomass and waste. Quads=quadrillion British thermal units
Assumption: Considering the current growth rate and progress of renewable energy sector.
Electricity generation in Guyana rose slowly from 0.94 billion kWh in 2012 to 1.14 in 2022. Modest increases are forecasted through 2030, reaching 1.36 billion kWh, with fossil fuels remaining dominant, especially oil. However, this can be significantly stepped up if gas is used for electricity generation.

8.7: Guyana Total Electricity Generation Projection

Sources	Generation (billion kWh)	Forecast(Generation (billion kWh))	Lower Confidence Bound(Generation (billion kWh))	Upper Confidence Bound(Generation (billion kWh))
2012	0.94			
2013	0.96			
2014	0.98			
2015	1.00			
2016	1.08			
2017	1.10			
2018	1.13			
2019	1.14			
2020	1.14			
2021	1.14			

2022	1.14	1.14	1.14	1.14
2023		1.20	1.14	1.26
2024		1.22	1.16	1.28
2025		1.25	1.19	1.30
2026		1.27	1.21	1.33
2027		1.29	1.23	1.35
2028		1.31	1.25	1.37
2029		1.34	1.27	1.40
2030		1.36	1.30	1.42

Sources	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Generation (billion kWh)	0.94	0.96	0.98	1	1.08	1.1	1.13	1.14	1.14	1.14	1.14		
Nuclear (billion kWh)	0	0	0	0	0	0	0	0	0	0	0		
Fossil fuels (billion kWh)	0.92	0.94	0.96	0.97	1.06	1.08	1.11	1.11	1.12	1.12	1.12		
Coal (billion kWh)	0	0	0	0	0	0	0	0	0	0	0		
Natural gas (billion kWh)	0	0	0	0	0	0	0	0	0.01	0.02	0.02		
Oil (billion kWh)	0.92	0.94	0.96	0.97	1.06	1.08	1.11	1.11	1.11	1.1	1.1		
Other gases (billion kWh)	0	0	0	0	0	0	0	0	0	0	0		
Renewables (billion kWh)	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.03	0.02	0.02	0.02		
Hydroelectricity (billion kWh)	0	0	0	0	0	0	0	0	0	0	0		
Non-hydroelectric renewables (billion kWh)	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.03	0.02	0.02	0.02		
Geothermal (billion kWh)	0	0	0	0	0	0	0	0	0	0	0		
Solar, tide, wave, fuel cell (billion kWh)	0	0	0	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01		
Tide and wave (billion kWh)	0	0	0	0	0	0	0	0	0	0	0		
Solar (billion kWh)	0	0	0	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01		
Wind (billion kWh)	0	0	0	0	0	0	0	0	0	0	0		
Biomass and waste (billion kWh)	0.02	0.02	0.02	0.03	0.02	0.01	0.01	0.01	0.01	0.01	0.01		
Hydroelectric pumped storage (billion kWh)	0	0	0	0	0	0	0	0	0	0	0		

Table 8.8: Guyana Electricity 2012-22

Data source: U.S. Energy Information Administration, International Energy Statistics
Assumption: Considering the current growth rate and progress of renewable energy sector.
Electricity generation in Guyana rose slowly from 0.94 billion kWh in 2012 to 1.14 in 2022. Modest increases are forecasted through 2030, reaching 1.36 billion kWh, with fossil fuels remaining dominant, especially oil. Renewable energy (mostly non-hydro sources like biomass and solar) contributed marginally (~2%) to electricity production, with no significant increase over the decade. Guyana's natural gas consumption began in 2018 but remains minimal. Forecasts suggest a slow increase to 0.2 billion cubic feet annually by 2030, indicating limited current infrastructure or demand. This can significantly increase with Guyana-India collaborations recommended in the report.

Table 8.9: Guyana Oil Production Projection

Guyana Oil Production	Barrel per day	Forecast(Barrel per day)	Lower Confidence Bound(Barrel per day)	Upper Confidence Bound(Barrel per day)
2019	1,200.00			
2020	74,570.00			
2021	11,691.00			
2022	28,896.00			
2023	39,118.00			
2024	6,74,000.00			
2025	7,86,000.00	7,86,000.00	7,86,000.00	7,86,000.00
2026		9,10,540.44	4,90,844.56	13,30,236.31
2027		10,38,439.19	4,73,515.29	16,03,363.09
2028		11,66,337.94	4,86,300.45	18,46,375.43
2029		12,94,236.69	5,15,724.71	20,72,748.67
2030		14,22,135.44	5,56,093.23	22,88,177.65

Source: Statista (2019-2023), Guyana Budget (2024-25)

Table 8.10: Guyana Oil Production Barrel/Day

Guyana Oil Production	2019	2020	2021	2022	2023	2024	2025

Barrel per day	1,200.00	74,570.00	11,691.00	28,896.00	39,118.00	6,74,000	7,86,000
Growth rate	0.00	6114.17%	-84.32%	147.16%	35.38%	1622.99%	16.62%

Source: Own Calculation

Energy Consumption with GDP Projection (2012–2030)

Energy use and GDP per capita have risen sharply post-2019. Energy demand is forecast to grow from 17,646 quad Btu in 2022 to over 25,000 by 2030, closely linked to economic expansion. Total population access is projected to increase from 91.6% in 2019 to over 97% by 2029, with rural access growing at a faster rate to reduce disparities

Access to Drinking Water

Water access for the total population is expected to rise from 94.9% (2019) to 97.3% (2029). Rural areas are catching up with urban overage, which is already high. Sanitation access is improving steadily. Total population coverage is set to grow from 89.1% in 2019 to 93.8% by 2029, with rural areas showing notable gains.

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The study was carried out by a dedicated research team comprising Professor Promod Kumar Painuly, Professor Badri Singh Bhandari, and Professor Atul Rawat. We extend special thanks to Research Associate Miss Sunam Nandi for her meticulous data analysis and projections, and to Mr. Anil Singh for formatting and printing the report to good professional standard.

In the process of gathering data, conducting comparisons, and refining insights, we made effective use of AI tools to enhance our efficiency and analytical capabilities. The study also drew extensively on data from government sources in Guyana and India, and from reputed international organizations such as the World Bank, IMF, UNDP, ADB, IEA, IDB, CARICOM, ITA, U.S. Department of Commerce, and U.S. Energy Administration.

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