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**BUSINESS VISION FOR
THE GUIANESE SHIELD
HUB**



May, 2008

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- Characteristics of the Guianese Shield Hub
- Dominant and Potential Hub Activities and Opportunities
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Current Composition of the Guianese Shield Hub

Guianese Shield Hub Group Projects

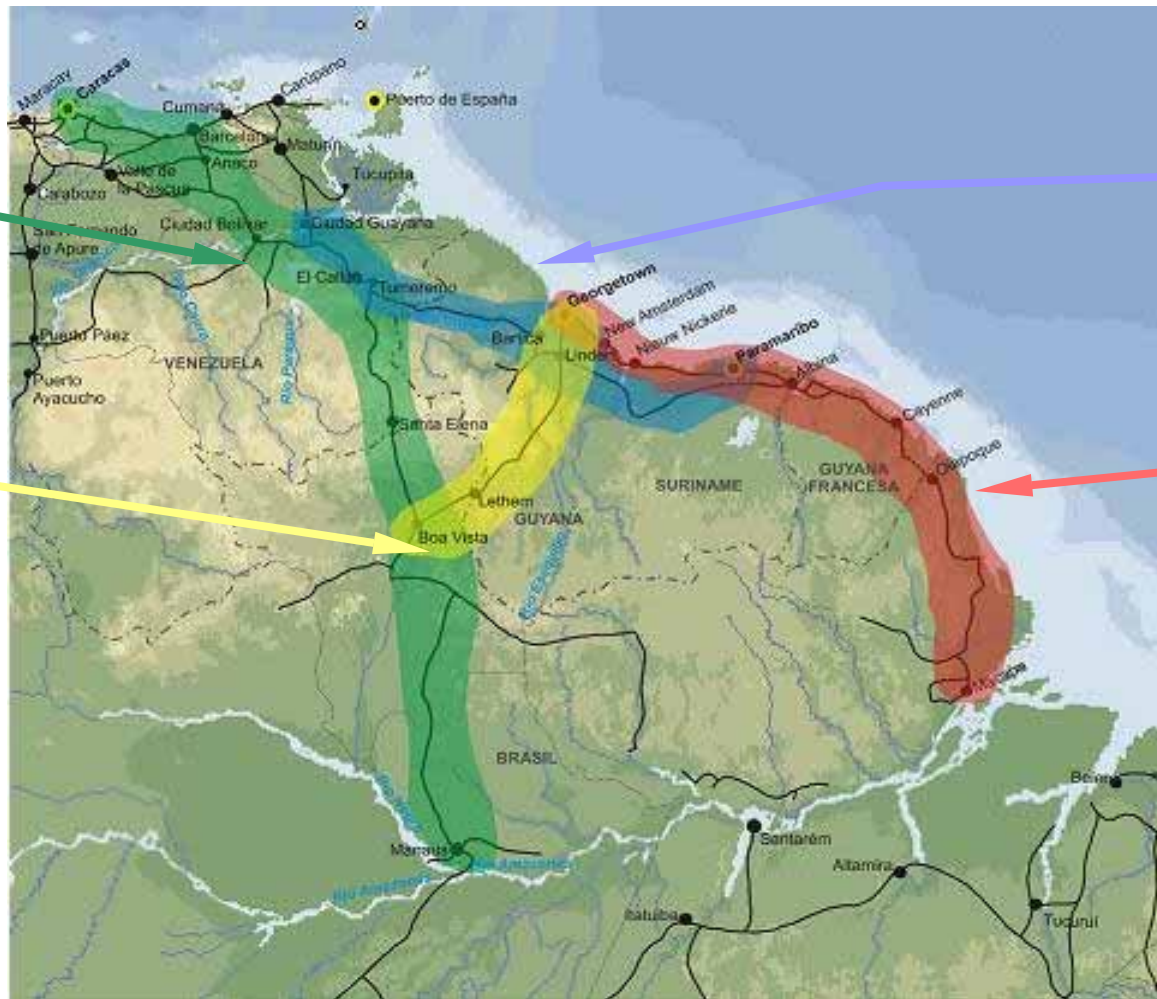


Group 1:
Interconnection
Venezuela -
Brazil

Group 2:
Interconnection
Guyana - Brazil

Group 3:
Interconnection
Venezuela
(Guyana City) –
Guyana
(Georgetown) –
Suriname
(Paramaribo)

Group 4:
Interconnection
Guyana –
Suriname –
French Guiana -
Brazil



Area of influence



AREA	2,699,500 KM2
POPULATION	20.7 MILLIONS
MAIN URBAN CENTRES (MILLIONS INHAB)	Manaus (1.6m), Caracas (4m), Macapá (0.3m), Georgetown (0.4m), Paramaribo (0.2m), Boa Vista (0.2m), Ciudad Guayana (1m), Cayenne (0.06m) and Ciudad Bolívar (0.4m).
GDP	US\$ 49,755 MILLIONS

Demography



- Total population: is approximately 20.7m, (21.1 including French Guiana).
- The bulk of its population is formed by the Brazilian and Venezuelan states (54.2% and 39.9% respectively). Brazilian States of Pará and Amazonas States, are the most populated (33.7% and 15.6% respectively) in the hub, and the regions of Miranda, Bolívar and Anzoátegui in Venezuela (13.8%, 7.4% and 7.2%).
- The main urban centers are Manaus (1.6m inhabitants), Caracas (4m), Macapá (0.3m), Georgetown (0.4m), Paramaribo (0.2m), Boa Vista (0.2m), Ciudad Guayana (1m), Cayenne (0.06m) and Ciudad Bolívar (0.4m).
- In consolidated terms, the demographic indicators for the territory show a population density well below the South American average.
- The Guianese Shield Hub's average density is 5.25 inh./km².

Population Figures for the Guianese Shield Hub's Area of Influence. 2006



Country	State	Capital	Surface Area	Population	%	Population Density (per km ²)
Brazil	Amapá	Macapá	142,815	594,587	2.9%	4.16
	Roraima	Boa Vista	224,299	391,317	1.9%	1.74
	Amazonas	Manaus	1,570,746	3,232,330	15.6%	2.06
	Pará	Belém	1,247,690	6,970,586	33.7%	5.59
Venezuela	Sucre	Cumaná	11,800	916,600	4.4%	77.68
	Anzoátegui	Barcelona	43,300	1,477,900	7.2%	34.13
	Monagas	Maturín	28,930	855,300	4.1%	29.56
	Bolívar	Ciudad Bolívar	238,000	1,534,800	7.4%	6.45
	Delta Amacuro	Tucupita	40,200	152,700	0.7%	3.80
	Miranda	The Teques	7,950	2,857,900	13.8%	359.48
	Nueva Esparta	The Asunción	1,150	436,900	2.1%	379.91
Guyana	Whole Country	Georgetown	214,970	765,283	3.7%	3.56
Suriname	Whole Country	Paramaribo	163,270	470,784	2.3%	2.88
Total			3,935,119	20,656,987	100%	5.25



Current Composition of the Guianese Shield Hub I

■ Brazil

- *Cities and Production Centers:* Manaus, Boa Vista, Macapá.
- *Border Crossings:* Bonfim (with Guyana), Pacaraima (with Venezuela).
- *Main Ports:* Manaus, Porto Velho, Santarém, Macapá, Vila do Conde, Belém.
- *Airports:* Macapá International Airport, Boa Vista International Airport, Eduardo Gomes International Airport (Manaus), Tabatinga International Airport, Altamira Airport, Val de Cans International Airport, Marabá Airport, Carajás Airport, Eduardo Gomes Airport (Santarém).

■ Guyana

- *Cities and Production Centers:* Georgetown, Linden, New Amsterdam, Fort Wellington, Lethem, Paradise.
- *Border Crossings:* Lethem (with Brazil) and Guyana-Suriname Border Crossing.
- *Main Ports:* Bartica, Georgetown, Linden, New Amsterdam, Parika.
- *Airports:* Cheddi Jagan International Airport, Ogle Municipal Aerodrome.



Current Composition of the Guianese Shield Hub II

■ Suriname

- *Cities and Production Centers:* Paramaribo, Zanderij, Marienburg, Meerzorg, Albina, Brokopondo, Moengo, Nieuw Nickerie.
- *Border Crossings:* Guyana-Suriname and Suriname-French Guiana.
- *Main Ports:* Albina, Moengo, Nieuw Nickerie, Paramaribo, Paranam, Wageningen.
- *Airports:* Johan Adolf Pengel Airport, Zorg Airport.

■ Venezuela

- *Cities and Production Centers:* Caracas, Puerto La Cruz, Ciudad Guayana, Ciudad Bolívar, Barcelona, Puerto Ordaz.
- *Border Crossings:* Santa Elena de Uairén (with Brazil).
- *Main Ports:* Oil port in Capure on the Gulf of Pariah, Tucupita on the Caño Mánamo, Puerto Cabello, La Guaira, Puerto Ordaz, and Guanta.
- *Airports:* General José Antonio Anzoátegui International Airport, San Tomé Airport, Canaima National Park Airport, José Francisco Bermúdez Airport, José Antonio Sucre International Airport, Santiago Mariño International Airport, Tomás de Heres International Airport, Manuel Carlos Piar International Airport.

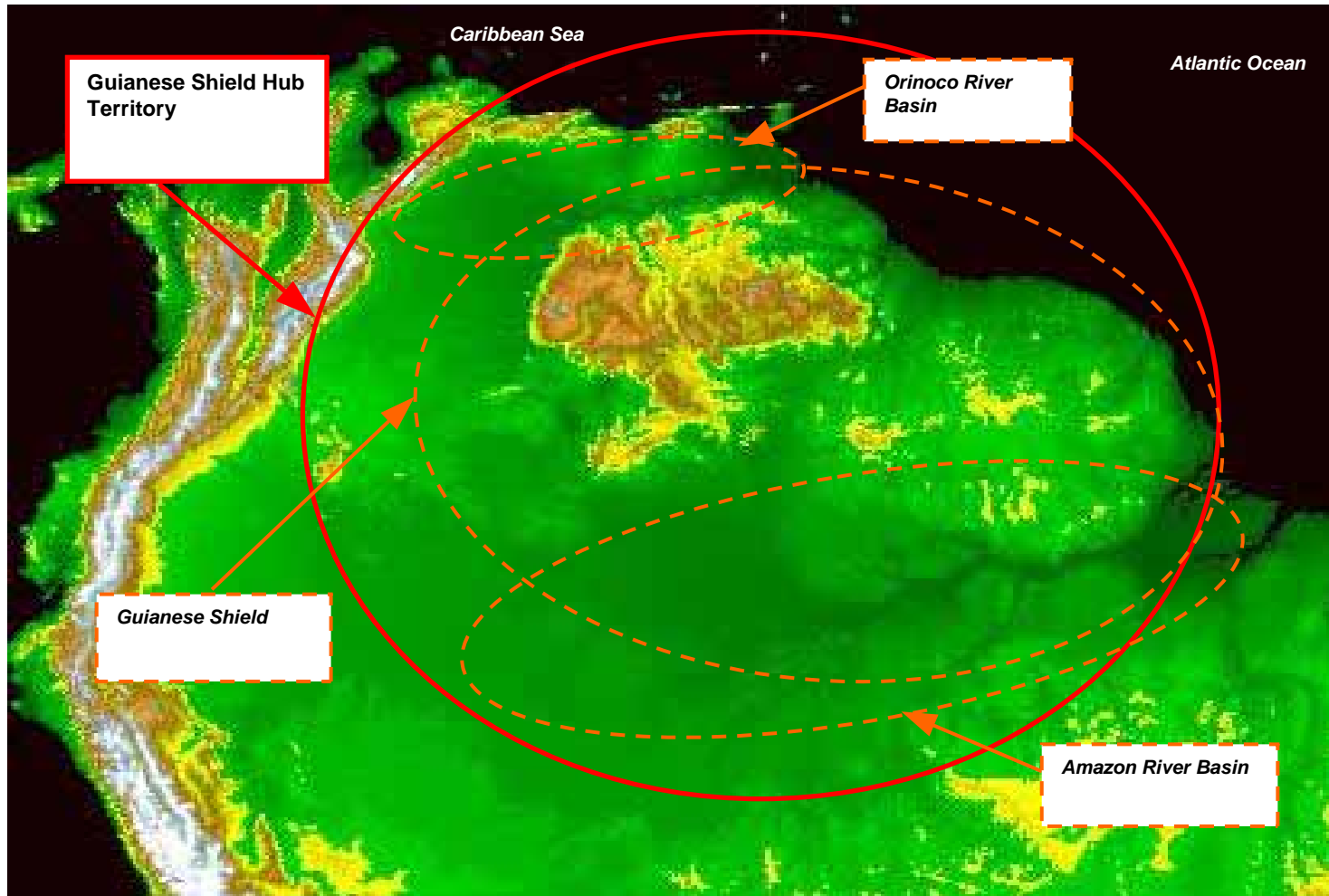


Characteristics of the Guianese Shield Hub

Geography



The Guianese Shield Hub's geography is complex: the most important aspects are its two major river basins: Amazon River Basin and the Orinoco River Basin.





Main problems

- Regulatory Frameworks: are precarious both for the productive sectors (e.g., mining and forestry in Suriname) and for infrastructure public policies;
- Environmental protection areas not consolidated;
- Demographic and land use patterns: almost all the population is concentrated in the coast area, there are low density and low growth rate in the population of both Guyana y Suriname.
- Tourism is restricted by risks in transport and high level of licenses and fees.
- Exists the need to improve Air security in Guyana and in some airports;



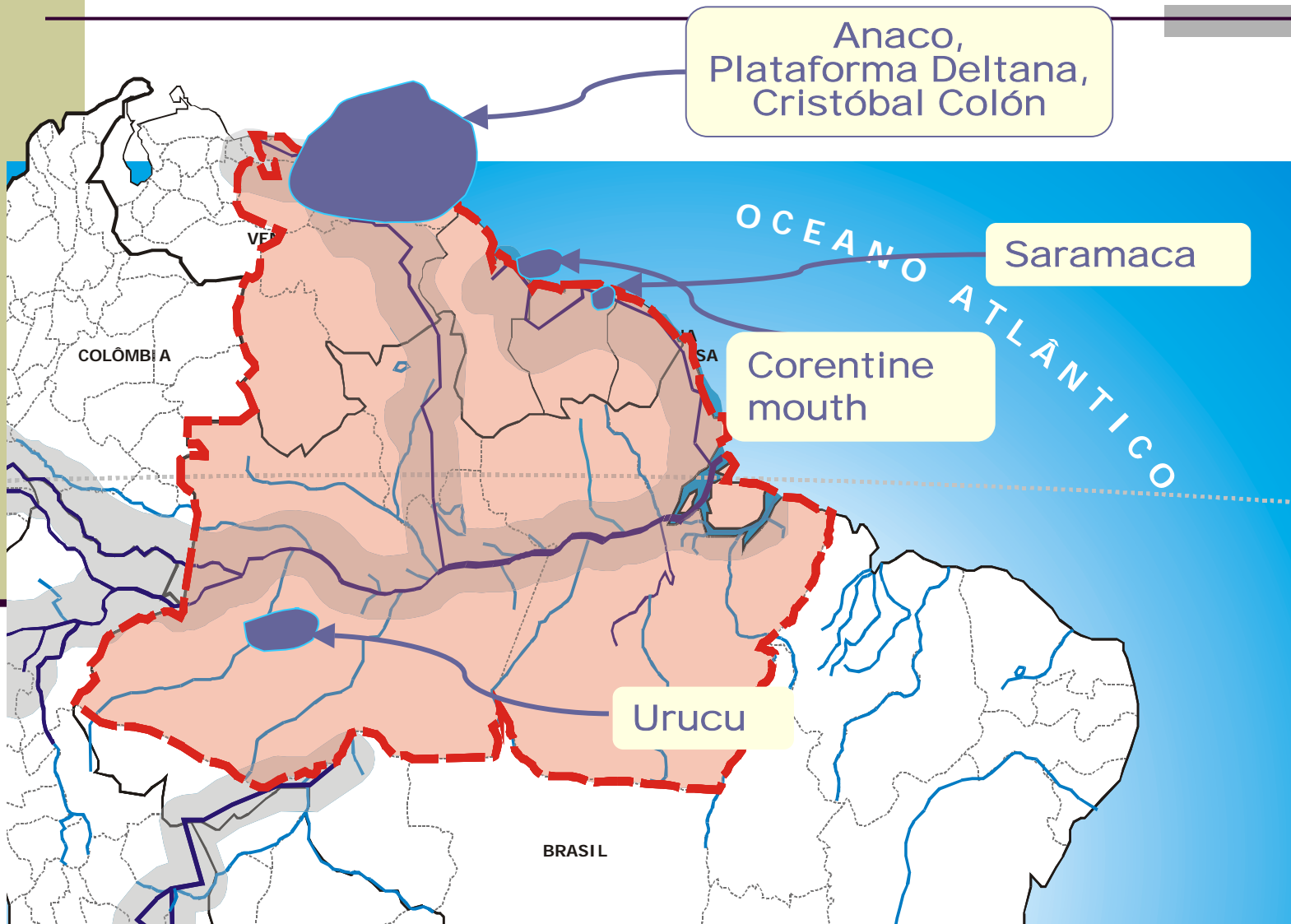
Dominant and Potential Hub Activities and Opportunities

Distribution of GDP in the Guianese Shield Hub (2005)



Region	GDP (Millions US\$)	%	Per Capita GDP
Brazil (area of influence)	33,489	67.3	2,967
Amapá	1,595	3.2	2,625
Roraima	797	1.6	2,004
Amazonas	15,947	32.1	4,881
Pará	15,150	30.4	2,159
Eastern Venezuela	14,019	28	1,776
Guyana	766	1.5	1,019
Suriname	1,481	3	3,312
Total	49,755		2,441

OIL AND NATURAL GAS



Anaco,
Plataforma Deltana,
Cristóbal Colón

Saramaca

Corentine
mouth

Urucu

Gas Industry:
energy
generation,
fertilizers and
petrochemicals,
value added to
some mining
products such as
brickets

RENEWABLE ENERGY

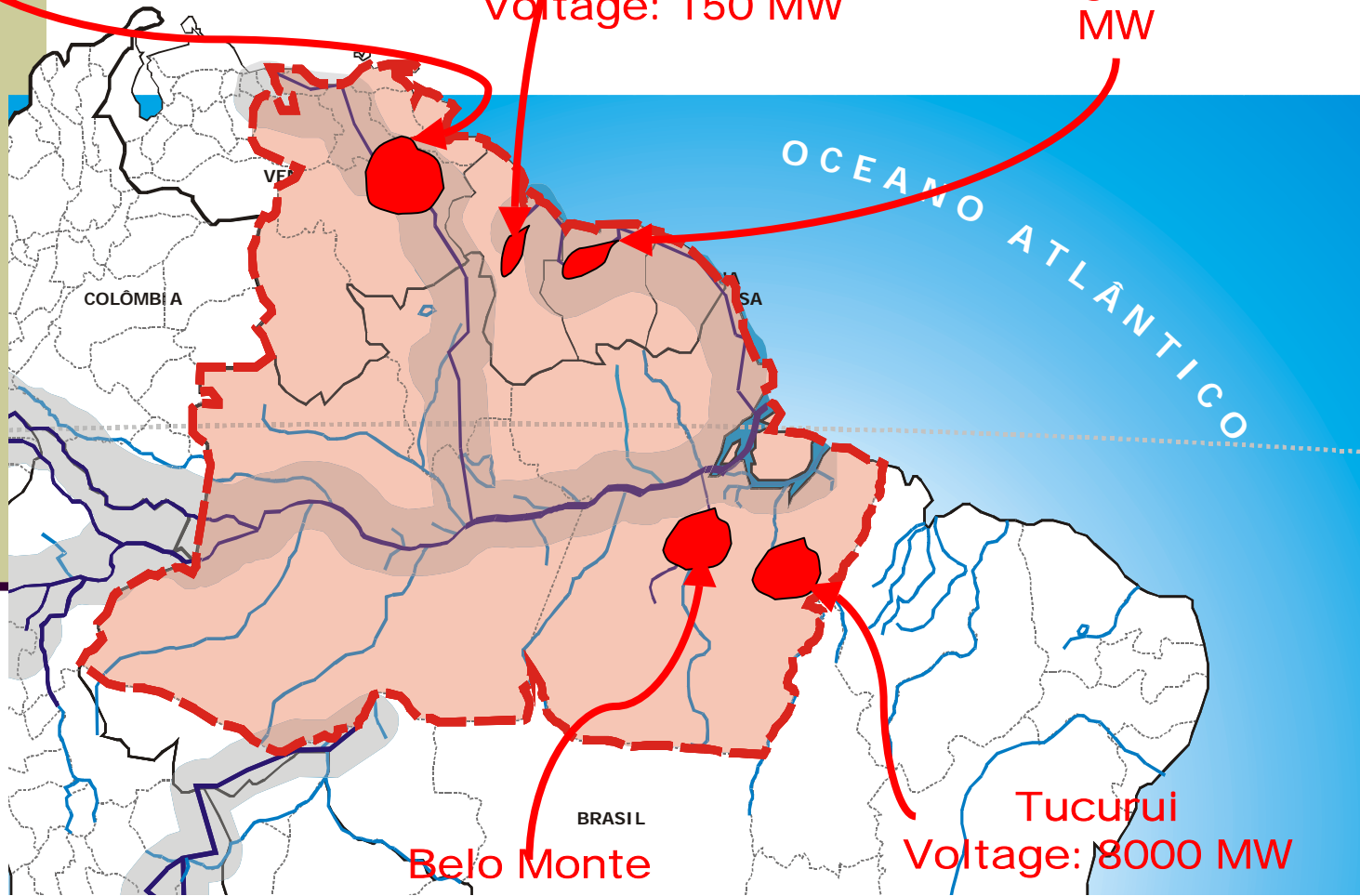


Caroní:
Guri, Macagua,
Caruachi, Tocoma
Voltage: 18000 MW

Amaila
Voltage: 150 MW

Tortruba
Voltage: 1000
MW

**Watershed
Management:**
generation of
renewable energy
and fishfarming;



Belo Monte
Voltage: 11000 MW

Tucuruí
Voltage: 8000 MW

MINING

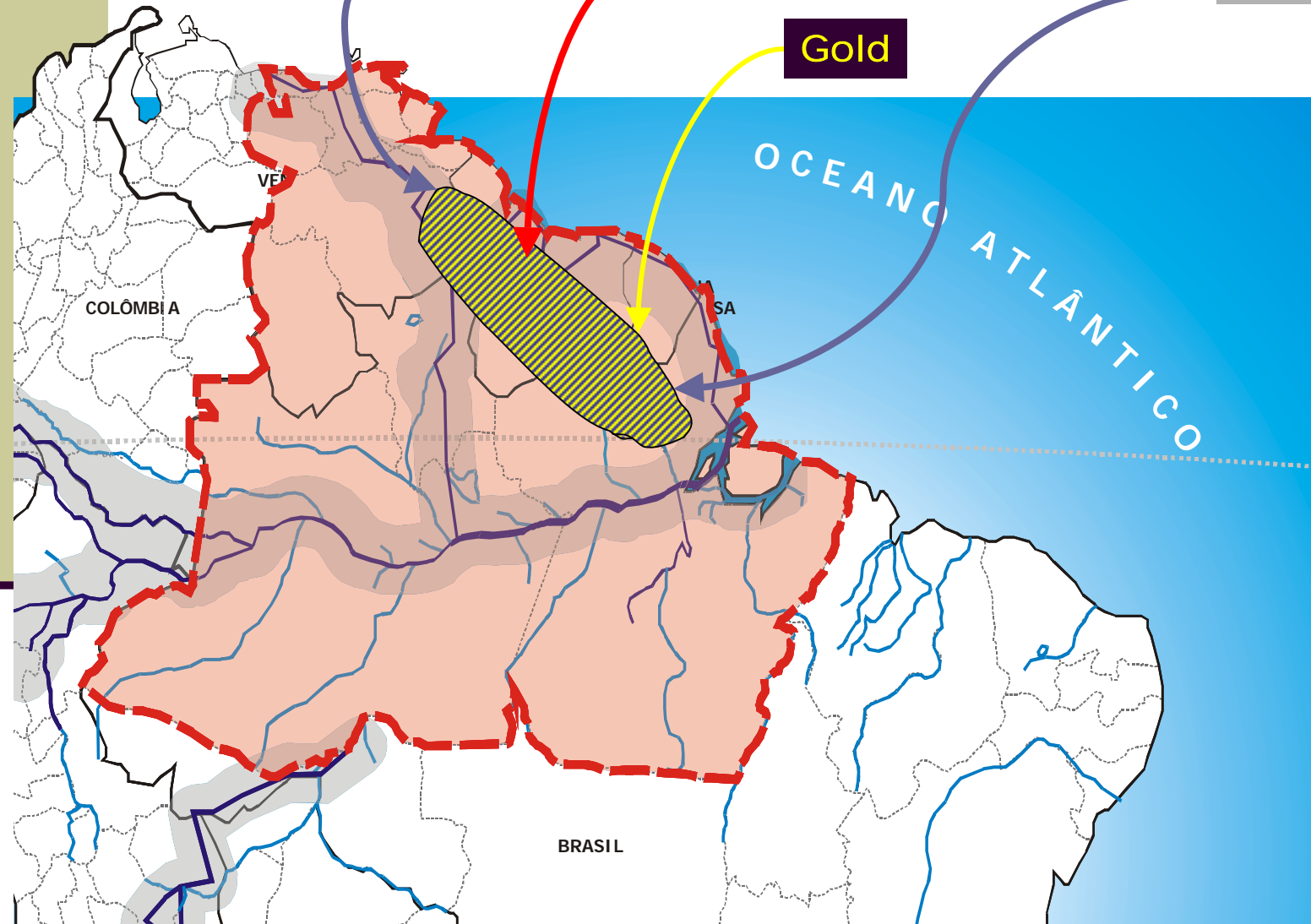


Diamonds

Bauxite

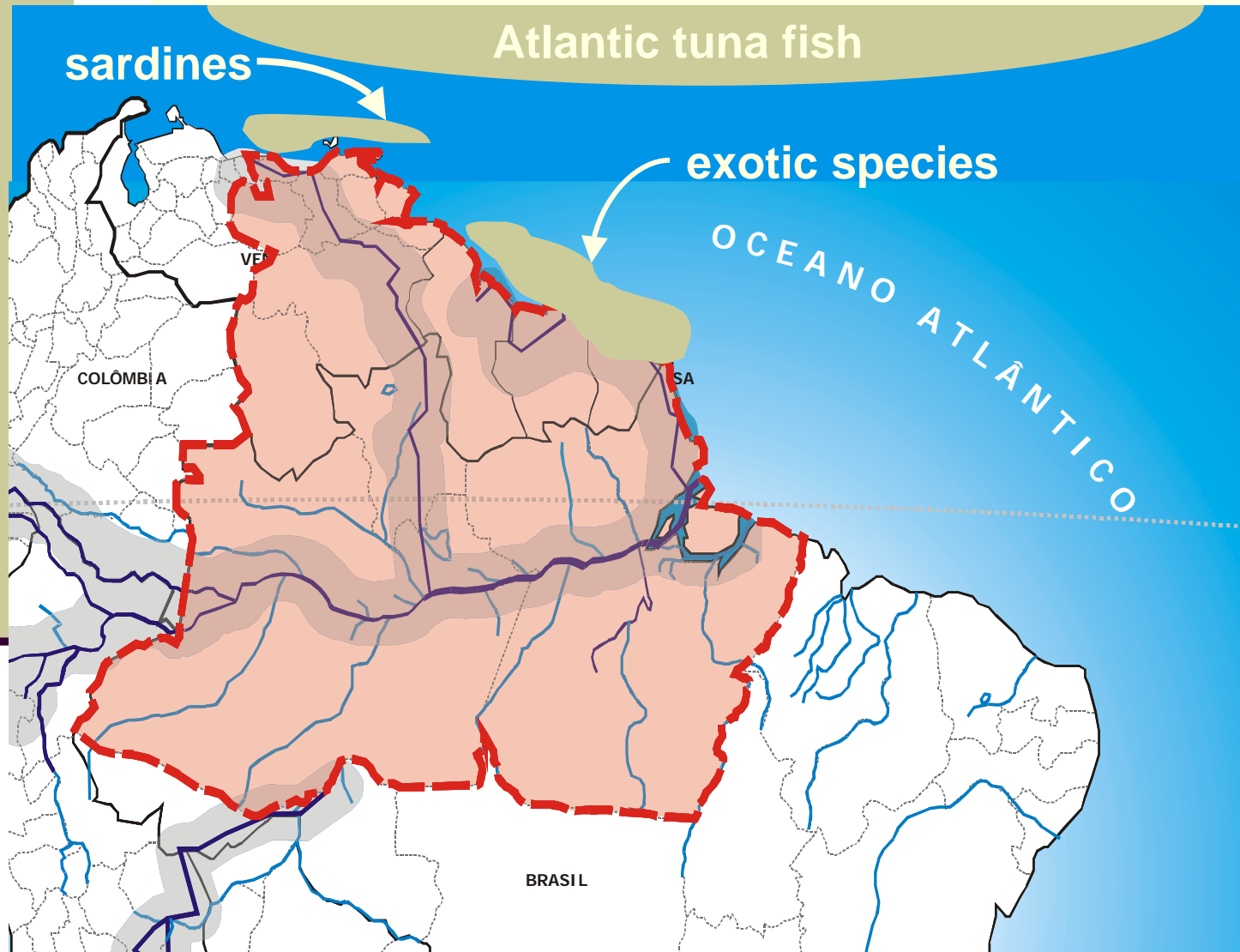
Other minerals???

Gold



Mining and Jewelry: iron, bauxite, gold, diamond and precious stones mining. Gold and diamond mining have two modes: informal and industrial.

FISHERIES

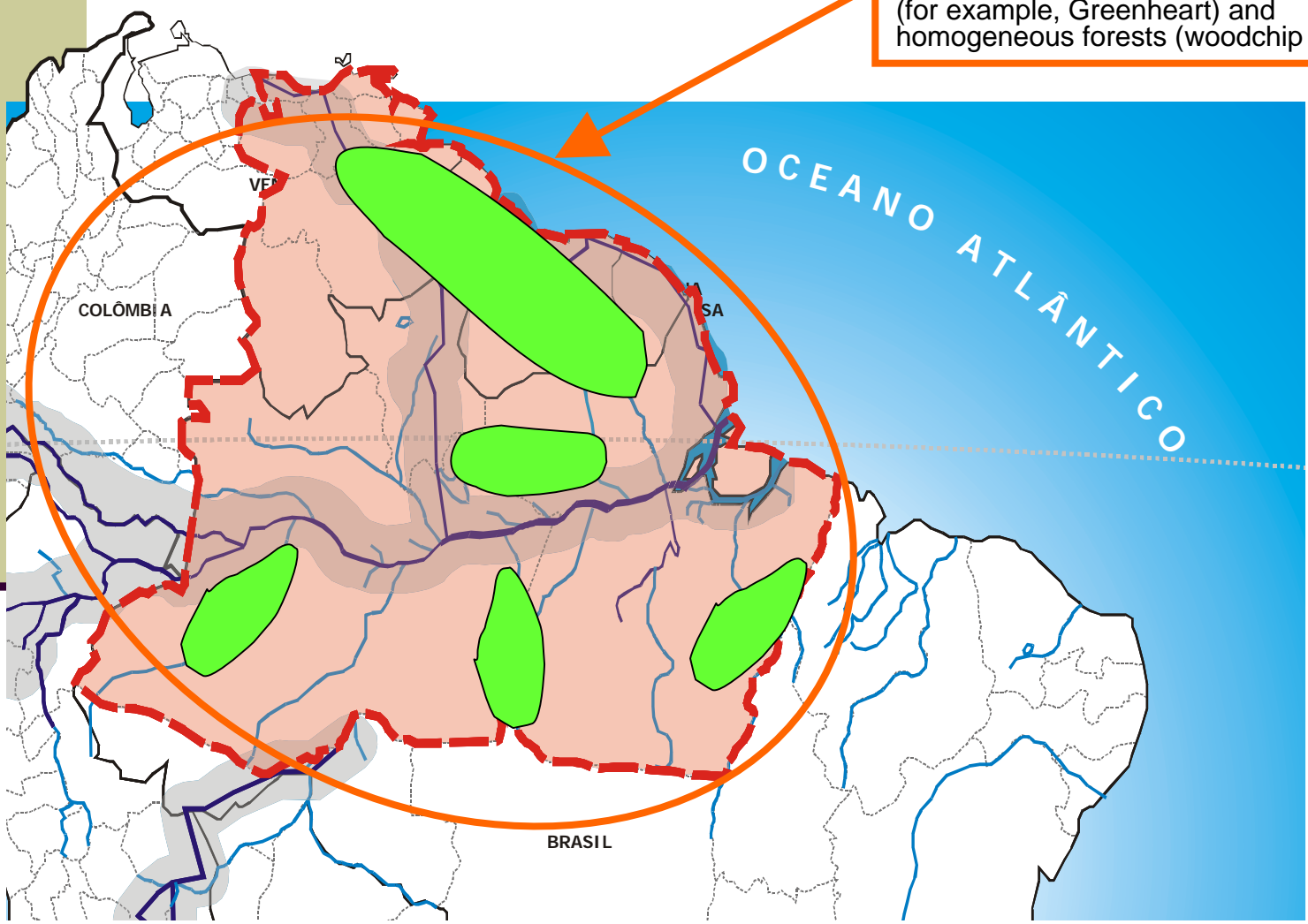


Fisheries: artisan harvesting of maritime species (exotic species: pargo, mero, etc.) and industrial (sardines, tuna fish, etc.)

FORESTRY



Forestry: harvesting of tropical rainforests for exotic woods, specially endemic species (for example, Greenheart) and homogeneous forests (woodchip and paper);



TOURISM



Tourism: Ecotourism, that benefits from the unique characteristics of the Amazon rainforest and the Guayanese Shield, and caribbean tourism, that benefits from the extensive coastline.

Caribbean Tourism

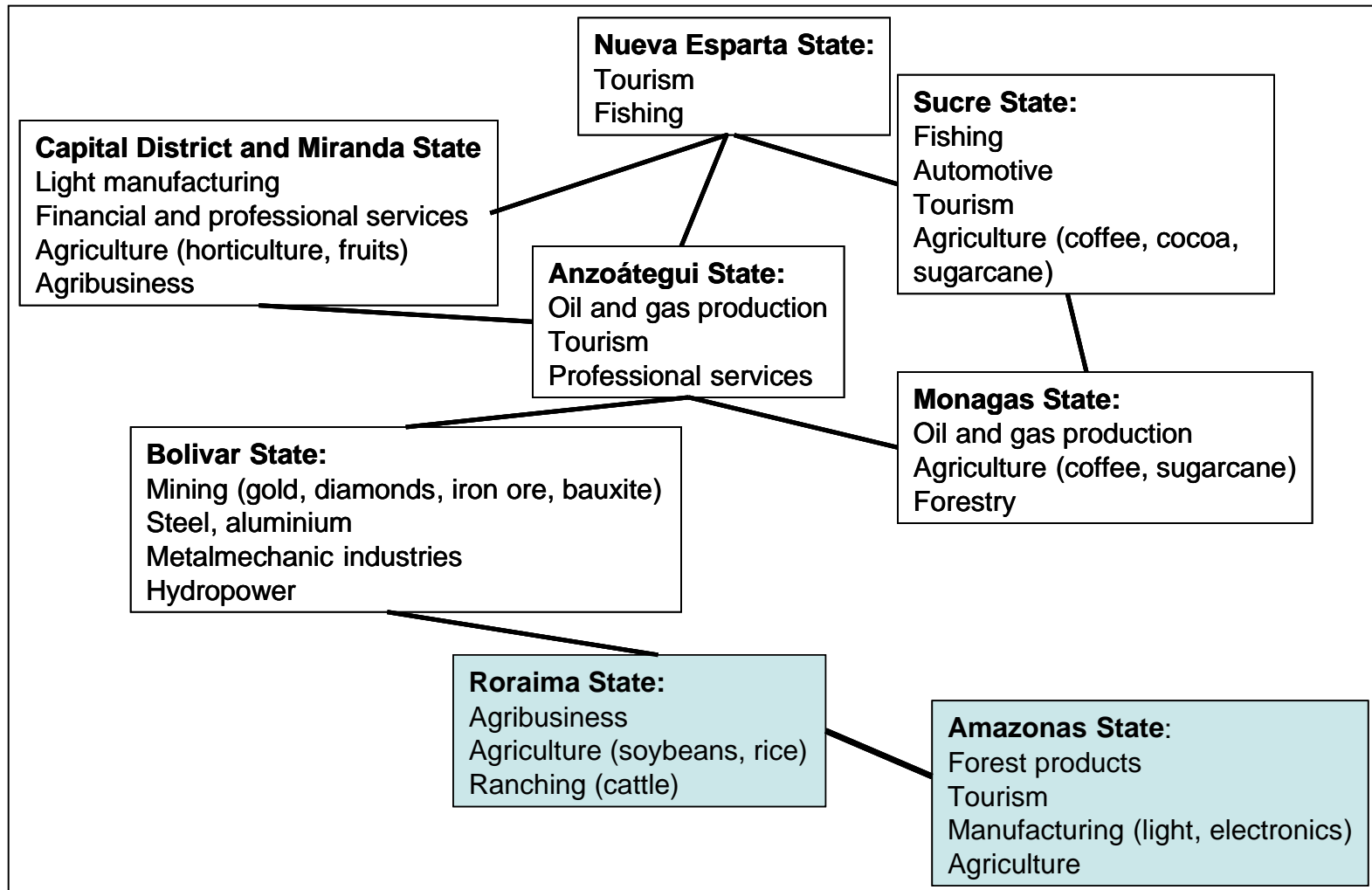


Ecotourism

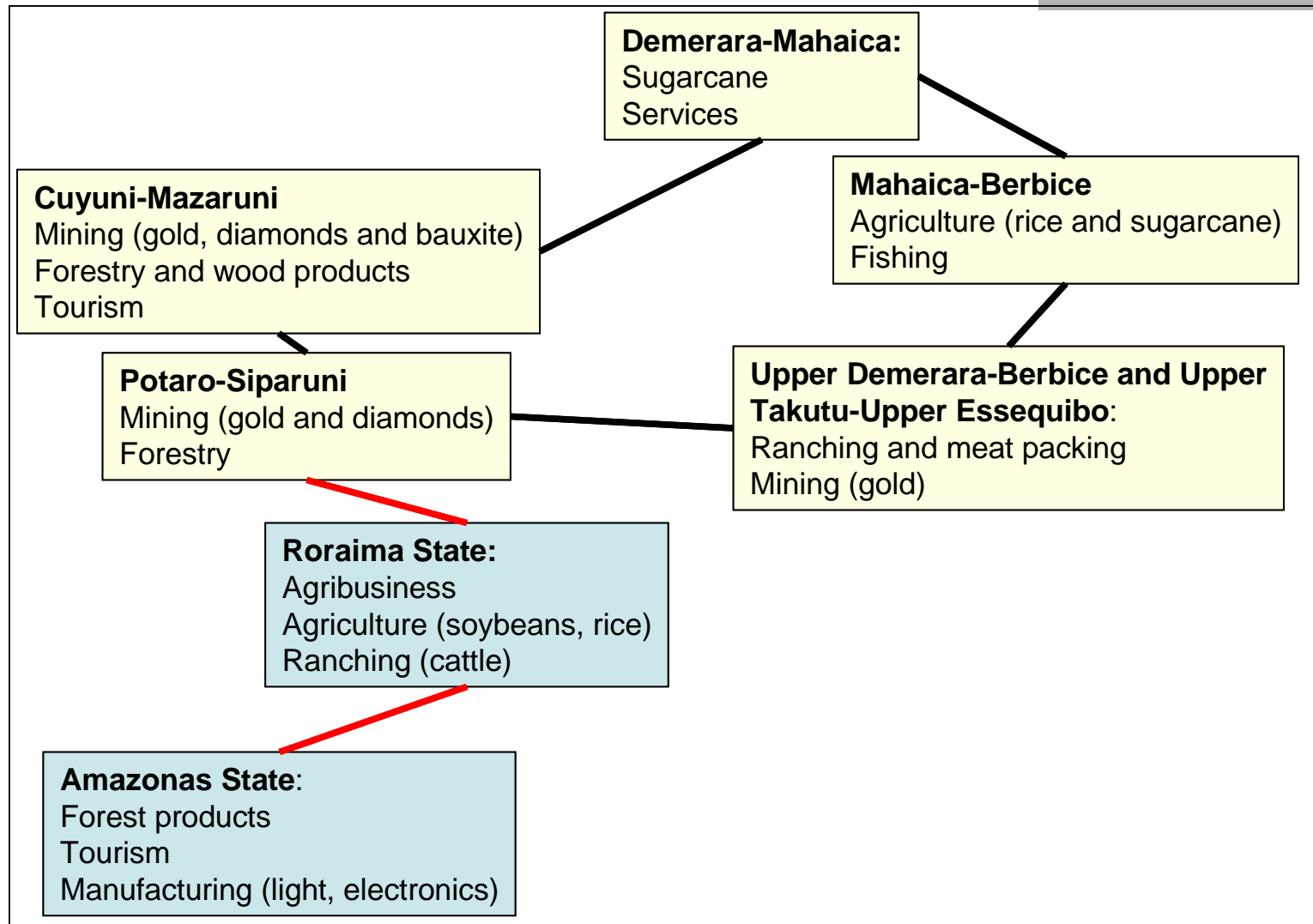
Structure and Spatial Distribution



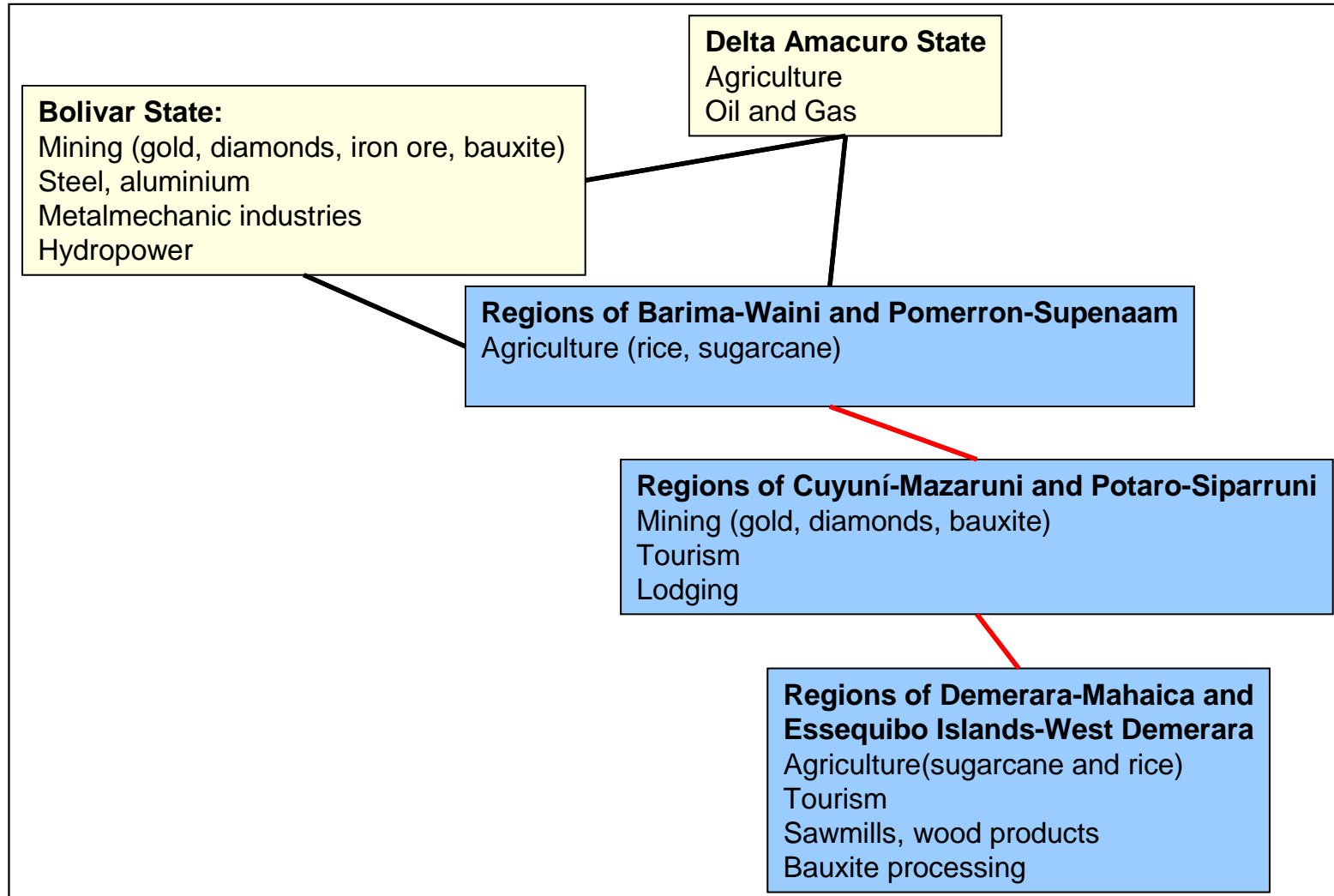
Dominant Venezuelan/Brazilian Commercial Activities



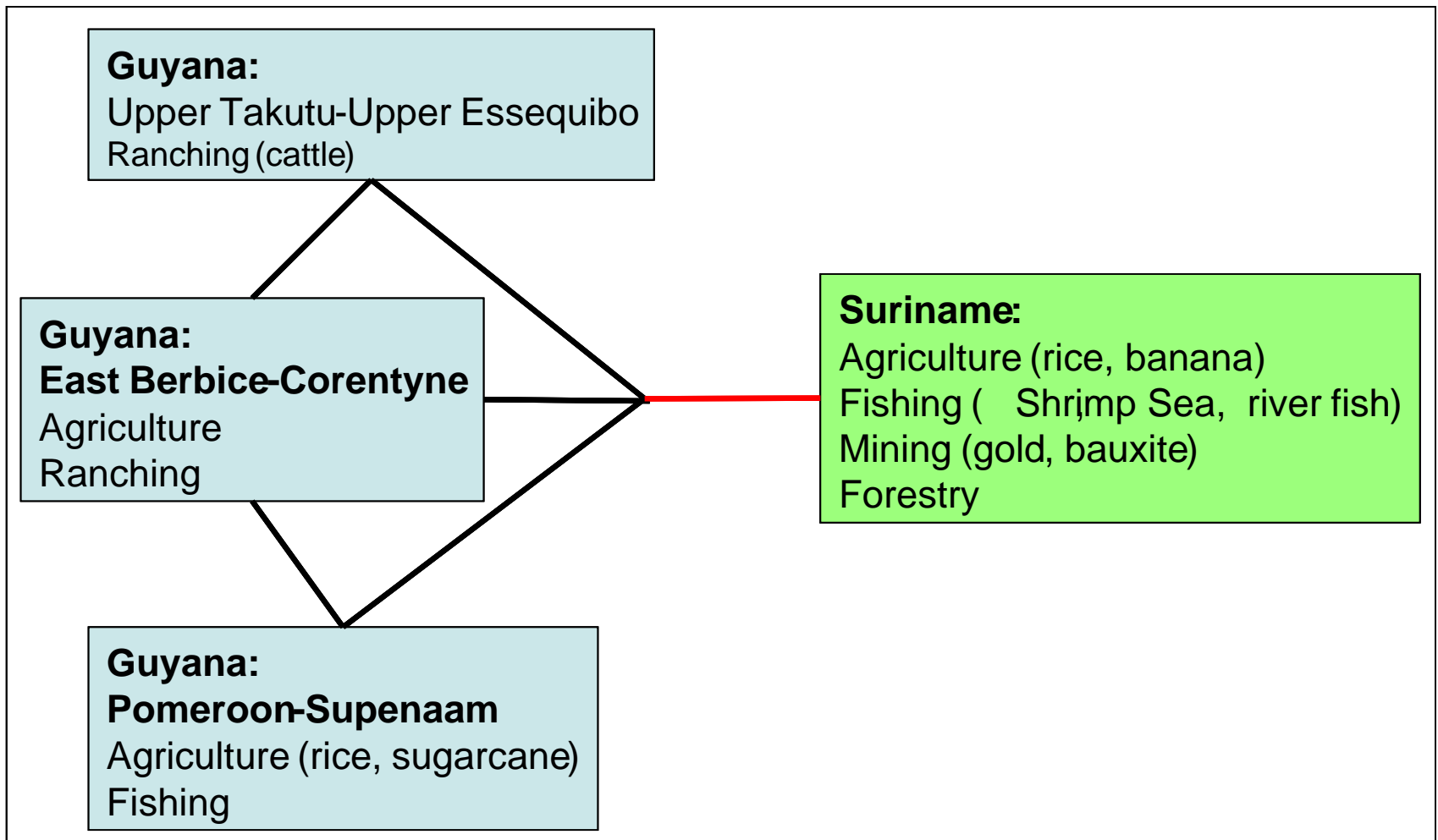
Dominant Guyanese/Brazilian Commercial Activities



Dominant Venezuelan/Guyanese Commercial Activities



Dominant Guyanese/Surinamese/ French Guianese/Brazilian Commercial Activities





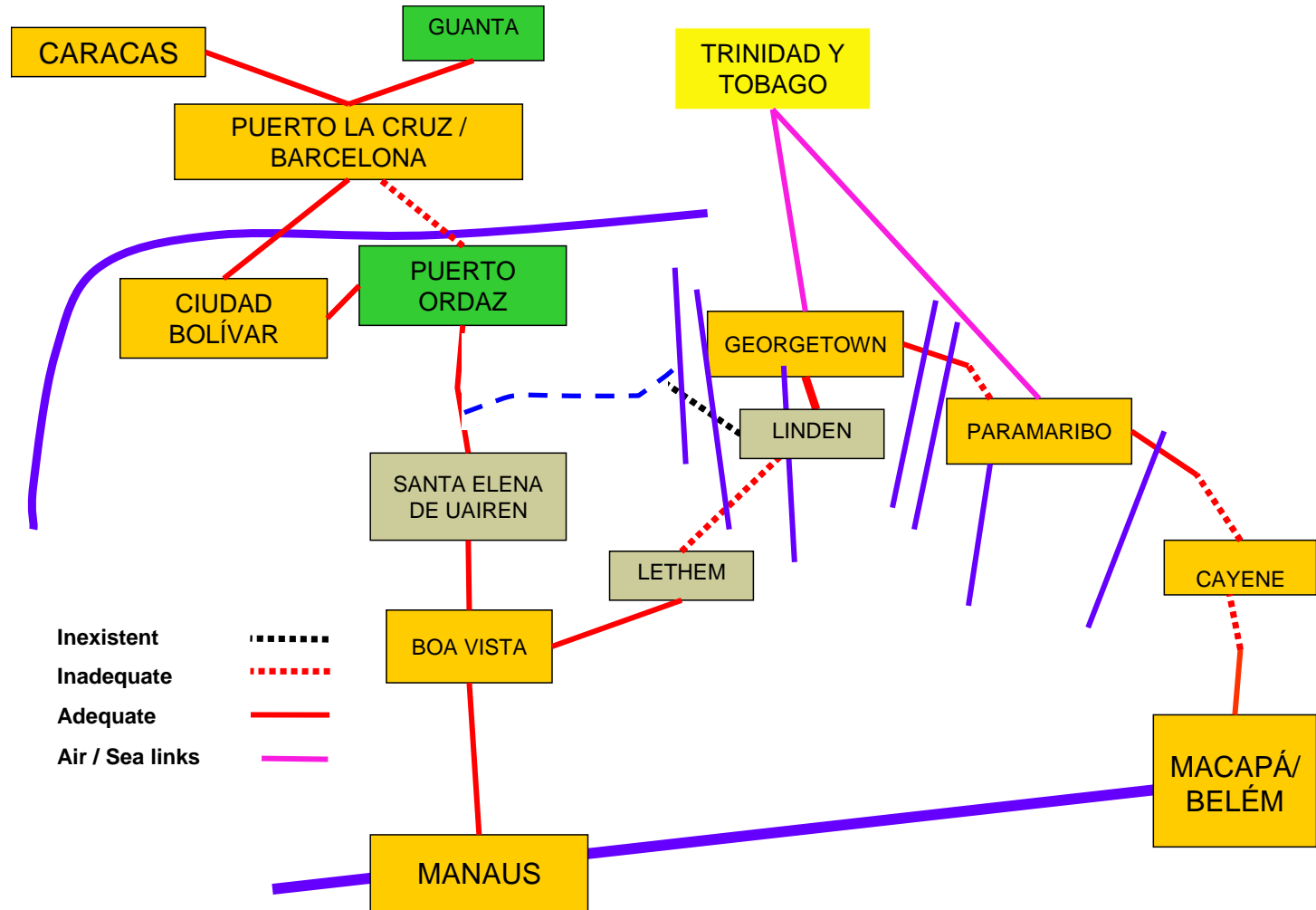
Hub Infrastructure

Economic Competitiveness Index 2007-2008



Country/Economy	Rank	Score
United States	1	5.67
Luxembourg	25	4.88
Barbados	50	4.32
Brazil	72	3.99
Venezuela	98	3.63
Senegal	100	3.61
Suriname	113	3.40
Mauritania	125	3.26
Guyana	126	3.25
Chad	131	2.78

Bottlenecks





Guianese Shield Hub: Project Groups



Group 1: Interconnection Venezuela - Brasil

Strategic Function of Group 1



- To develop potential economic sectors like the heavy and durable goods industries, mining and jewellery, agribusiness and tourism (ecotourism and Caribbean), taking into account the existing paved road Manaus - Caracas and transmission line between Guri and Boa Vista.
- Type of Group: Consolidated

Group 1



Bimodal Bridge over
The Orinoco River

System for
navigational support in
the Orinoco River

Fiber optics line
interconnecting
Caracas with the north
of Brazil through an
existing power line
(Boa Vista) and a new
one (Manaus)

Waterway between the
Negro and Branco
Rivers connecting
Manaus and Boa Vista



Improvements to the
Port of Guanta

Railroad connecting
the Port of Guanta (or
a new one) to Puerto
Ordaz

Anchor project:
Caracas -Manaus
Paved road (Existent)

Extension of Guri – Boa
Vista's power line to
Manaus

Group 1 Investments



Guianese Shield Hub: Group 1	Estimated Investment (Millions US\$)
Caracas-Manaus Road (existing)	168.0
Branco and Negro Rivers waterway connecting Manaus and Boa Vista	n.d.
Deep-water port on Venezuela's northeastern Caribbean coast or improvement work on current Guanta	1,203
Railroad connecting deep-water port or Guanta, and Ciudad Guayana	573.3
Second bimodal bridge over the River Orinoco	601.7
Navigation support system on the River Orinoco	14.3
Expansion of current Guri-Boa Vista transmission line	n.d.
Fiber optic lines or other suitable technology interconnecting Caracas and northern Brazil	n.d.



Group 2: Brazil/Guyana Interconnection

Strategic Function of Group 2



- To support economic development and integration between the Brazilian states of Amazonas and Roraima, and Guyana, through the consolidation of the infrastructure linking both countries
- Type of group: Emergent

Group 2



Tortuba Hydroelectric Plant (1000 MW) and transmission line to Boa Vista y Manaus (pending private investment in aluminum smelting plant in Guyana and/or Brazilian interest in bringing energy to the north of the region from Guyana)

Amaila Hydroelectric Plant (150) MW and transmission line to Georgetown

Industrial investments in Boa Vista: Pulp mill, soya processing plant, instant coffee processing plant, meat packing plant (subject to identification of private investors' interests)

Fiber optics line (connected to international underwater network) to Boa Vista y Manaus



Deep water port in northern Guyana

Improvements to Georgetown access

Anchor Project: Boa Vista – Bonfin – Lethem – Linden – Georgetown road

Bridge over the Itakutu River (Brazil - Guyana border)

Bridge over the River Arraia

Group 2 Investments



Guianese Shield Hub: Group 2	Estimated Investment (Millions US\$)
Boa Vista-Bonfin-Lethem-Linden-Georgetown Road	250.0
Bridge over River Arraia	1.6
Bridge over River Takutu on Brazil-Guyana border	10.0
Deep-water port in Guyana (pending further studies)	n.d.
Amaila hydroelectric plant	300.0
Tortuba 1,000mW hydroelectric plant and transmission line to Boa Vista and Manaus (pending private investment in aluminum smelting plant in Guyana and/or Brazilian interest in bringing energy to the north of the region from Guyana)	1,850.0
Fiber optic lines or other suitable technology to connect Boa Vista and Manaus to existing international underwater cables	n.d.
Improvements to Georgetown access	n.d.
Industrial investments in Boa Vista: Pulp mill, soya processing plant, instant coffee processing plant, meat packing plant (subject to identification of private investors' interests)	n.d.



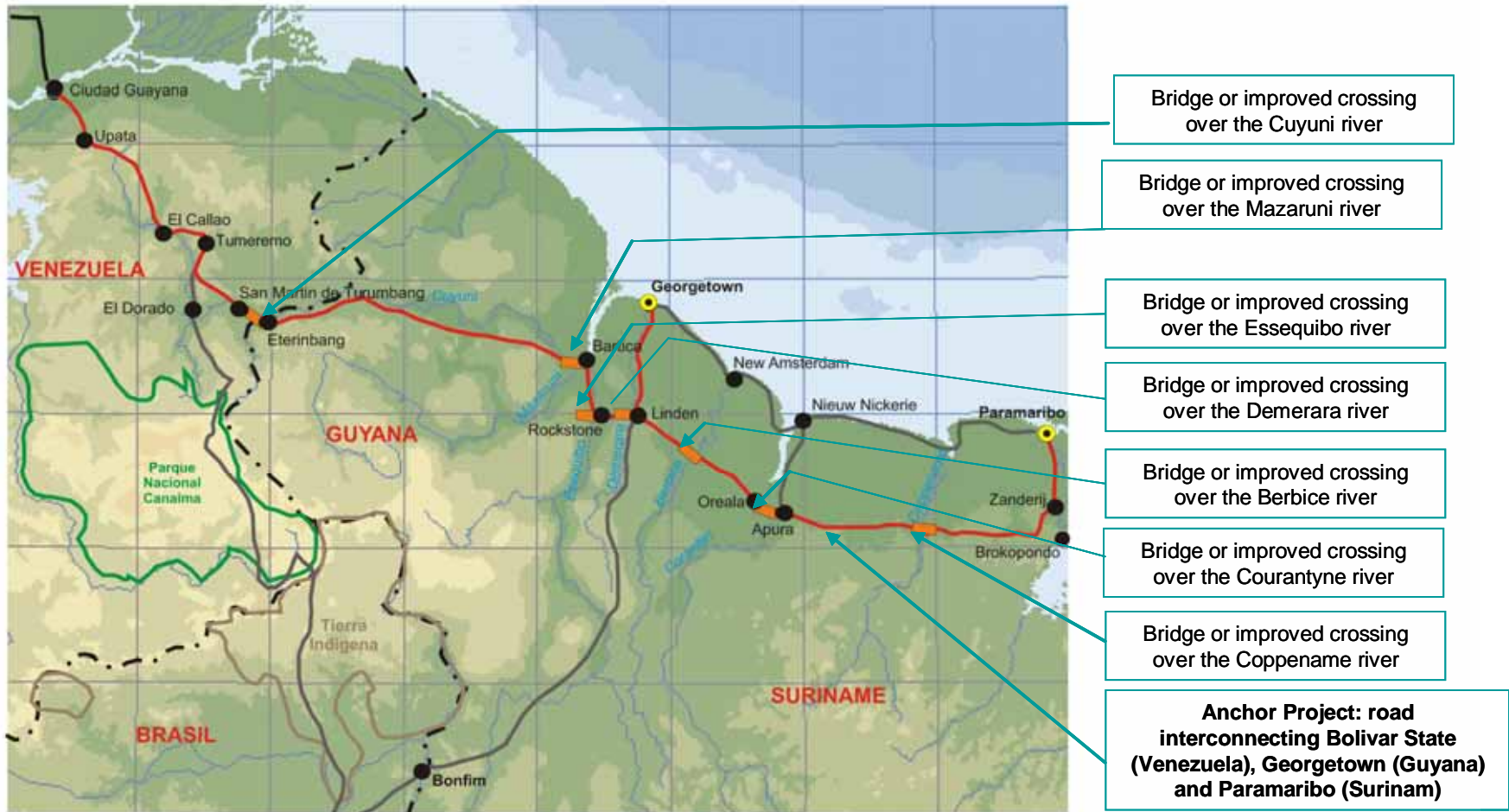
**Group 3: Venezuela (Ciudad
Guayana)/Guyana
(Georgetown)/Suriname (Paramaribo)
Interconnection**

Strategic Function of Group 3



- To implement a development and integration link along the Caribbean coast, in the extreme north path of South America.
- Type of group: Emergent

Group 3



Group 3 Investments



Guianese Shield Hub: Group 3	Estimated Investment (Millions US\$)
Venezuela (Ciudad Guayana)-Guyana (Georgetown)-Suriname (Paramaribo) connecting road	110.8
Bridge or improvements to Cuyuní river crossing	n.d.
Bridge or improvements to Mazaruni river crossing	n.d.
Essequibo river crossing	n.d.
Demerara river crossing	n.d.
Berbice river crossing	n.d.
Courantyne international river crossing	n.d.
Bridge or improvements to Coppename river crossing	n.d.



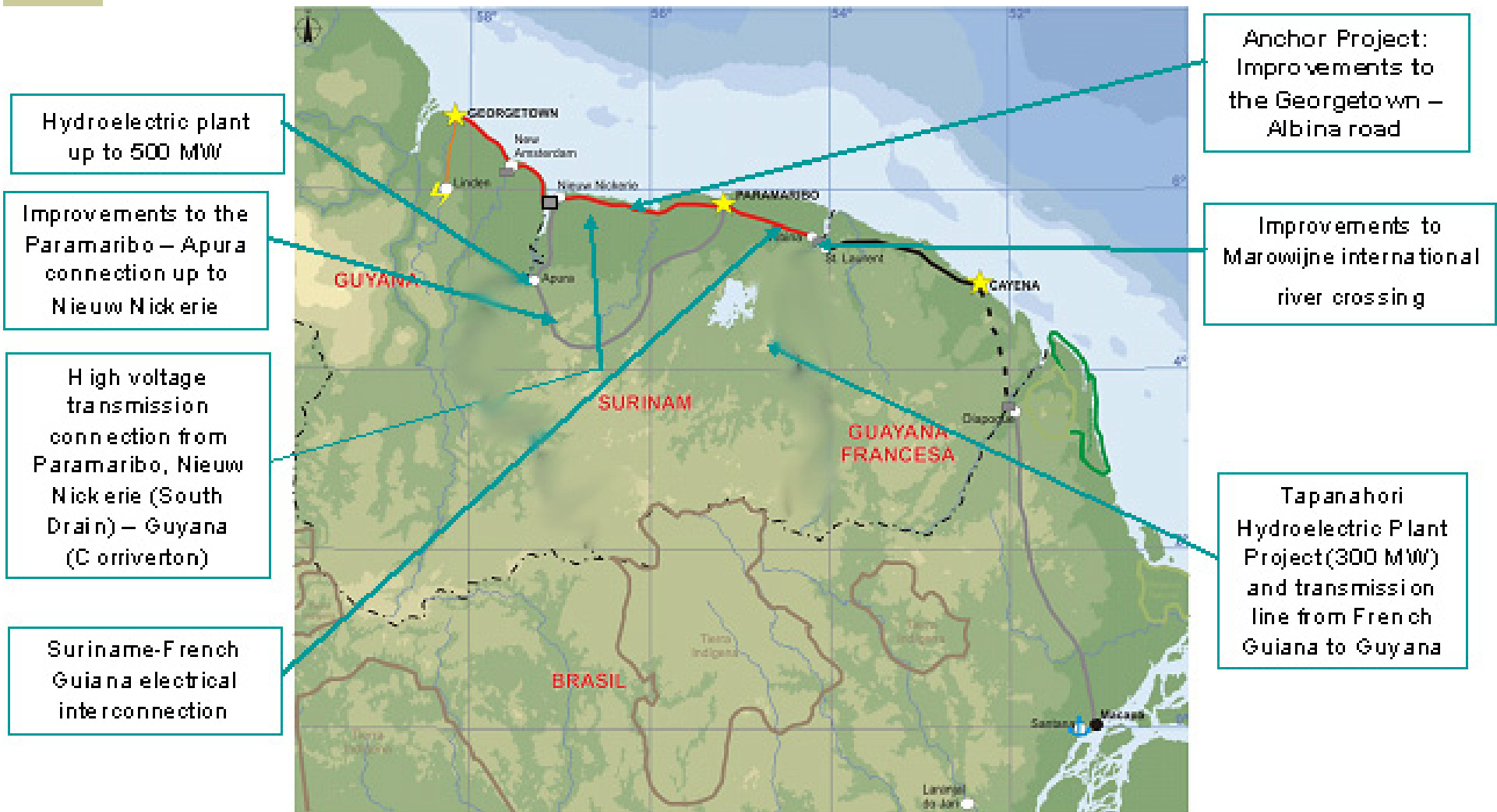
Group 4: Guyana/Suriname/French Guiana/Brazil Interconnection

Strategic Function of Group 4



- To consolidate an international physical connection to promote the social and economical development and integration of Guyana, Suriname, French Guiana and the Brazilian states of Amapá and Pará.
- Type of group: Emergent

Group 4



Group 4 Investments



Guianese Shield Hub: Group 4	Estimated Investment (Millions US\$)
Improvements to Georgetown-Albina road	108.5
Improvements to Maroni international river crossing	50.0
500mW hydroelectric plant	500.0
Paramaribo-Apura connection, on to Nieuw Nickerie	105.0
Suriname-French Guiana electrical interconnection	n.d.
Paramaribo-Nieuw Nickerie (South Drain)-Guyana (Corriverton) high-voltage transmission line	n.d.
300mW hydroelectric scheme (Tapanahori Diversion)	0.9



Conclusions and Recommendations

Conclusions



- Despite neighborhood intraregional trade is minimal, with the exception of the axis Manaus-Caracas, the region possesses significant potential for industrial development based on their natural resources:
 - The Bauxite-Alumina-Aluminum chain
 - The Oil/gas-Petrochemicals-fertilizers chain
- Improved infrastructure could allow the area to exploit their economic complementarities so as to serve the largest consumption poles and to integrate productive chains across international borders in order to attain global economies of scale

Potential Activities and Development Opportunities I



- The area is rich in natural resources: large reserves of bauxite, iron, gold, diamonds and timber exist within its boundaries
- There are huge proven reserves of oil and natural gas (Venezuela) and potential for developing additional offshore fields (Guyana, Suriname)
- Hydroelectricity is abundant, and the region has potential for developing additional power from this source
- There are large natural forests with potential for the production of precious woods

Potential Activities and Development Opportunities II



- There are three industrial poles within the boundaries of the hub: Manaus (technology and light manufacturing), Ciudad Guayana (heavy industries and metal processing) and Puerto La Cruz (petrochemicals and fertilizers)
- In the rest of the hub most industrial facilities are oriented towards domestic consumption
- The region includes many sites that are suitable for developing tourism (ecotourism and Caribbean).
- There are facilities for wood processing in Guyana and large planted forests in Monagas (Venezuela)

Infrastructure I



- The two largest cities, Caracas and Manaus, are well connected through a paved road (Group 1)
- The road communication in the east-west direction needs to be improved and completed
- There is power connection between Boa Vista and the Venezuelan System, but the rest of the countries' electric systems are isolated
- Suriname lacks sea ports. Guyana's ports are subject to tidal cycles
- Part of the region lacks fiber optic telecommunications
- Trinidad acts as a de facto hub for air transportation

Infrastructure II



- The integration of hydroelectric systems from Guri / Boa Vista towards Manaus may come accompanied by telecom infrastructure (optic fiber);
- The same would be for the Georgetown – Lethem – Boa Vista – Manaus corridor once there is a sizeable hydroelectric dam in Guyana;
- In air transport systems:
 - Airports of higher ranking are needed in Santa Elena and Puerto Ordaz (Venezuela) for business and tourism;
 - There are no direct connexions between Guyana and developed countries due to safety regulations.

Infrastructure III



- The Orinoco River has restrictions for deep keel ships, and therefore there is a need for a deep water port (Guanta?) that could also provide an attractive option for Manaus;
- Another port option for Boa Vista and Manaus would be an eventual deep water port in Guyana;
- Trinidad & Tobago could be included in the area of influence of the Hub, in light of the fact that currently it already functions as a maritime and air hub for Guyana and Suriname;
- Guyana generates only thermoelectric energy, which does not make it feasible to add value to bauxite mining. Suriname has hydroelectric power (Brokopondo), although limited;
- Due to the difficulty of establishing a high capacity road between Boa Vista, Georgetown, Paramaribo, Cayenne and Macapá, an attractive alternative may be a maritime shipment system.

Energy



- A far-reaching study should be carried out, setting out any potential hydroelectric developments targeting the industrial pole of Manaus.
- The strategy to supply Manaus with electricity from neighboring countries via the Guianese Shield Hub depends not only on the profitability of energy projects, but on Brazil's domestic policy.
- From a commercial point of view, energy is the sector with the greatest potential for generating new trade in the Guianese Shield Hub.

Telecommunications



- The energy transmission line projects (Guri-Boa Vista-Manaus and Georgetown-Boa Vista-Manaus) may be accompanied by telecommunications infrastructure (fiber optics).
- This would be a significant step toward the completion of the fiber optics connections in the Guianese Shield Hub. Furthermore, priority in Group 1 should be given to preinvestment studies for the projected fiber optic line or other technology to connect Caracas and Northern Brazil.