

Responsible mining in Venezuela

Investment opportunities in the mining sector

Main minerals



Ministry of People's Power for Ecological Mining Development
Las Mercedes Urbanization, Veracruz Avenue with Cali Street, Pawa Building, Miranda State, Venezuela
zip code 1060. RIF: G - 20012136 - 0

Nicolás Maduro Moros
President of the Bolivarian Republic of Venezuela

Víctor Cano
Minister of People's Power for Ecological Mining Development
Franklin Ramírez
Vice Minister for Exploration and Ecomining Investments

Johanna Piñero, Mario Cappelli y Julian Rodríguez
New Ecomining Investments
Janette Villanueva, Cesar Camacho y Jonas Vielma
Mining Information System**Kha**
Khatrine Marín, Ronal Parra y Jesús Gutiérrez
Planning and Ecomining Development
Juan Carlos Suárez, Pablo Hernández, Rosly Guerrero, Manuel Méndez, Luis Espinoza y Mirtha Carvajal
Mining Research and Exploration
Gustavo Serrano
Office of Integration and International Affairs
Charly Rodríguez
Technical Coordination of Environment and Development
Alejandro Ponce
Economic Coordination

Irwing Martínez
Design and layout
Francisco Ávila y Clara Guedez
Editing and proofreading
Nerliny Carucí
Coordination of content production
Yesibel Díaz, Juan Carlos Monsalve, Marianly Tovar y Luis Contreras
Collaborators

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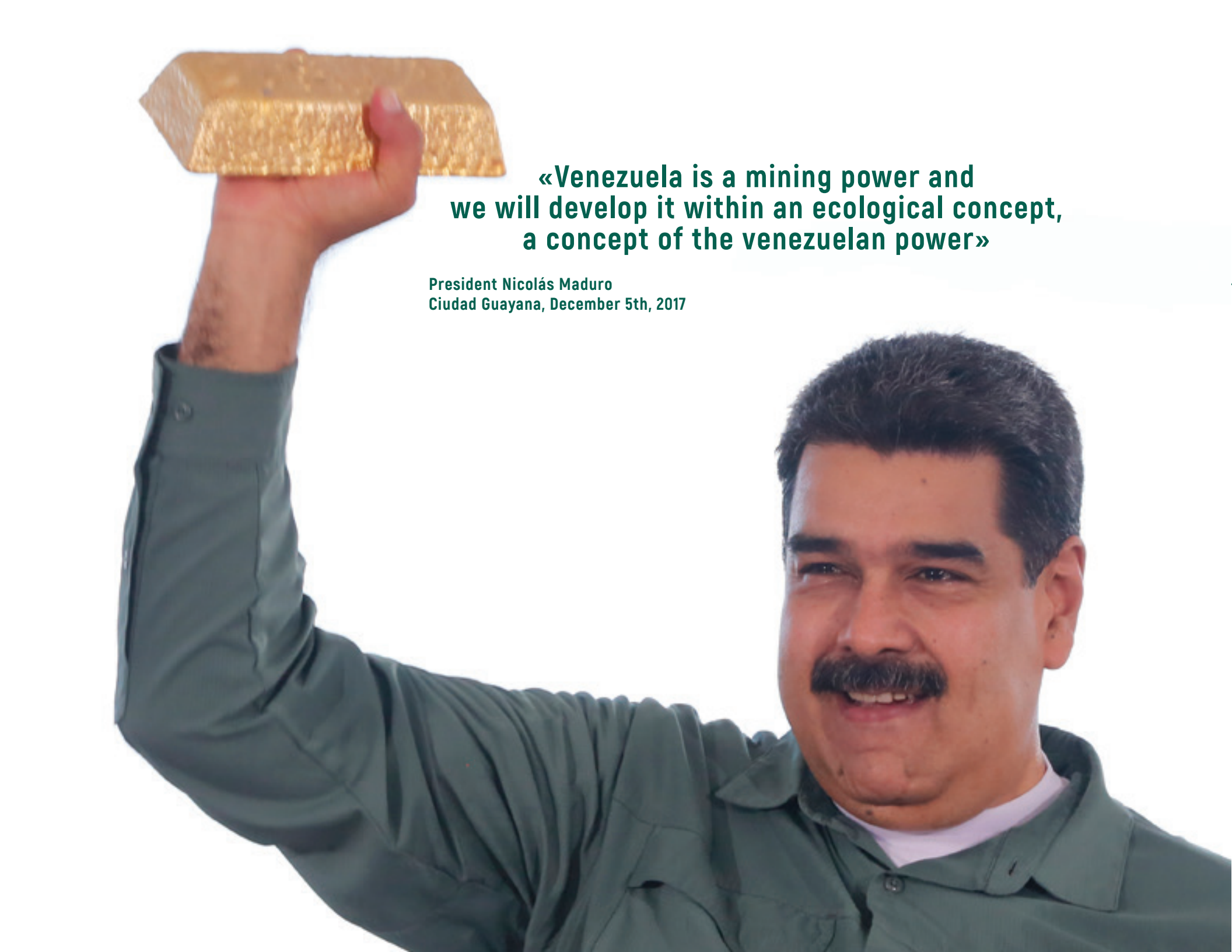


«Venezuela is a mining power and we will develop it within an ecological concept, a concept of the venezuelan power»

President Nicolás Maduro
Ciudad Guayana, December 5th, 2017

Content

Presentation

The Bolivarian Republic of Venezuela is a territory blessed by the generosity of nature. It has beautiful and varied landscapes, a stable climate, fertile lands, a wide geographical variety and many riches in our soils: oil, gas, amplitude of existence of metallic and non-metallic minerals; but the most important thing is the warmth of the people who live in this territory located in the north of South America, and their traditions.

With the purpose of making better use of its resources and potentialities, at the beginning of 2016, Venezuela entered a new stage that seeks to reinvigorate and strengthen its economy. Traditionally, the main livelihood of this nation has been oil rent. It is for this reason that the Bolivarian Government activated a series of actions of different kinds, to start a new path whose main objective is to renew the sources of national income and achieve the definitive transit to turn the country into a productive power.

In January 2016, the national government, led by President Nicolás Maduro, officially launched the Bolivarian Economic Agenda for the new growth and development of the nation, with the help of the private (national and foreign) and public sectors.

This effort by President Maduro to set the Venezuelan economy on productivity is made up of 15 productive engines, whose purpose is to repower some 36 sectors of the national economy.

These 15 engines are constituted as follows: Agroalimentary Engine, Pharmaceutical Engine, Industrial Engine, Exports Engine, Communal and Social Economy Engine, Hydrocarbons Engine, Petrochemical Engine, Mining Engine, Tourism Engine, Construction Engine, Forestry Engine, Military Industrial Engine, Telecommunications and Computing Engine, Banking and Finance Engine, and, finally, the Basic, Strategic and Socialist Industries Engine.

It is from then on that the Mining Engine will be replenished and the necessary changes will be made to reorder and improve the mining activity in the country, with greater commitment, productivity, effectiveness and responsibility, hand in hand with national and international investors that want to work for the development of the mining sector. Therefore, we would like to present these investment opportunities of the mining industry in Venezuela, starting with the most important metallic and non-metallic minerals in the country.

A ministry for ecological mining development

The Government of the Bolivarian Republic of Venezuela created, on June 9th, 2016, the Ministry of Popular Power for Ecological Mining Development, through Presidential Decree No. 2350, published in the Official Gazette No. 40 922; in order to establish a governing entity on mining matters in Venezuela. In this regard, the Ministry's main competencies were assigned to the development, use and control of non-renewable natural resources over which it exercises its stewardship, in accordance with the applicable regulations, always maintaining a deep respect for human beings and the environment.

With the creation of this Ministry, through the abolition of the former office of the Deputy Minister of Mines, attached to the Ministry of People's Power for Oil and Mining, which until that date was assuming the stewardship of the mining sector in Venezuela; likewise, the following decentralized entities were assigned to the new ministry:

- Venezuelan Mining Corporation, S.A. (VMC), with the following subsidiary and mixed companies:
  - National Auriferous Company, S.A. (NAC)
  - Social Production Company National Mining C.A. (SPC National Mining)
  - Coals of Zulia, S.A. (Carbozulia), with its subsidiaries and mixed companies:
    - Coals of La Guajira, S.A.
    - Coals of Guasare, S.A.
    - Carbozulia International, INC
  - General Mining Company of Venezuela, C.A. (Minervén)
  - Mining Technique, C.A. (Tecmín)
  - Coals of the Southwest, C.A. (Carbosuroeste)
  - Phosphates of the Southwest, C.A. (Fosfasuroeste)
- Mission Piar Foundation
- National Institute of Geology and Mining (NIGM)

Mission

Exercise the stewardship, formulation, management, control and evaluation of Venezuela's public mining policy to develop the productive chain of the mining sector, through the rational, responsible, efficient and sustainable use of non-renewable mineral resources, based on ecological mining that allows to generate sources of employment and promote a new national productive model.

Vision

Guarantee the sovereignty of the Venezuelan State over the responsible, efficient and sustainable use of non-renewable mineral resources, with minimal impact on the environment and its biological diversity, thanks to the efficient use of science and technology, with balanced participation of all the actors linked to mining activity.

Víctor Cano

Minister of People's Power for Ecological Mining Development

Geology Engineer, graduated from the Central University of Venezuela (UCV). Researcher versed in the geological and mining subject. With a specialization in Geoinformation for Geohazard, at the Indian Institute of Remote Sensing. Master Degree in Geographic Information Systems from the University of Girona, Spain. From 2001 to 2013, he was President of the Venezuelan Foundation for Seismological Research (FUNVISIS). In 2013, he was appointed as president of the Bolivarian Agency for Space Activities (ABAE). In August 2016, he was appointed by the President of the Republic, Nicolás Maduro, as Minister for Ecological Mining Development.

Bolivarian Republic of Venezuela

General information

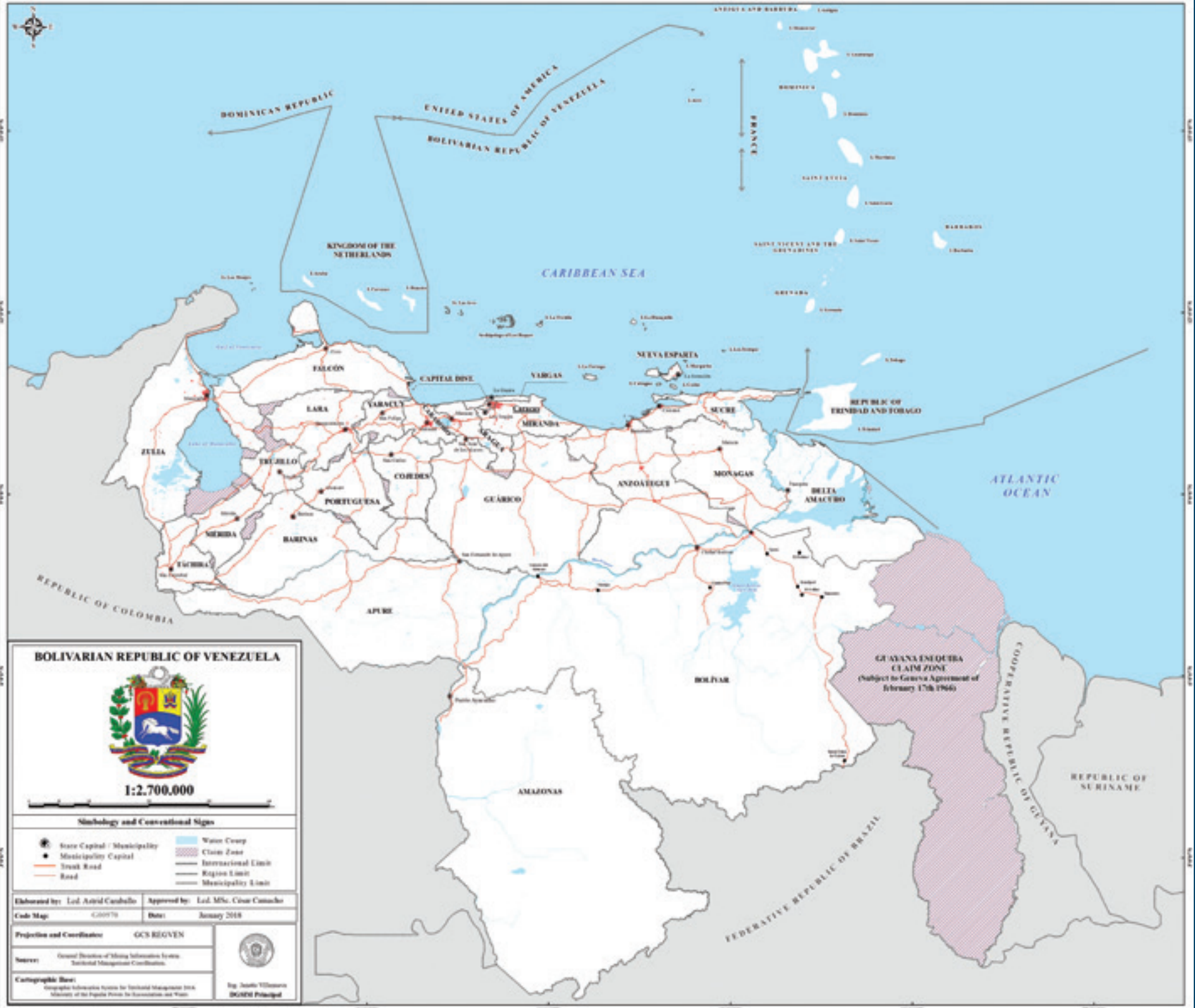
Limits: Venezuela limits to the north with the Caribbean Sea, to the south with Colombia and Brazil, to the east with Guyana and to the west with Colombia.
Population: 331 568 179 inhabitants for the year 2016. (BM)
Capital: Caracas.
Main cities: Caracas, Valencia, Maracay, Barquisimeto, Maracaibo, Mérida, San Cristóbal, Ciudad Guayana, Cumaná, Puerto La Cruz, Maturín.
Majority religion: Catholic.
Official language: Spanish.
Climatological data: the climate in Venezuela is characterized by being tropical, warm and rainy.

Economical information

Currency: Bolívar.
Mineral resources: gold, iron, bauxite, nickel, coltan, copper, silver, lead, zinc, and anothers. Among the non-metallic ones, there are: limestone, clay, diamond, coal, kaolinite, sands, phosphate, marble, granite, salt, gypsum and talc.
GDP: $ 371,006 billion for the year 2013. (BM)
GDP per capita: $ 11,760 for the year 2013. (BM)
Economic growth rate: -8.153% for the year 2015. (BM)
Exports: Crude oil ($ 24.9 million miles), refined petroleum ($ 5.57 million miles), gold ($ 916 million), acyclic alcohols ($ 451 million) and petroleum coke ($ 336 million). (OEC)
Imports: Refined petroleum ($ 2.3 million), packaged drugs ($ 1.38 million), concentrated milk ($ 900 million), automotive vehicles ($ 674 million) and frozen beef ($ 673) millions). (OEC)
Exchange rate:
DIPRO: protected exchange rate: 1 $ = 10 bolivars (for the year 2016).
DICOM: obtained by auction: 1 $ = 3 345 bolivars (for August 21, 2017).

Political information

Political system: Presidential Republic
Administrative division: It is composed of 23 states, the Capital District (seat of the capital of the Republic) and a set of islands that make up the Insular Territory Francisco de Miranda.
Main political parties: United Socialist Party of Venezuela (PSUV), Communist Party of Venezuela (PCV), Democratic Action (AD), Committee of Independent Electoral Political Organization (COPEI).
President of the Republic: Nicolás Maduro Moros (PSUV).
Vice President: Tareck El Aissami (PSUV).
Minister People's Power for Foreign Affairs: Jorge Arreaza (PSUV).
Minister of Popular Power for Ecological Mining Development: Víctor Cano (PSUV).
Foreign policy: It is governed by the foundations of the 1999 Constitution, which establishes the principles of independence, equality among States, self-determination and non-intervention, peaceful resolution of conflicts, cooperation, respect for human rights and solidarity among peoples. It also promotes peace, Latin American and Caribbean integration, nuclear disarmament and ecological balance.
Members of the following international organitations: World Trade Organization (WTO), United Nations Organization (UN), Organization of American States (OAS), Organization of Petroleum Exporting Countries (OPEC), Movement of Non-Aligned Countries (MNOAL)), Unasur, Mercosur, Petrocaribe.


DOMINICAN REPUBLIC
UNITED STATES OF AMERICA
BOLIVARIAN REPUBLIC OF VENEZUELA
FRANCE
KINGDOM OF THE NETHERLANDS
CARIBBEAN SEA
ANTIGUA AND BARBUDA
DOMINICA
SAINT LUCIA
SAINT VINCENT AND THE GRENADINES
BARBADOS
GRENADA
FALCÓN
CAPITAL DIST.
VARGAS
NUEVA ESPARTA
LARA
YARACUY
CARABOBO
MIRANDA
SUCRE
REPUBLIC OF TRINIDAD AND TOBAGO
ZULIA
TRUJILLO
COJEDES
ANZOATEGUI
MONAGAS
DELTA AMACURO
ATLANTIC OCEAN
PORTUGUESA
GUÁRICO
MERIDA
BARINAS
TACHIRA
REPUBLIC OF COLOMBIA
APURE
BOLÍVAR
GUAYANA ESEQUIBA CLAIM ZONE
(Subject to Geneva Agreement of February 17th 1966)
COOPERATIVE REPUBLIC OF GUYANA
REPUBLIC OF SURINAME
AMAZONAS
FEDERATIVE REPUBLIC OF BRAZIL
BOLIVARIAN REPUBLIC OF VENEZUELA
1:2.700.000
Simbology and Conventional Signs
State Capital / Municipality
Municipality Capital
Trunk Road
Road
Water Coarp
Claim Zone
International Limit
Region Limit
Municipality Limit
Elaborated by: Lcd. Astrid Caraballo
Approved by: Lcd. MSc. César Camacho
Code Map: G00970
Date: January 2018
Projection and Coordinates: GCS REGVEN
Source:
Cartographic Base:
Ing. Josefa Villanueva
DGSDI Principal

Orinoco Mining Belt (OMB)

The Bolivarian Republic of Venezuela is a country rich in metallic and non-metallic minerals, distributed throughout the national territory, with opportunities for the country's transformation and exportation.

One of the main premises in the mining activity of the country is the use of technologies of low environmental impact, through the balance of ecology and economy in all mining projects.

On February 24th, 2016, the Bolivarian Government of Venezuela created the Orinoco Mining Belt National Strategic Development Zone, through Presidential Decree No. 2248, published in the Official Gazette No. 40 855.

This Strategic Development Zone is an essential part of the Mining Engine, one of the fifteen engines that make up the Bolivarian Economic Agenda, launched in 2016 by President Nicolás Maduro.

Under the regulation and control of the State, this special area has the purpose of stimulating sectoral activities associated with the exploitation of mineral resources, with the participation of private, public and mixed companies, as well as the participation of small-scale mining, under criteria of sovereignty and environmental responsibility.

The Orinoco Mining Belt is located south of the Orinoco River, in the northern part of the Bolivar state. It has a total area of 111 843.70 km2. The activities of exploration and exploitation are being carried out in just 5%, of that surface. Once the exploration stage is completed, it is estimated that mineral exploitation will be carried out only in 1.5% of the Mining Belt. It should be noted that the OMB is organized internally in four areas for the purpose of development and administrative organization.

Planned surface for mining production in the Orinoco Mining Belt (OMB)

Minerales

- Coltan
- Quartz
- Bauxite
- Iron
- Granite
- Gold
- Diamond
- Gold-Diamond

- Surface AMO: **111 843,70 km²**
- Usable territory: **5 %**
- Territory planned for production: **1.5 %**

1 Juana La Avanzadora

2 Manuelita Sáenz

3 Negra Hipólita

4 Josefa Camejo

San Fernando

Río Orinoco

Calcara del Orinoco

Ciudad Bolívar

Puerto Ordaz

Upata

Embalse de Guri

El Callao

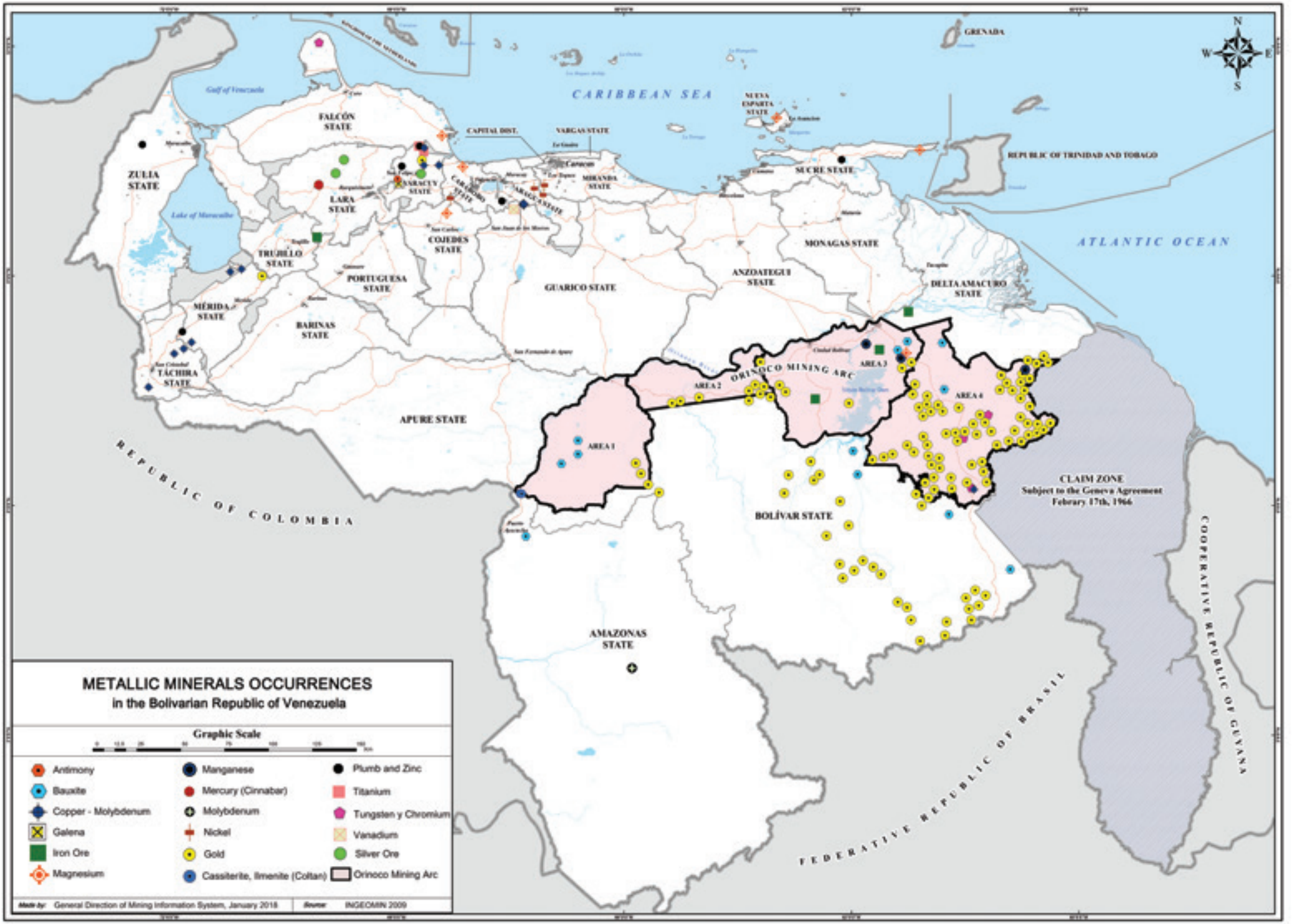
Tumeremo

Puerto Páez

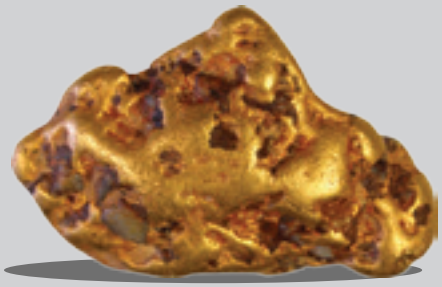
Pijiguaos

Guaniamo

Cerro Impacto


CARIBBEAN SEA
ATLANTIC OCEAN
Gulf of Venezuela
Lake of Maracaibo
GRENADA
REPUBLIC OF TRINIDAD AND TOBAGO
FALCÓN STATE
ZULIA STATE
LARA STATE
TRUJILLO STATE
MÉRIDA STATE
TÁCHIRA STATE
PORTUGUESA STATE
BARINAS STATE
APURE STATE
COJEDES STATE
GUARICO STATE
ANZOATEGUI STATE
MONAGAS STATE
SUCRE STATE
DELTA AMACURO STATE
BOLÍVAR STATE
AMAZONAS STATE
ORINOCO MINING ARC
AREA 1
AREA 2
AREA 3
AREA 4
CLAIM ZONE
Subject to the Geneva Agreement
Febrary 17th, 1966
REPUBLIC OF COLOMBIA
FEDERATIVE REPUBLIC OF BRASIL
COOPERATIVE REPUBLIC OF GUYANA
N
S
W
E
METALLIC MINERALS OCCURRENCES
in the Bolivarian Republic of Venezuela
Graphic Scale
Antimony
Bauxite
Copper - Molybdenum
Galena
Iron Ore
Magnesium
Manganese
Mercury (Cinnabar)
Molybdenum
Nickel
Gold
Cassiterite, Ilmenite (Coltan)
Plumb and Zinc
Titanium
Tungsten y Chromium
Vanadium
Silver Ore
Orinoco Mining Arc
Made by: General Direction of Mining Information System, January 2018
Source: INGEOMIN 2009

Metallic minerals



GOLD

Occurrence and geology

In Venezuela, the primary deposits of gold are associated with a hypothermal mineralization type Au-Fe-W that affected a large part of the central region of the Guayana Shield, in the Bolívar state, mainly to the Pastora Group and the El Callao formation. As a consequence of the great extension of this metallogenic zone, secondary deposits of gold in alluvium and eluvions are abundant throughout the eastern and central regions of the Shield.

Of the mineralized regions with primary gold, the area of El Callao occupies a preponderant place. This region has been the center of gold production since the Colonial Era, in the 18th century.

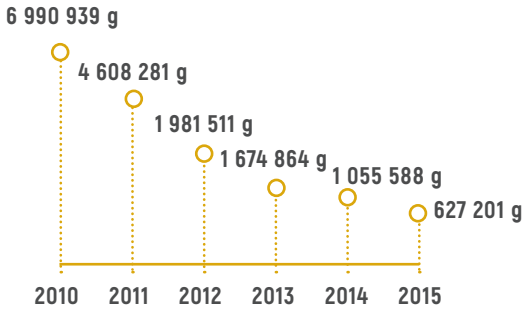
Resourses/ reserves

The resources of the auriferous industrial sector are in the order of 262 928 472 tons, with an average tenor of 2.45 g / t of Au, for a total of 644 tons of Au. Discriminated as follows:

- Guasipati-El Callao block: 231 353 598 tons, with a content of 1.73 g / t, for a total of 400.87 tons of Au.
- El Callao block: 25 337 187 tons, with a content of 6.99 g / t, for a total of 176 99 tons of Au.
- Block Sifontes Norte: 6 237 701 tonnes, with a tenor of 10.57 g / t, for a total of 65.91 tonnes of Au.

Source: Minervén, 2015

Production



Tenors

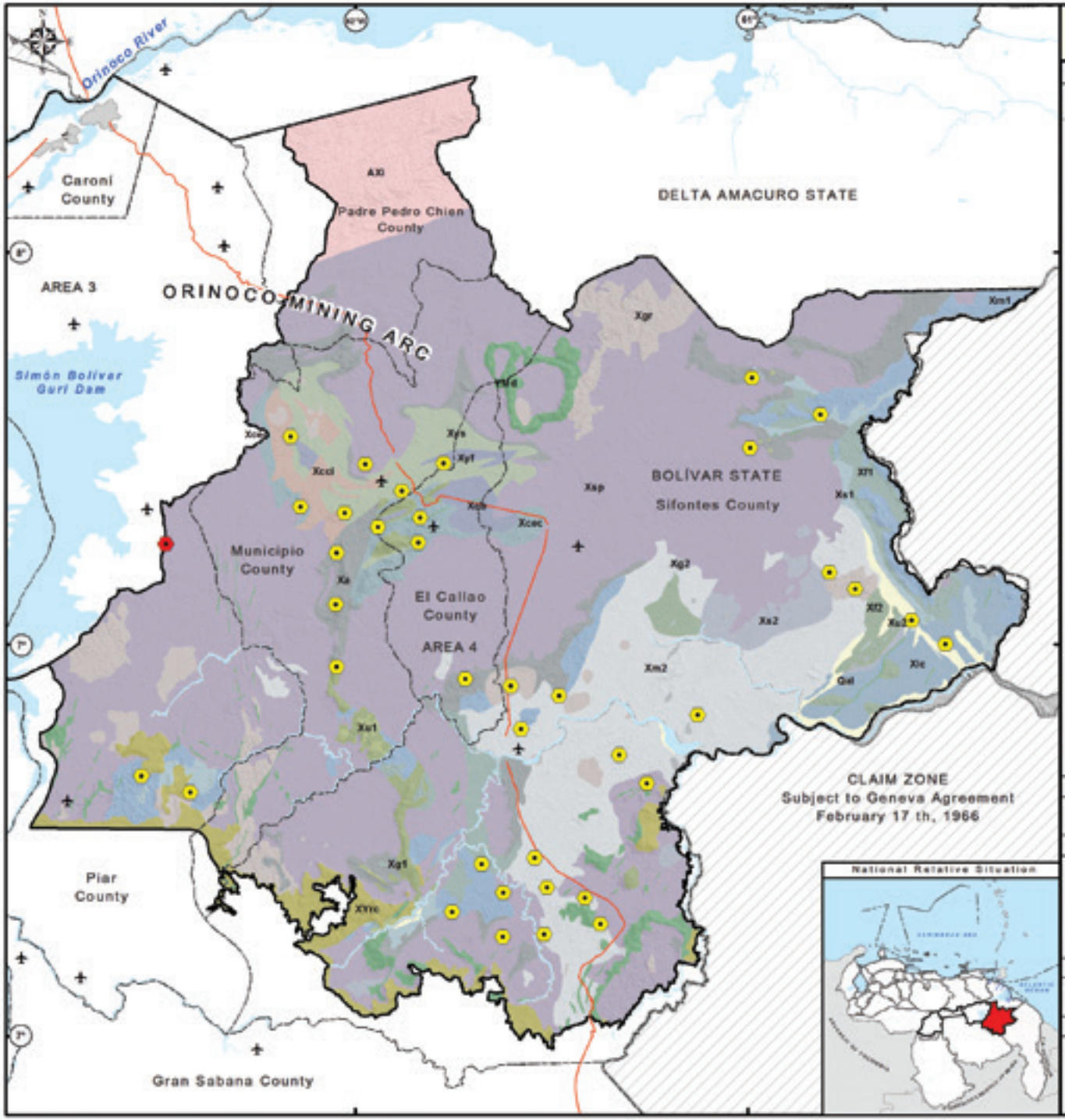
Average tenor of 2.45 g / t.
Guasipati-El Callao block: tenor of 1.73 g / t.
El Callao block: tenor of 6.99 g / t.
Block Sifontes Norte: tenor of 10.57 g / t.

Cut

3 g/t Au

Main uses

- Deposit of value and international means of exchange.
- Manufacture of coins and gold ingots.
- Jewelry, industry and electronics.
- Manufacture of essential parts of the engines of spacecraft and jet propulsion aircraft.



ORINOCO MINING ARC - AREA 4
GEOLOGICAL MAP

CONTENTS

Geological Units

(Grp.= Group, Fm.= Formation. fms.= formations, Mbr.= Member, w.d.= without differencing)

NON CONSOLIDATED SEDIMENTS

- Qal — Alluvium (Pleistocene to Holocene)

NORTHEAST GUAYANA GREEN ROCKS BELT

- Xg1 — Metagabbro green rocks belt. (Early Proterozoic)
- Xa — Andesite anphibolite schists (Early Proterozoic)
- Xu1 — Ultramafic rocks without differencing (Early Proterozoic)
- Xcec — El Callao Fm., Carichapo Group. Metalavas of basaltic composition (Early Proterozoic)
- Xm1 — Metavolcaniv rocks w.d. (Early Proterozoic)
- Xs1 — Phyllite schists, metavolcanic rocks w.d. (Early Proterozoic)
- Xcb — Caballape Fm., Mudestones, siltstones and epiclastic volcanic graywacke, lavas, tubas and breccias. (Early Proterozoic)
- Xyf — Yuruari Fm., Acid volcanic rocks, dacite, rhyodacite, tubas, sandstones and feldspar siltstones. (Early Proterozoic)
- Xys — Yuruari Fm., Metasedimentary rocks. Dacites, tubas, sandstones, siltstones, phyllite and schists. (Early Proterozoic)
- Xcci — Cicapra Fm., Grp., Carichapo. Volcaniclastic rocks of basic composition, amphibolite schists of breccia and tubas. (Early Proterozoic)
- Xf1 — Siliceous metatubas, volcanic rocks flow w.d.(Early Proterozoic)

NORTH GUAYANA ROCKS

- AXi — Imataca Complex. Gneiss. (Archean to Early Proterozoic)

SEDIMENTARY, METASEDIMENTARY AND VOLCANIC ROCKS

PROTEROZOIC

- XYrc — Upper Roraima Group, sandstones, quartz. (Early to Middle Proterozoic)
- Xlc — Los Caribes Fm., Polimictic metaconglomerates (Early Proterozoic)

INTRUSIVE ROCKS

- Xgr — Quartz monzonite. (Early Proterozoic)
- Xsp — Supamo complex. Granodiorites, diorites, amphibolite gneiss and granite (Early Proterozoic)
- YMd — Diabase. (Middle Proterozoic to Mesozoic)

NORTHEAST GUAYANA METAMORPHIC ROCKS

- Xg2 — Metagabbro. (Early Proterozoic)
- Xu2 — Ultramafic rocks w.d. (Early Proterozoic)
- Xs2 — Moscovite schist, phyllite. w.d. (Early Proterozoic)
- Xf2 — Siliceous metatubas and volcanic rocks w.d. (Early Proterozoic)
- Xm2 — Metalavas and mafic to intermediate metatubas. (Early Proterozoic)

Suggested Areas for Prospecting and Exploration

Gold — Granite

Simbology and Conventional Signs

- State Capital
- Water courp
- Orinoco Mining Arc
- Claim Zone
- Urban perimeter
- Trunk Road
- International Division
- Regional Division
- Airport

Graphic Scale

20 10 0 20 40 60 80 Km.

Geological and Mining Information Sources

Geological data proceed from technical cooperation between U.S. Geological Survey, Venezuelan Foundation for Sismological Investigations (FUNVISIS) and the School of Geology, Mining and Geophisics, Central University of Venezuela (U.C.V.)
Ecological Mining Development Ministry - National Mining Catastrum 2017.
Cartographic proyection and coordinates system used was SIRGAS-REGVEN

COLTAN

Occurrence and geology

The manifestations of niobium, tantalum and tin in Venezuela constitute the classic mineralizations associated with granitic and pegmatitic complexes. The northeast zone of the Amazonas state and the southwestern region of the municipality of Cedeño, Bolívar state, constitute one of the most interesting metallogenic areas of tin, niobium, tantalum, titanium and iron in the country.

Resourses/ reserves

Previous studies carried out by the National Institute of Geology and Mining (NIGM) have defined the following deposits of columbite-tantalite with the objective of carrying out prospecting and exploration activities for their subsequent certification of reserves: Aguamena-Boquerones-Villacoa sector, Cerro Impacto, Guaniamo , Cuao River sector, Cerro Delgado Chalbaud (Black River).

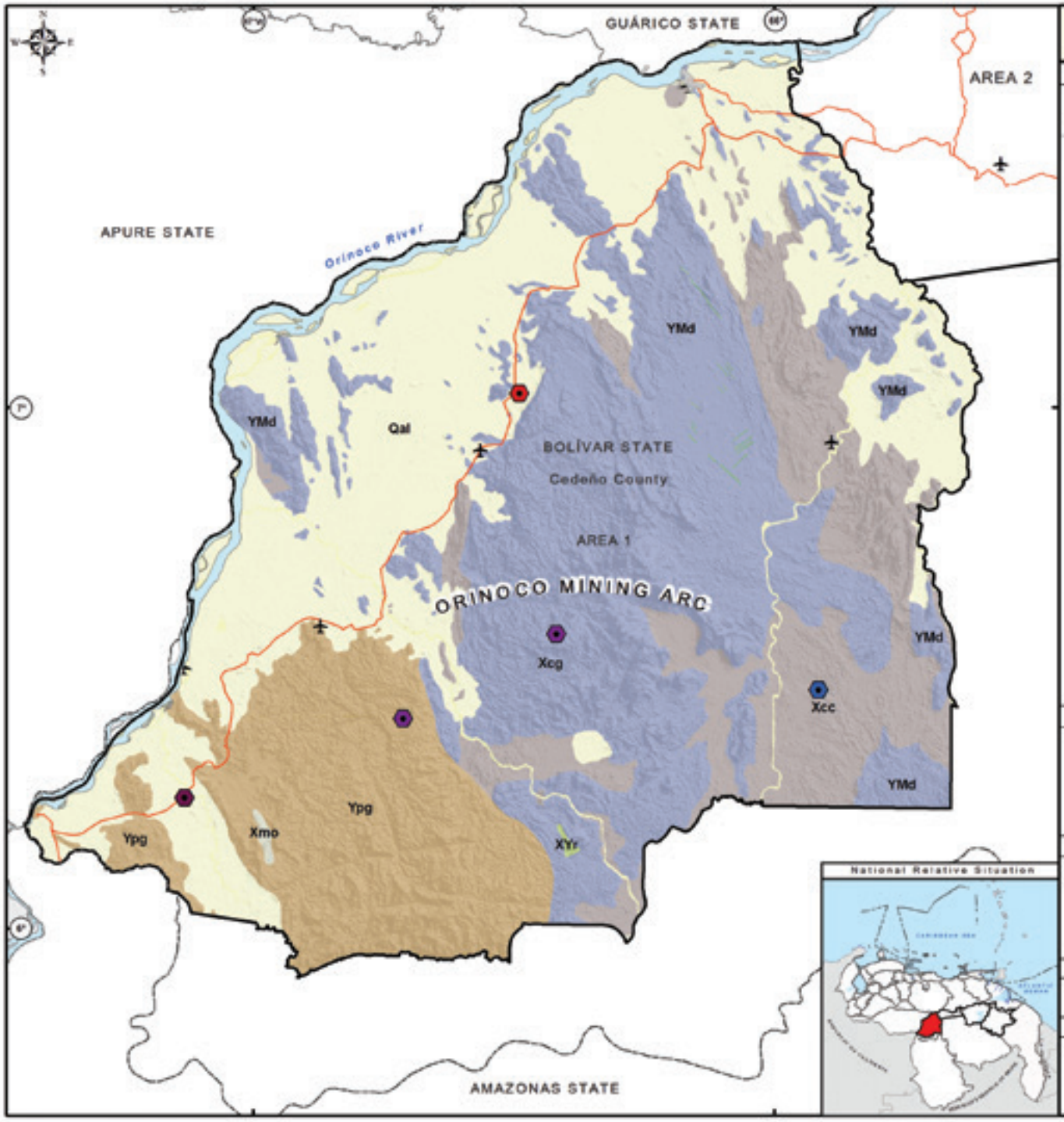
Production

Currently, in Venezuela there is no determination of the reserves of columbite and tantalite (coltan), but preliminary studies estimate that there is a significant concentration of these minerals.

Neither are data available on the volume of niobium and tantalum reserves, the estimates are based on previous exploration studies reported by the NIGM. Also, there is currently no effective production of both minerals in the country.

Main uses

- Super alloys used in the construction of machines and gas pipelines, jet aircraft turbines, automobile exhaust pipes, electronic ceramics and photographic objects.
- Key input for the manufacture of various electronic capacitors.
- Raw material for the manufacture of electronic devices in the computer and telecommunications sector.



ORINOCO MINING ARC - AREA 1 GEOLOGICAL MAP

CONTENTS

Geological Units

(Grp.= Group, Fm.= Formation, fms.= formations, Mbr.= Member, w.d.= without differencing)

SEDIMENTARY, METASEDIMENTARY AND VOLCANIC ROCKS

PROTEROZOIC

- **XYr** — Roraima Group, pre-Roraima sediments, non divided, continental sediments (Early to Middle Proterozoic)
- **Xmo** — Moriche, Cinaruco, Esmeralda fms., w.d. Quarzite, quartz chloritic schists (Early Proterozoic)
- **Xcc** — Caicara Fm., Cuchivero Group Rhyolite, rhyodacite and dacites (Early Proterozoic)

INTRUSIVE ROCKS

- **YMd** — Diabase. (Middle Proterozoic to Mesozoic)
- **Ypg** — Parguaza Granite. (Middle Proterozoic)
- **Xcg** — Siliceous intrusive rocks of Cuchivero Group (Early Proterozoic)

Suggested Areas for Prospecting and Exploration

- Tatalum - Niobium
- Bauxite
- Diamond

Simbology and Conventional Signs

- State Capital
- Water courp
- Orinoco Mining Arc
- Claim Zone
- Urban perimeter
- Trunk Road
- International Division
- Regional Division
- Airport

Graphic Scale

10 5 0 10 20 30 40 Km.

Geological and Mining Information Sources

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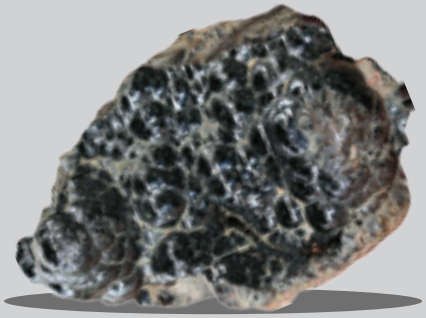


IRON

Occurrence and geology

From the genetic point of view, deposits of iron in Venezuela are associated with a large amount of minerals, being able to extract from some such as hematite, magnetite, goethite and limonite. Although it is rare in its native form, its metallic form is not found in nature, given the ease with which it is oxidized, this element is only found in grains in basalts.

Hematite is an accessory mineral in numerous eruptive rocks, especially in lava, it is rare to find it in plutonic rocks, but, on the other hand, it is common in pegmatites and in hydrothermal veins. Many times it is formed in sedimentary environments by diagenesis of limonite, maintaining the concrete and oolitic form. It remains stable in a low-grade metamorphic environment, where it even replaces magnetite pseudomorphically. It is also found in the products of sublimation of volcanic exhalations.

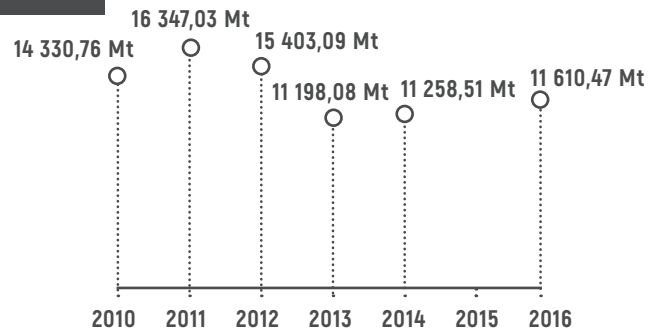
The iron ore of the high tenor of the Piar iron district originated from the ferruginous quartzites of Imataca for supergene enrichment.

Resourses/ reserves

The iron ore resources are in the order of 14 678 million tons.
- 3631 million tons are proved reserves.
- 2327 million tons of probable reserves.
- 8711 million tons of probable reserves.

The production capacity of CVG Ferrominera Orinoco (state company that is responsible for extracting iron) is 24 000 000 tons / year, which includes the production of own and contracted processing plants.

Production

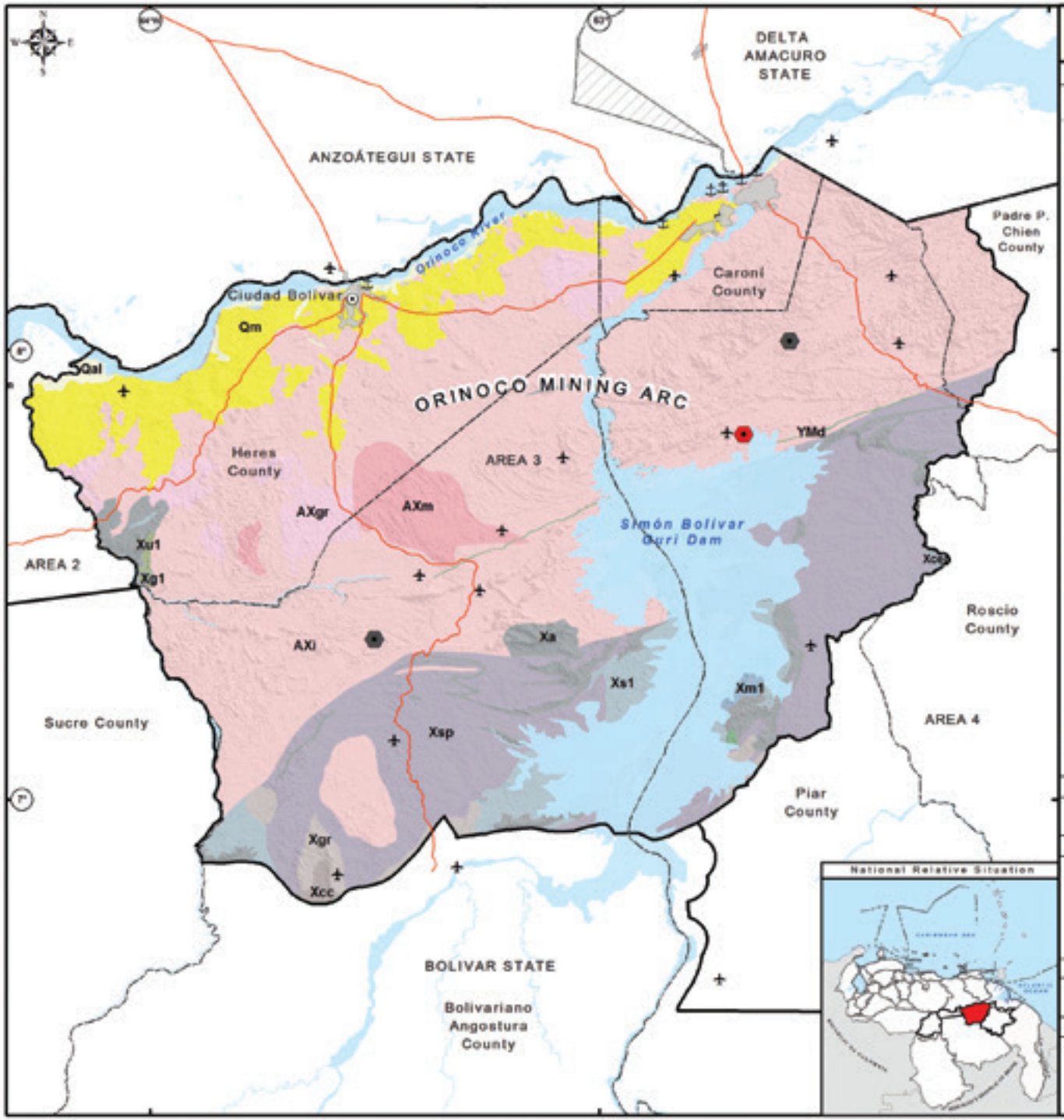


Tenors

Between 55% and 61% of iron.

Main uses

- In the steel industry in alloys with other metals to obtain steel and derivatives.
- The cast iron, the slab and the steel.
- In the construction industry (buildings, bridges, etc.).
- Household items.
- Automotive section.



ORINOCO MINING ARC - AREA 3 GEOLOGICAL MAP

CONTENTS

Geological Units

(Grp.= Group, Fm.= Formation, fms.= formations, Mbr.= Member, w.d.= without differencing)

NON CONSOLIDATED SEDIMENTS

- Qal — Alluvium (Pleistocene to Holocene)

SEDIMENTARY, METASEDIMENTARY AND VOLCANIC ROCKS

CENOZOIC

- Qm — Mesa Fm., Sands, gravel, clays (Pleistocene)
- Xcc — Caicara Fm., Cuchivero Group. Rhyolite, rhyodacite and dacites (Early Proterozoic)

NORTHEAST GUAYANA GREEN ROCKS BELT

- Xg1 — Metagabbro green rocks belt. (Early Proterozoic)
- Xa — Andesite amphibolite schists (Early Proterozoic)
- Xu1 — Ultramafic rocks without differencing (Early Proterozoic)
- Xcec — El Callao Fm., Carichapo Group. Metalavas of basaltic composition (Early Proterozoic)
- Xm1 — Metavolcaniv rocks w.d. (Early Proterozoic)
- Xs1 — Phyllite schists, metavolcanic rocks w.d. (Early Proterozoic)

NORTH GUAYANA ROCKS

- AXgr — Imataca Complex. Siliceous and intrusive rocks. (Archean to Early Proterozoic)
- AXi — Imataca Complex. Gneiss. (Archean to Early Proterozoic)
- AXm — Imataca Complex. Migmatite (Archean to Early Proterozoic)

INTRUSIVE ROCKS

- Xcg — Siliceous intrusive rocks of Cuchivero Group (Early Proterozoic)
- Xgr — Quartz monzonite (Early Proterozoic)
- Xsp — Supamo Complex. Granodiorites, diorites, amphibolites gneiss and granite (Early Proterozoic)
- YMd — Diabase. (Middle Proterozoic to Mesozoic)

Suggested Areas for Prospecting and Exploration

Iron — Granite

Simbology and Conventional Signs

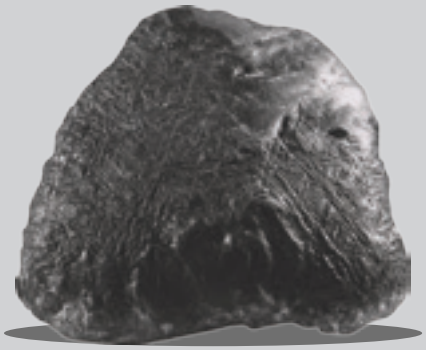
- State Capital
- Orinoco Mining Arc
- Claim Zone
- Urban perimeter
- Water courp
- Trunk Road
- International Division
- Regional Division
- Airport
- Port

Graphic Scale

20 10 0 20 40 60 80 Kms.

Geological and Mining Information Sources

Geological data proceed from technical cooperation between U.S. Geological Survey, Venezuelan Foundation for Sismological Investigations (FUNVISIS) and the School of Geology, Mining and Geophisics, Central University of Venezuela (U.C.V.)
Ecological Mining Development Ministry - National Mining Catastrum 2017.
Cartographic proyection and coordinates system used was SIRGAS-REGVEN



NICKEL

Occurrence and geology

The main deposits are located between the Miranda and Aragua states, as well as possible deposits in the Cojedes state. Nickel deposits are associated with serpentinized ultrabasic rocks of the Cordillera de la Costa. All the deposits and manifestations studied are of the lateritic type.

The ultrabasic rocks in the north of Venezuela form two defined strips along the Coast Mountain Range and interior Mountain Range. The northern belt extends from the Nueva Esparta state through the north of Caracas to the west, north of the mountains of Puerto Cabello-Santa María (Yaracuy state); the second strip extends from the Araya-Paria Peninsula, in direction, in a westerly direction through the Santa Lucía basin, Charallave, Loma de Hierro, Villa de Cura, San Juan de los Morros, Tinaquillo and Cabimba.

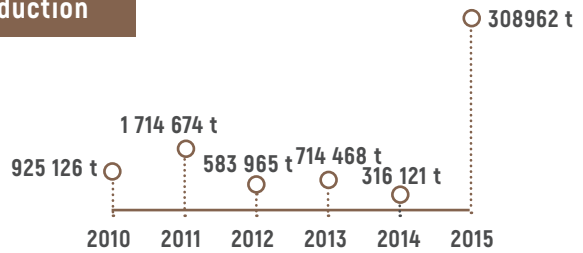
For the year 2013, Venezuelan Mining Corporation, S.A. (VMC) Loma de Níquel (state company that is in charge of extracting and processing the nickel mineral) managed to mine 582 165 tons of nickel material with a nickel content of 1.523% (8866 tons of nickel). The refining plant managed to produce 11,026 tons of nickel. Until October 2014, mine extraction was 179 749 tons of nickel mineral with a nickel content of 2813 tons (1.56% mineral grade). In the refining plant they managed to produce 2036 tons of nickel.

Resourses/ reserves

Reserves of 28 927 980 tonnes of nickel material with a nickel content of 407 885 tonnes (1.41% mineral grade); 9 151 000 tonnes of resources (indicated + measured) of nickel material with a nickel content of 138 000 tonnes (1.51% mineral grade); 6 387 000 tonnes of inferred resources of nickel material with a nickel content of 97 721 tonnes (1.53% of mineral grade)

Source: CVM Loma de Níquel, 2016

Production



Tenors

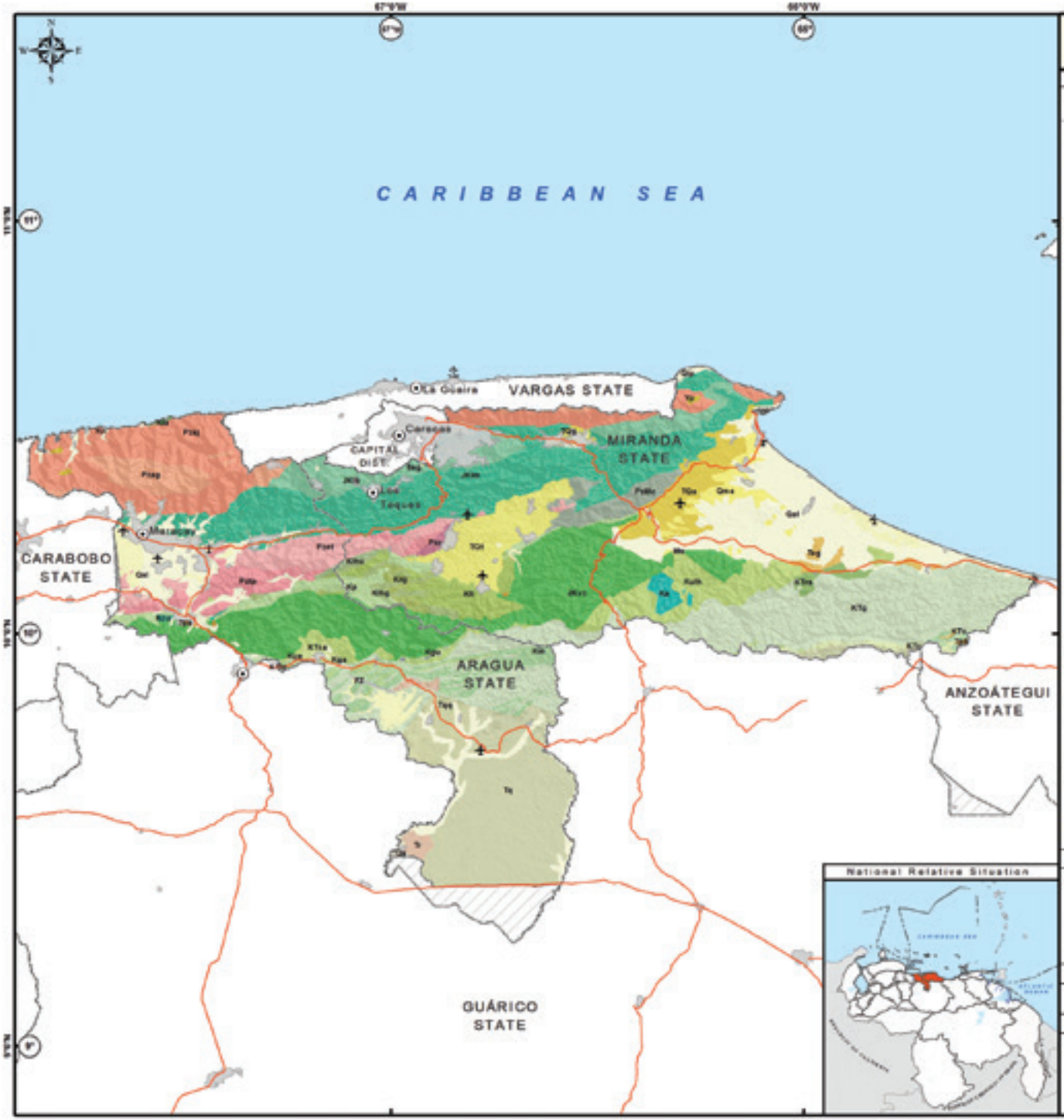
Reserves (1,42-1,46 % Ni)
Resources (1,51-1,53 % Ni)

Cuts

> 0,8 % de Ni y < 35 % Fe

Main uses

- In the steel industry for obtaining quality steels and in many alloys with copper, chromium, aluminum, lead, cobalt, manganese, gold and silver.
- In the automotive and aeronautical industry, maritime transport, electrical and electronic equipment, food and chemical industry; for the manufacture of coins, pipes, plates, electrolytes, among others.



ARAGUA AND MIRANDA STATES GEOLOGICAL MAP

CONTENTS

Geological Units

(Grp.= Group, Fm.= Formation, fms.= formations, Mbr.= Member, w.d.= without differencing)

NON CONSOLIDATED SEDIMENTS

- **Qal** Alluvium. (Pleistocene to Holocene)
- **Qs** Sediments s.d. (Pleistocene)

SEDIMENTARY AND VOLCANIC ROCKS

CENOZOIC

- **TQt** Tuy and Siquire fms., Alluvium w.d. Gravels, conglomerate, clays, shales, mudstone and sandstone. (Pliocene to Pleistocene)
- **TQg** Tuy and Siquire fms., Alluvium w.d. Gravels, conglomerate, clays, shales, mudstone and sandstone. (Pliocene to Pleistocene)
- **TQa** Aramina Fm., Cursaca Mbrs., Carenero, and Caucagua Fm., w.d. Conglomerate, clays, shales, sandstones. (Miocene to Pleistocene)
- **Tqq** Quebradon fms, Quiamare, Naricual w.d. Shales, sandstones and conglomerate,claystone. (Oligocene to Miocene)
- **Tr** Robleicito Fm., Shales. (Eocene to Miocene)
- **Tpb** Peñas Blancas Fm., Limestone(Eocene)
- **Teg** El Guapo Fm., Shales, sandstones and siltstones. (Paleocene)
- **Tps** Sedimentary Rocks w.d. (Paleocene)

METAMORPHIC AND INTRUSIVE ROCKS

MESOZOIC

- **Mo** Ultramafic rocks. (Mesozoic)

PALEOZOIC TO MESOZOIC

- **PzMc** Conoropa Complex, La Aguadita Gneiss, Urape Phyllite, Muruguata Phyllite. (Paleozoic to Mesozoic)

PALEOZOIC

- **Pzag** Metamorphic Rocks, El Avila Metamorphic suite. Schists, gneiss. (Ordovician to Permian)
- **Pzc** Charallave metaconglomerate (Paleozoic)
- **Pzet** El Tinaco Complex, w.d. Hornablende gneiss and associated rocks (Paleozoic)
- **Pzsj** San Julian Complex, El Avila Metamorphic suite. Schist and gneiss. (Paleozoic)
- **Pztp** Tucutunemo phyllite. (Paleozoic)

PROTEROZOIC

- **Yp** Peña de Mora, Augengneiss Avila metamorphic asociation (Middle Proterozoic)

METAMORPHIC AND INTRUSIVE ROCKS

MESOZOIC

- **Kulh** Las Placitas Phyllite,Pilancones volcanics w.d. (Upper Cretaceous)
- **Kp** Peracotos Phyllite. (Upper Cretaceous)
- **Kti** Tiara Metavolcanics. (Cretaceous)
- **Klhu** Lomas de Hierro Ophiolite Complex, ultramafic rocks. (Cretaceous)
- **Klhg** Lomas de Hierro Ophiolite Complex, gabbros. (Cretaceous)
- **Kcu** Chacao Ultramafics. (Cretaceous)
- **Kn** Ningua Complex, Metamorphic Suite of the Coast. (Cretaceous)
- **Kta** Tacagua Schist, Antimano Marble w.d. Metamorphic Suite of the Coast. (Cretaceous)
- **JKvc** Villa de Cura Volcanosedimentary w.d. (Cretaceous)
- **JKlm** Las Mercedes Schist, Chuspita Schist, w.d., Caracas Metasedimentary Suite (Jurassic to Cretaceous)
- **JKlb** Las Brisas Schist, Caracas Metasedimentary Suite (Jurassic to Cretaceous)

SEDIMENTARY AND VOLCANIC ROCKS

MESOZOIC TO CENOZOIC

- **KTc** Chacual Complex. Shales, sandstones. (Cretaceous to Oligocene)
- **KTra** Río Aragua Fm., Sandstones, shales and conglomerate. (Cretaceous to Eocene)
- **KTg** Guárico Fm., sandstones, shales and limestones, w.d. (Cretaceous to Eocene)
- **KTlc** Los Cajones Mbr., Guárico Fm., sandstones, shales, limestones. (Cretaceous to Eocene.)
- **Kue** Escorzonera Fm., Shales, sandstones and interstratified limestones, andesite and basaltic lavas. (Upper Cretaceous)
- **Kgu** Guayuta Grp., w.d. Shales and limestones. (Upper Cretaceous).
- **Kga** Garrapata Fm., Conglomerate, sandstones, siltstones, shales and limestones. (Upper Cretaceous).
- **Km** Mucaria Fm., Shales and limestones. (Upper Cretaceous)
- **Krg** Guarè River Volcaniclastic Rocks (Cretaceous).

Simbology and Conventional Signs

- State Capital
- Water courp
- Trunk Road
- Overlapped Zone
- Urban perimeter
- Port
- International Division
- Regional Division
- Airport

Graphic Scale

20 10 0 20 40 60 80 Km.

Geological and Mining Information Sources

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National Relative Situation

BAUXITE

Occurrence and geology

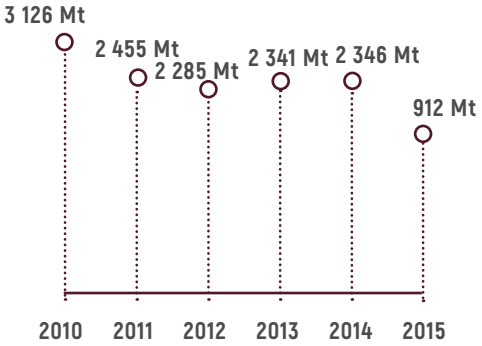
The main deposits of bauxite in Venezuela are in the states of Bolivar and Delta Amacuro, the most important of which is the Los Pijiguaos deposit (Bolívar state). The deposits of bauxite and aluminum laterites in Venezuela are all associated with granitic rock laterization levels and basic character of the Bolívar state, especially gabros and diabases. Five areas that have been studied: Upata, Nuia, Santa Elena, The Guaicas and The Pijiguaos, present accumulations of bauxite and aluminum laterites.

Currently, there are eight concessions of exploitation of mantle bauxite in force granted to Venezuelan Mining Corporation, S.A. (VMC) Bauxilum, C.A. (company of the State that is responsible for carrying out these mining activities), called Serranía Los Pijiguaos BPL no. 1, Serranía Los Pijiguaos BPL no. 8, two extinguished rights denominated Lot no. 1 and Lot no. 2 and two Free zones, called La Carata and Cerro No. 11.

Resourses/ reserves

The resources are in the order of 321 350 000 tonnes.
Classified as follows:
Inferred: 88 000 000 tons.
Indicated: 134 000 000 tons.
Measured: 99 350 000 tonnes.

Production



Tenors

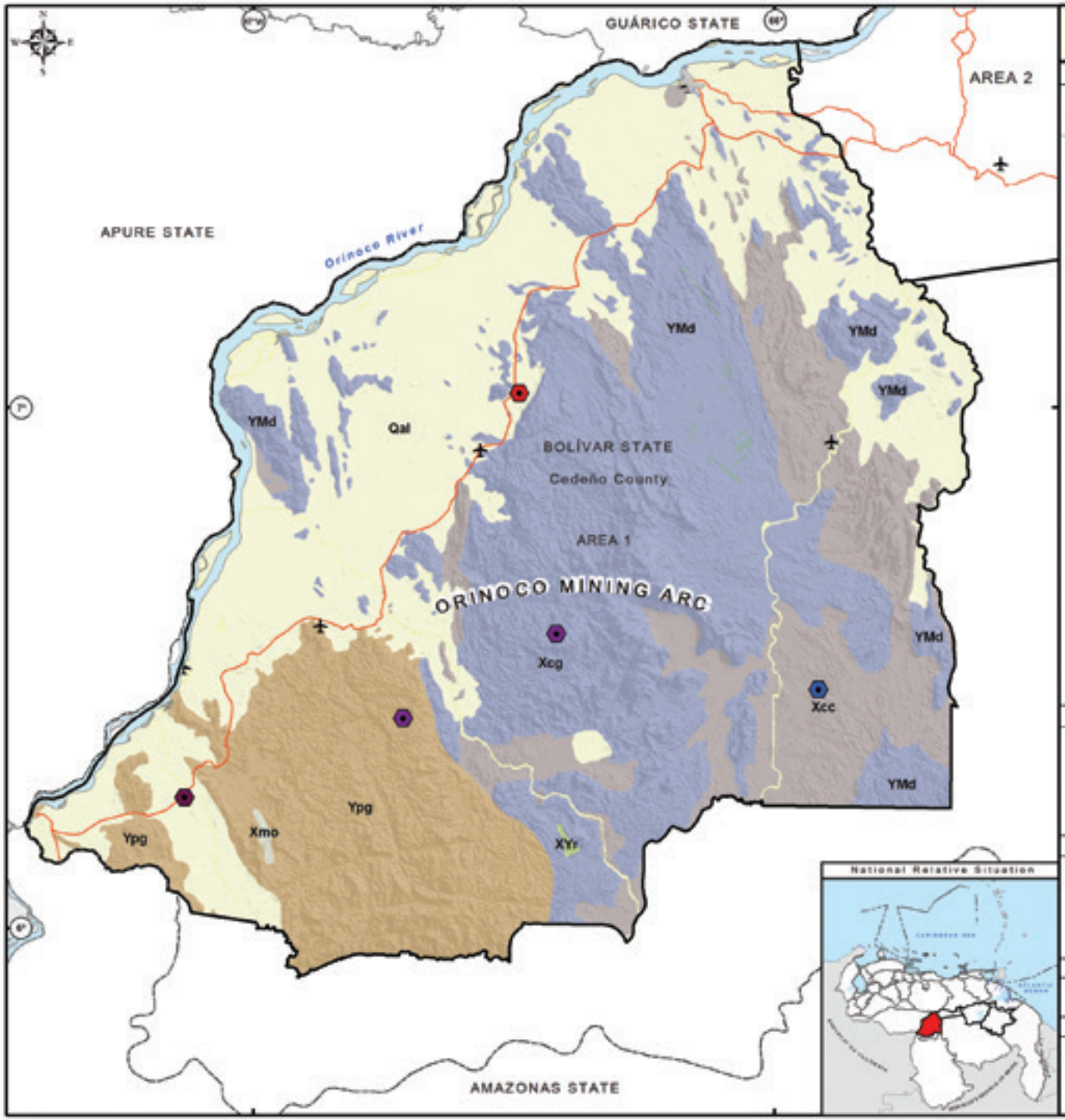
An average tenor estimate of 45% Al2O3, with approximately 15% SiO2, 8% Fe2O3 and 1% TiO2.

Cut

> 44 % Al203

Main uses

As raw material to obtain aluminum, with which aluminum foil, airplanes, sheets and roof are made, household utensils, armored glass.



ORINOCO MINING ARC - AREA 1 GEOLOGICAL MAP

CONTENTS

Geological Units

(Grp.= Group, Fm.= Formation, fms.= formations, Mbr.= Member, w.d.= without differencing)

SEDIMENTARY, METASEDIMENTARY AND VOLCANIC ROCKS

PROTEROZOIC

- **XYr** — Roraima Group, pre-Roraima sediments, non divided, continental sediments (Early to Middle Proterozoic)
- **Xmo** — Moriche, Cinaruco, Esmeralda fms., w.d. Quarzite, quartz chloritic schists (Early Proterozoic)
- **Xcc** — Caicara Fm., Cuchivero Group Rhyolite, rhyodacite and dacites (Early Proterozoic)

INTRUSIVE ROCKS

- **YMd** — Diabase. (Middle Proterozoic to Mesozoic)
- **Ypg** — Parguaza Granite. (Middle Proterozoic)
- **Xcg** — Siliceous intrusive rocks of Cuchivero Group (Early Proterozoic)

Suggested Areas for Prospecting and Exploration

Tatalum - Niobium · Bauxite · Diamond

Simbology and Conventional Signs

State Capital · Water courp · Orinoco Mining Arc · Claim Zone · Urban perimeter · Trunk Road · International Division · Regional Division · Airport

Graphic Scale

10 5 0 10 20 30 40 Km.

Geological and Mining Information Sources

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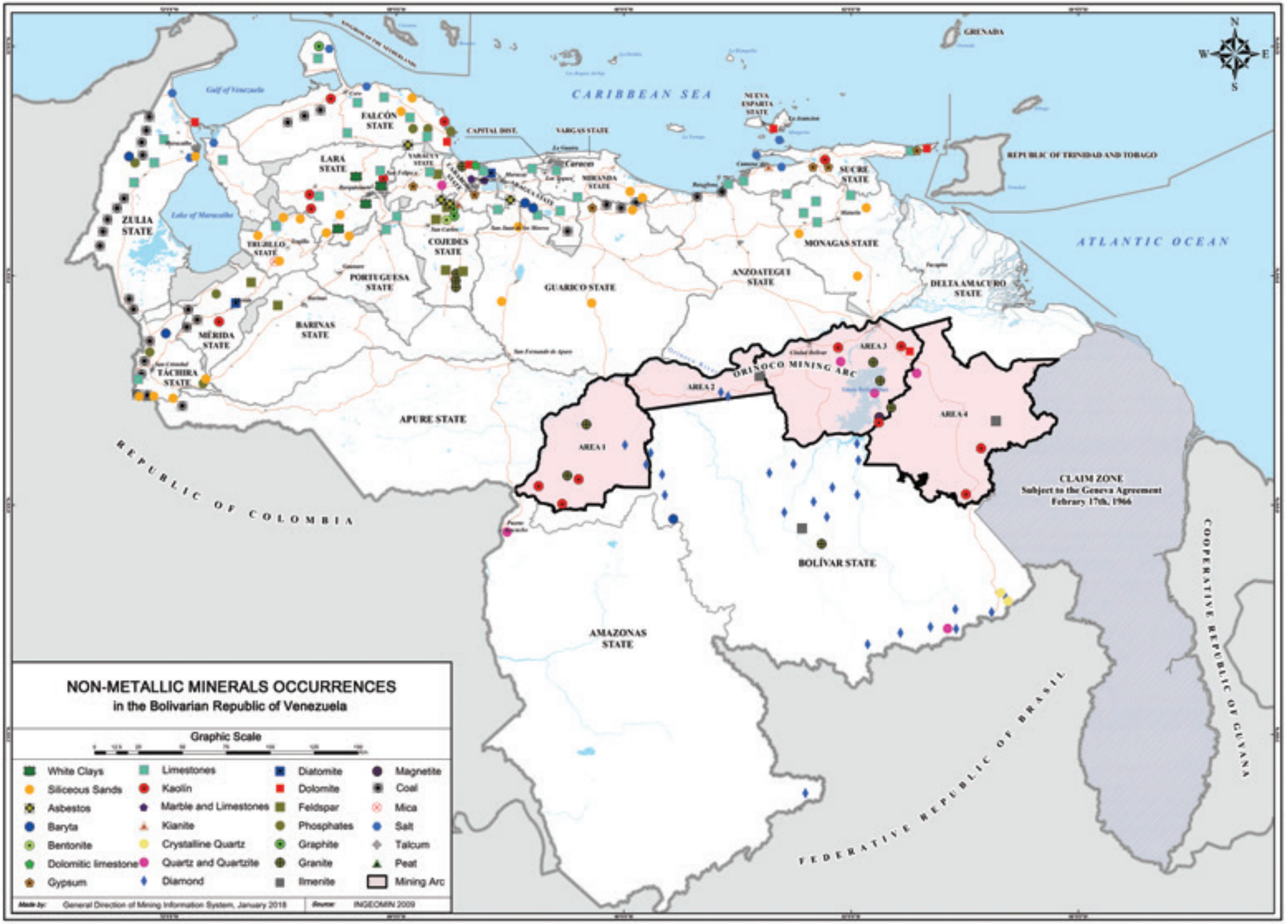

CARIBBEAN SEA
ATLANTIC OCEAN
GRENADA
REPUBLIC OF TRINIDAD AND TOBAGO
Gulf of Venezuela
Lake of Maracaibo
NUEVA ESPARTA STATE
FALCÓN STATE
CAPITAL DIST.
VARGAS STATE
LARA STATE
YARACUY STATE
MIRANDA STATE
SUCRE STATE
ZULIA STATE
TRUJILLO STATE
COJEDES STATE
PORTUGUESA STATE
GUARICO STATE
ANZOATEGUI STATE
MONAGAS STATE
DELTA AMACURO STATE
BARINAS STATE
MÉRIDA STATE
TÁCHIRA STATE
APURE STATE
ORINOCO MINING ARC
AREA 1
AREA 2
AREA 3
AREA 4
BOLÍVAR STATE
AMAZONAS STATE
REPUBLIC OF COLOMBIA
FEDERATIVE REPUBLIC OF BRASIL
COOPERATIVE REPUBLIC OF GUYANA
CLAIM ZONE
Subject to the Geneva Agreement
February 17th, 1966
N
S
W
E
NON-METALLIC MINERALS OCCURRENCES
in the Bolivarian Republic of Venezuela
Graphic Scale
White Clays
Siliceous Sands
Asbestos
Baryta
Bentonite
Dolomitic limestone
Gypsum
Limestones
Kaolin
Marble and Limestones
Kianite
Crystalline Quartz
Quartz and Quartzite
Diamond
Diatomite
Dolomite
Feldspar
Phosphates
Graphite
Granite
Ilmenite
Magnetite
Coal
Mica
Salt
Talcum
Peat
Mining Arc
Made by: General Direction of Mining Information System, January 2018
Source: INGEOMIN 2009

Non-metallic minerals

DIAMOND

Occurrence and geology

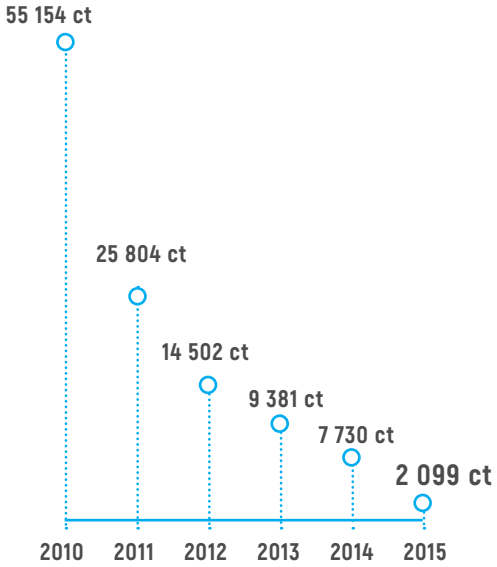
In Venezuela, the diamond-bearing zones are traditionally related to the Roraima formation, when this supra lies the Cuchivero formation. Therefore, the vast majority of diamond mining activities are carried out in the Roraima formation, which is characterized by being an extensive Precambrian sedimentary unit constituted by conglomerates, sandstones, shales, which occupy a large part of the southern region of the country. Towards the west of the Bolívar state, in the region of Guaniamo, located geologically in Cuchivero, the diamond mining operations are carried out in alluvial deposits and dikes and very weathered kimberlitic sills.

Resourses/ reserves

The resources and reported reserves of diamonds amount to 1020 million carats in the Orinoco Mining Arc. 275 million carats alone in the area of Guaniamo.

Source: MPPEMD, NIGM, GDMINEX, 2015

Production

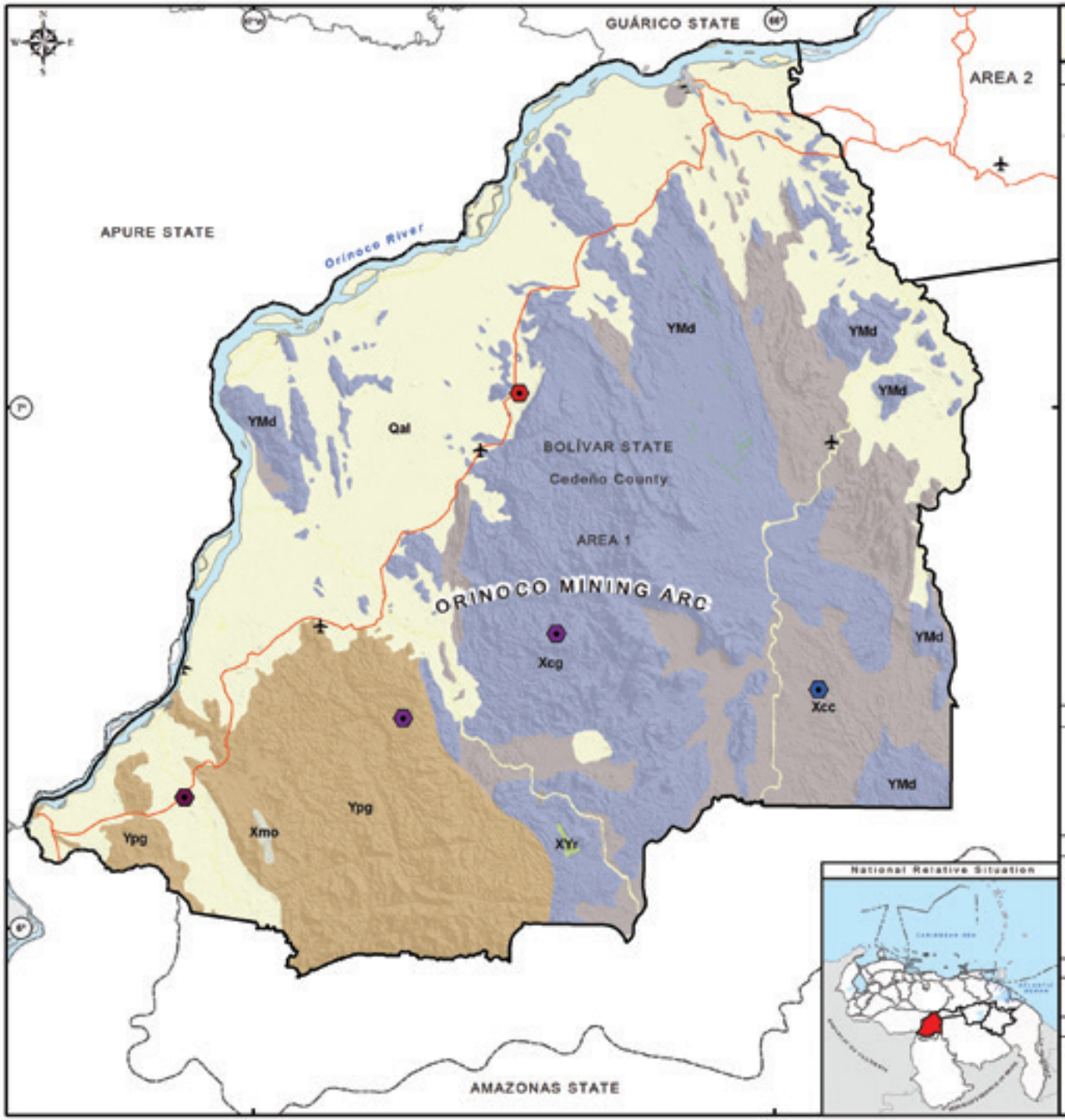


Tenors

Aluvial: 2-5 ct/t
Kimberlita: 1-4 ct/t

Main uses

- As a gemstone in jewelry
- In drills for geological drilling.
- Cutting and polishing tools.
- Precision engraving on all types of metals.
- In computer science they are used in semiconductors and microchips.
- Domes of the speakers, which improve the quality and clarity with which the sounds are emitted in a remarkable way.



ORINOCO MINING ARC - AREA 1 GEOLOGICAL MAP

CONTENTS

Geological Units

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SEDIMENTARY, METASEDIMENTARY AND VOLCANIC ROCKS

PROTEROZOIC

- **XYr** — Roraima Group, pre-Roraima sediments, non divided, continental sediments (Early to Middle Proterozoic)
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INTRUSIVE ROCKS

- **YMd** — Diabase. (Middle Proterozoic to Mesozoic)
- **Ypg** — Parguaza Granite. (Middle Proterozoic)
- **Xcg** — Siliceous intrusive rocks of Cuchivero Group (Early Proterozoic)

Suggested Areas for Prospecting and Exploration

- Tatalum - Niobium
- Bauxite
- Diamond

Simbology and Conventional Signs

- State Capital
- Water courp
- Orinoco Mining Arc
- Claim Zone
- Urban perimeter
- Trunk Road
- International Division
- Regional Division
- Airport

Graphic Scale

10 5 0 10 20 30 40 Km.

Geological and Mining Information Sources

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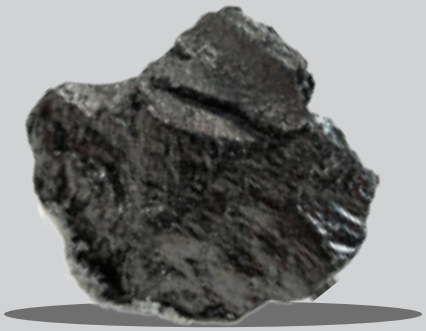


COAL

Occurrence and geology

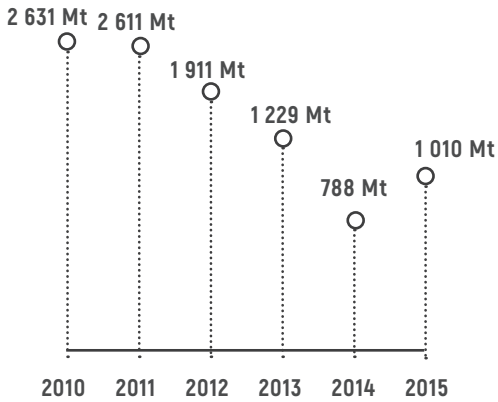
Venezuelan coal is located in the following carboniferous zones: the Zulia state coal basin, the Northeast Guárico carboniferous belt, the southern Aragua coalfield, the Naricual coal basin in Anzoátegui, the Táchira coal mining areas (Lobatera area and Rubio), carboniferous region of Santo Domingo, carboniferous zones of the Falcón state. The main deposits of coal in Venezuela are in the west of the country, in the Guasare coal basin, located in the northwestern region of Zulia state, which represents 83.1% of the total coal resources in Venezuela.

Geologically, the Guasare basin is located in the Manuelote syncline (Leaño, 1982) and is mainly found in the Marcellina formation, of Paleocene age (Hedberg and Sass, 1937). Their coal has been classified, according to ASTM standards, as high volatile bituminous, type A and B. They are of very good quality for thermal purposes, with low sulfur and ash content. Several deposits have been located in the basin, exploitable through open-pit and underground mining systems (Urdaneta, 1992); these are the Paso Diablo mine, the Socuy and Mina Norte deposits and the Inciarte and Cachirí prospects.

Resourses/ reserves

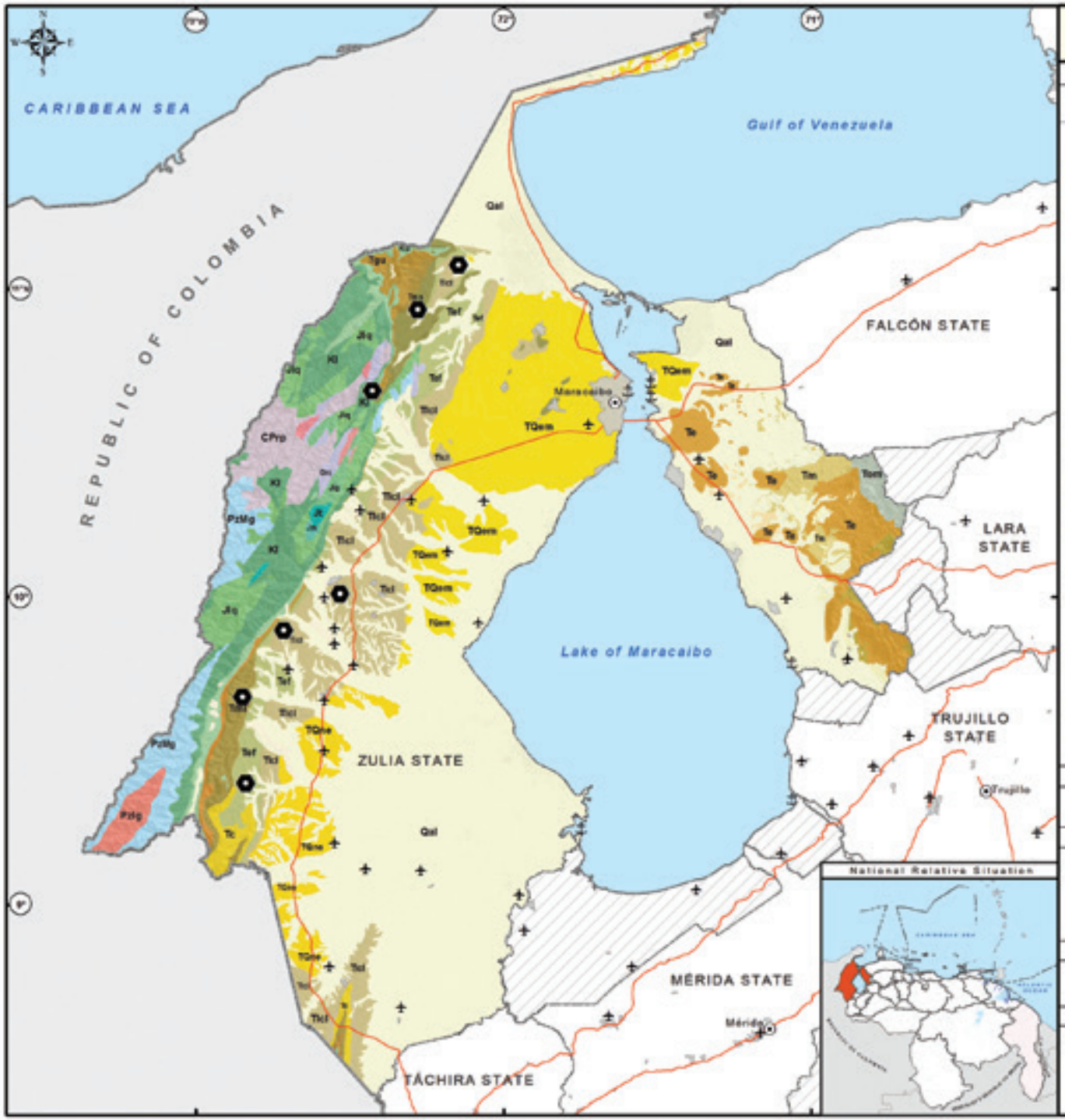
The Guasare coal basin has coal resources in the order of (7 000 000 000 tons), its certified reserves of coal is (3 006 000 000 tons), of which (1 139 000 000 tons) can be extracted with mining to open sky and (1 867 000 000 Tm) by underground mining.

Production



Main uses

- In the steel industry for the manufacture of steel.
- As fuel (coke), as a combustible mineral.
- It can be burned to produce caloric energy for industrial or domestic uses.
- In heating.
- Manufacture of cement, paper, glass, textiles, insecticides, paints, perfumes, explosives, fertilizers, gasoline, etc.



ZULIA STATE GEOLOGICAL MAP

CONTENTS

Geological Units

(Grp.= Group, Fm.= Formation, fms.= formations, Mbr.= Member, w.d.= without differencing)

Sedimentary and Volcanic Rocks

CENOZOIC

- **TQem** El Milagro Fm. and equivalent (Pliocene and Pleistocene)
- **TQne** Necesidad, El Rosario Fm., w.d Intercalated clays and sandstones. (Pliocene to Pleistocene)
- **TQc** Castilletes Fm. Limestones, clays and shales. (Miocene to Pleistocene)
- **Tg** Guayabo Grp., w.d. Clays and sandstones. (Miocene)
- **Ticl** La Vila, Cuiba, Los Ranchos fms., w.d. Sandstones, clays and siltstones. (Miocene)
- **Tef** El Fausto Grp., w.d. Clays and sandstones. (Oligocene to Miocene)
- **Tc** Carbonera Fm. Shales and clays. (Eocene to Oligocene)
- **Tmi** Mirador Fm.Sandstone, clays and y conglomerate. (Eocene)
- **Tms** Misoa Fm. Sandstone, quarzite and shales. (Eocene)
- **Tis** La Sierra Fm. Sandstone, siltstone, shales and conglomerate. (Eocene)
- **Tor** Orocué Grp., w.d. Clays, sandstones and stratums of coal. (Paleocene to Eocene)
- **Tmr** Mercelina Fm. . Sandstones, shales, arenaceous shales and stratums of coal (Paleocene)
- **Tgu** Guasare Fm. Limestone and carbonaceous shales, clays sandstones and siltstones. (Paleocene)
- **Te** Agua Negra Grp. Mene Grande, Misoa, Pauji, Caús fms., w.d. (Eocene)
- **Tps** Sedimentary rocks w.d. (Paleocene)
- **Tmat** Matatare, Trujillo Fms.,w.d. (Paleocene to Eocene)
- **Tom** Agua Salada Grp. Guaicharaca Fm. w.d. (Oligocene)

Sedimentary and Volcanic Rocks

MESOZOIC

- **Ku** La Luna, Colón, Mito Juan fms.,w.d. Limestones, shales and flanite. (Upper Cretaceous)
- **Kl** Cogollo Grp., Río Negro Fm., w.d. Shales, sandstones, limestones, conglomerate. (Lower Cretaceous)
- **Jlg** La Ge Grp., Volcanics of El Totumo Volcanics, w.d. (Jurassic)
- **Jlq** La Quinta Fm. Limestones, shales, siltstones, sandstones, stratums of coal and conglomerate (Jurassic)
- **Jm** Macoita Fm. Shales, sandstones, siltstones, limestones. (Jurassic)
- **Jt** Tinacoa Fm. Calcareous shales, sandstones, pyroclastic siltstones, limestones and tubas. (Jurassic)

PALEOZOIC

- **CPrp** Río Palmar Fm. Limestones, marlstone mudestones.(Carboniferous to Permian
- **Drc** Río Cachiri Grp. w.d. Shales and sandstones. (Devonian)

Metamorphic and Intrusive Rocks

PALEOZOIC TO MESOZOIC

- **PzMg** Intrusive siliceous rocks. (Upper Paleozoic to Mesozoic)

MESOZOIC

- **Pzmg** Intrusive siliceous rocks. (Middle Paleozoic)
- **Pzmp** Perijá Fm. Quarzita, quartz cilie, schists, granite. (Lower to Middle Paleozoic)
- **Pzlg** Intrusive siliceous rocks. (Lower Paleozoic)

Non Consolidated Sediments

- **Qal** Alluvium (Pleistocene to Holocene)

Suggested Areas for Prospecting and Exploration

- Coal

Simbology and Conventional Signs

- State Capital
- Water courp
- Trunk Road
- Overlapped Zone
- Urban perimeter
- Port
- International Division
- Regional Division
- Airport

Graphic Scale

20 10 0 20 40 60 80 Km.

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GRANITE

Occurrence and geology

In the southern part of the country there are the main granite commercial deposits, so there are at least nineteen mining rights granted by the government of Bolívar state, through the Autonomous Institute of Mines of Bolívar (AIMB). Although there are also demonstrations of this rock in the states of Carabobo and Cojedes, it is in the state of Bolívar where there is more information about its exploitation.

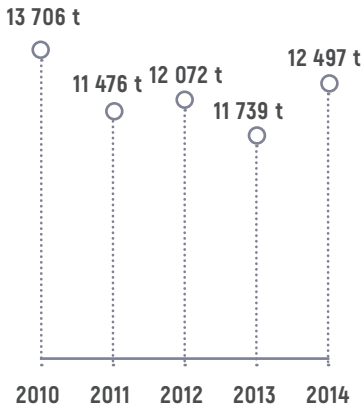
In the vicinity of the Parguaza River, 80 kilometers from the Bauxilum mines, There has been documented a series of mineral deposits with a geological formations of more than 3 billion years ago were recently found. There are also deposits associated with micropegmatites of El Tinaco granite complex. This granite is intruding metamorphic rocks located along the southern flank of the mountains of northern Cojedes.

Resourses/ reserves

Currently, in Venezuela there is no determination of granite reserves at the national level; however, according to information from the government of the Bolívar state, reserves in this state of 44 million cubic meters are estimated.

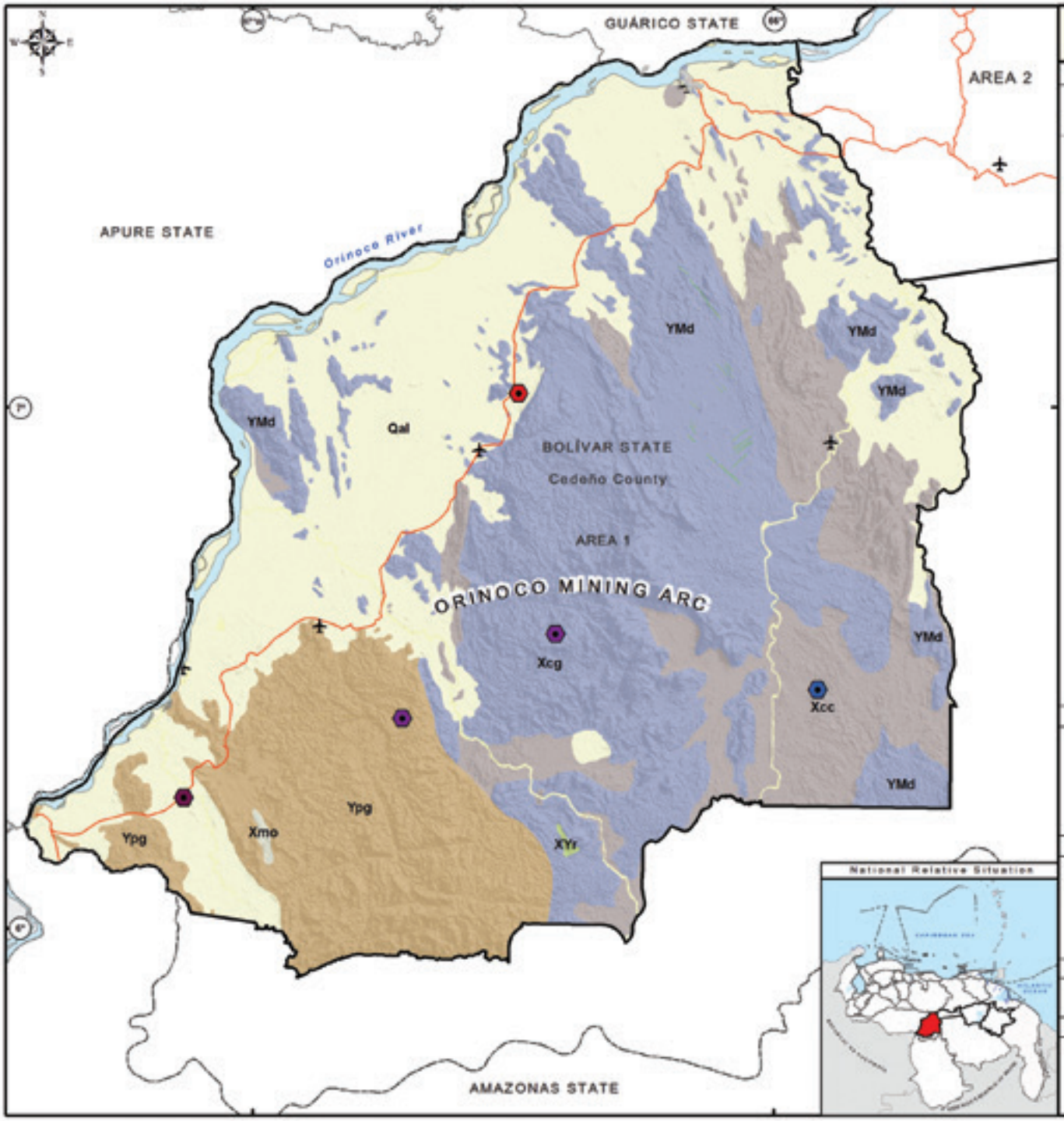
Source: Mppdme, Ingeomin, Diexmin 2017

Production



Main uses

- In construction, thanks to the tenacity of the material and its resistance to erosion, compared to other types of rock.
- For decorative purposes that take advantage of their characteristic drawings, for this, it is usually cut into plates of a few centimeters in thickness, which are polished and used as a coating.
- As a coating for external use in public buildings and monuments. Polished granite is very popular in kitchen countertops due to its high durability and aesthetic qualities.



ORINOCO MINING ARC - AREA 1 GEOLOGICAL MAP

CONTENTS

Geological Units

(Grp.= Group, Fm.= Formation, fms.= formations, Mbr.= Member, w.d.= without differencing)

SEDIMENTARY, METASEDIMENTARY AND VOLCANIC ROCKS

PROTEROZOIC

- **XYr** — Roraima Group, pre-Roraima sediments, non divided, continental sediments (Early to Middle Proterozoic)
- **Xmo** — Moriche, Cinaruco, Esmeralda fms., w.d. Quarzite, quartz chloritic schists (Early Proterozoic)
- **Xcc** — Caicara Fm.. Cuchivero Group Rhyolite, rhyodacite and dacites (Early Proterozoic)

INTRUSIVE ROCKS

- **YMd** — Diabase. (Middle Proterozoic to Mesozoic)
- **Ypg** — Parguaza Granite. (Middle Proterozoic)
- **Xcg** — Siliceous intrusive rocks of Cuchivero Group (Early Proterozoic)

Suggested Areas for Prospecting and Exploration

Tatalum - Niobium **Bauxite** **Diamond**

Simbology and Conventional Signs

State Capital
Water courp
Orinoco Mining Arc
Claim Zone
Urban perimeter
Trunk Road
International Division
Regional Division
Airport

Graphic Scale

10 5 0 10 20 30 40 Km.

Geological and Mining Information Sources

Geological data proceed from technical cooperation between U.S. Geological Survey, Venezuelan Foundation for Sismological Investigations (FUNVISIS) and the School of Geology, Mining and Geophisics, Central University of Venezuela (U.C.V.)
Ecological Mining Development Ministry - National Mining Catastrum 2017.
Cartographic proyection and coordinates system used was SIRGAS-REGVEN

LIMESTONE

Occurrence and geology

The limestone deposits of Venezuela are associated with different stratigraphic levels; however, it was during the Cretaceous and Miocene that the deposition became intense. This is evidenced by the huge commercial deposits associated with the Cogollo group in the west and the the Cantil formation in the east of the country. In relation to the Miocene, enormous deposits of limestone of excellent quality appear widely throughout the northern and eastern Falcon state.

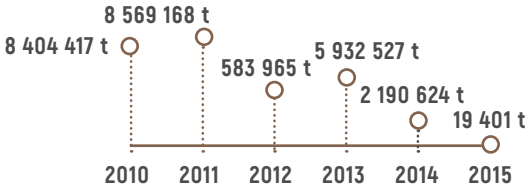
In the central region of the country, constituted by the states of Carabobo, Aragua, Guárico, Cojedes, Miranda and the Capital District, there are two limestone bands associated with metamorphic and sedimentary formations of the coast mountain range (The Brisas formations, The Mercedes, Antímano, Paracotos and Guárico) (Rodríguez, 1986).

Resources/ reserves

The probable reserves of the subsidiary companies of the Socialist Cement Corporation, S.A., are 300 693 784 tons, for the year 2011, distributed as follows:

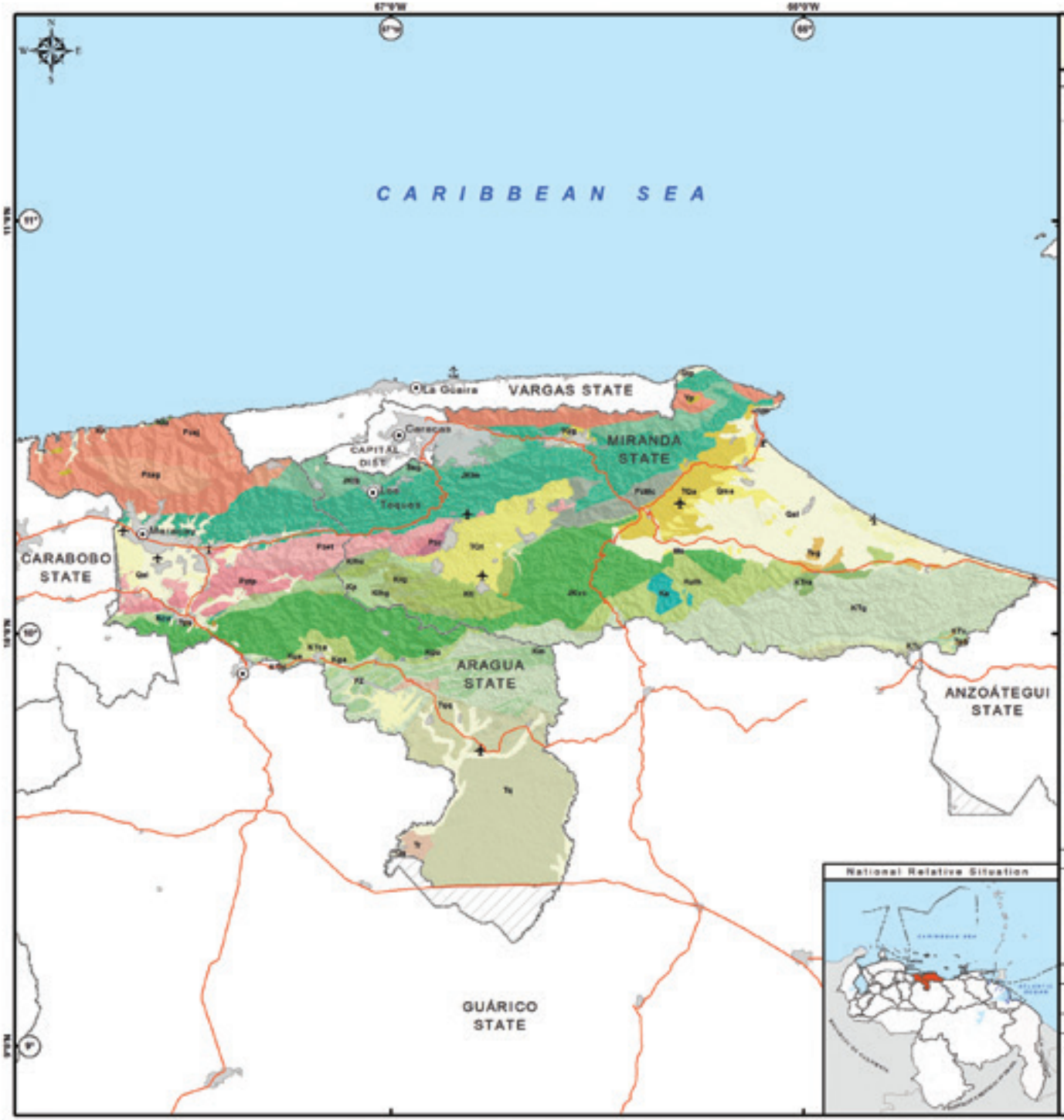
- National Cement Factory, formed by the quarries: the Melero, San Bernardo, Mume and Cementos Táchira: 32 468 349 t.
- Venezuelan Cement Industry, has the following quarries: Mampostal and The Morros, with a total of reserves: 94 000 000 t.
- Cemento Andino Cement Complex, which administers the The Cedars quarry: 17 000 000 t.
- Venezolana de Cementos, formed by the following quarries: The Taparo, Cantil, San Jose, Querecual, The Cañada, The Conception, The Danta and Conpiedra, with a total of reserves of 157 225 435 t.

Production



Main uses

It is used in the manufacture of cement.
- As a construction material.
- As gravel in the construction of roads and railroad tracks.
- As a stone in the manufacture of lime.
- As a flux in the steel industry.
- From the point of view of its use as an agricultural input, the element calcium (Ca) is particularly important in limestone, since it is a macronutrient for plants and animals and a corrector for humic clayey complexes in soils.



ARAGUA AND MIRANDA STATES GEOLOGICAL MAP

CONTENTS

Geological Units

(Grp.= Group, Fm.= Formation, fms.= formations, Mbr.= Member, w.d.= without differencing)

NON CONSOLIDATED SEDIMENTS

- **Qal** Alluvium. (Pleistocene to Holocene)
- **Qs** Sediments s.d. (Pleistocene)

SEDIMENTARY AND VOLCANIC ROCKS

CENOZOIC

- **TQt** Tuy and Siquire fms., Alluvium w.d. Gravels, conglomerate, clays, shales, marlstone and sandstone. (Pliocene to Pleistocene)
- **TQg** Tuy and Siquire fms., Alluvium w.d. Gravels, conglomerate, clays, shales, marlstone and sandstone. (Pliocene to Pleistocene)
- **TQa** Aramina Fm., Curiaca Mbrs., Carenero, and Caucagua Fm., w.d. Conglomerate, clays, shales, sandstones. (Miocene to Pleistocene)
- **Tqq** Quebracon fms, Quiamare, Naricual w.d. Shales, sandstones and conglomerate,claystone. (Oligocene to Miocene)
- **Tr** Robleclto Fm., Shales. (Eocene to Miocene)
- **Tpb** Peñas Blancas Fm., Limestone(Eocene)
- **Teg** El Guapo Fm., Shales, sandstones and siltstones. (Paleocene)
- **Tps** Sedimentary Rocks w.d. (Paleocene)

METAMORPHIC AND INTRUSIVE ROCKS

MESOZOIC

- **Mo** Ultramafic rocks. (Mesozoic)

PALEOZOIC TO MESOZOIC

- **PzMc** Conoropa Complex. La Aguadita Gneiss. Urape Phyllite., Muruguata Phyllite. (Paleozoic to Mesozoic)

PALEOZOIC

- **Pzag** Metamorphic Rocks, El Ávila Metamorphic suite. Schists, gneiss. (Ordovician to Permian)
- **Pzc** Charallave metaconglomerate (Paleozoic)
- **Pzet** El Tinaco Complex, w.d. Hornablende gneiss and asociated rocks (Paleozoic)
- **Pzsj** San Julián Complex, El Ávila Metamorphic suite. Schist and gneiss. (Paleozoic)
- **Pztp** Tucutunemo phyllite. (Paleozoic)

PROTEROZOIC

- **Yp** Peña de Mora, Augengneiss Avila metamorphic association (Middle Proterozoic)

METAMORPHIC AND INTRUSIVE ROCKS

MESOZOIC

- **Kulh** Las Placitas Phyllite,Pilancones volcanics w.d. (Upper Cretaceous)
- **Kp** Paracotos Phyllite. (Upper Cretaceous)
- **Kti** Tiara Metavolcanics. (Cretaceous)
- **Klhu** Lomas de Hierro Ophiolite Complex, ultramafic rocks. (Cretaceous)
- **Klhg** Lomas de Hierro Ophiolite Complex, gabbros. (Cretaceous)
- **Kcu** Chacao Ultramafics. (Cretaceous)
- **Kn** Ningua Complex, Metamorphic Suite of the Coast. (Cretaceous)
- **Kta** Tacagua Schist, Antimano Marble w.d. Metamorphic Suite of the Coast. (Cretaceous)
- **JKvc** Villa de Cura Volcanosedimentary w.d. (Cretaceous)
- **JKlm** Las Mercedes Schist, Chuspita Schist, w.d., Caracas Metasedimentary Suite (Jurassic to Cretaceous)
- **JKlb** Las Brisas Schist, Caracas Metasedimentary Suite (Jurassic to Cretaceous)

SEDIMENTARY AND VOLCANIC ROCKS

MESOZOIC TO CENOZOIC

- **KTc** Chacual Complex. Shales, sandstones. (Cretaceous to Oligocene)
- **KTra** Rio Aragua Fm., Sandstones, shales and conglomerate. (Cretaceous to Eocene)
- **KTg** Guárico Fm., sandstones, shales and limestones. w.d. (Cretaceous to Eocene)
- **KTlc** Los Cajones Mbr., Guárico Fm., sandstones, shales, limestones. (Cretaceous to Eocene.)
- **Kue** Escorzonera Fm., Shales, sandstones and interstratified limestones, andesite and basaltic lavas. (Upper Cretaceous)
- **Kgu** Guayuta Grp., w.d. Shales and limestones. (Upper Cretaceous).
- **Kga** Garnapata Fm., Conglomerate, sandstones, siltstones, shales and limestones. (Upper Cretaceous).
- **Km** Mucaria Fm., Shales and limestones. (Upper Cretaceous)
- **Krg** Guare River Volcaniclastic Rocks (Cretaceous).

Simbology and Conventional Signs

- State Capital
- Water courp
- Trunk Road
- Overlapped Zone
- Urban perimeter
- Port
- International Division
- Regional Division
- Airport

Graphic Scale

20 10 0 20 40 60 80 Km.

Geological and Mining Information Sources

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Ecological Mining Development Ministry - National Mining Catastrum 2017.
Cartographic proyection and coordinates system used was SIRGAS-REGVEN

National Relative Situation

FELDSPAR

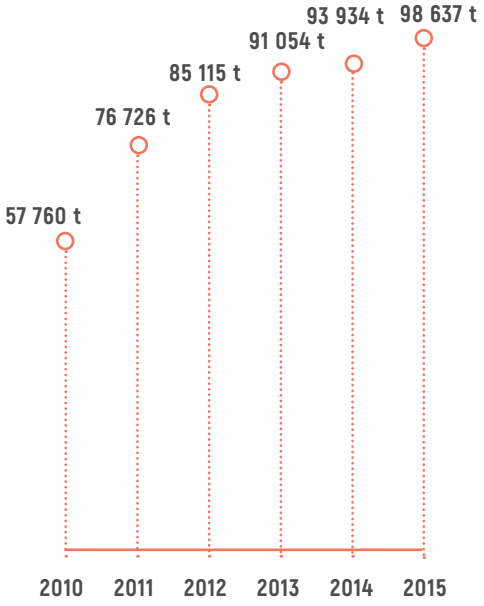
Occurrence and geology

The main deposits are located in the states Barinas, Cojedes, Mérida, Yaracuy. In the Merida state, it is associated with pegmatites and aplites present in the banded gneiss of the Mitisús, an integrated unit, according to Schubert (1968). In Yaracuy, Rodríguez (1986) explains that feldespathic gneiss has been exploited; but large-scale mining has not been viable due to physical-chemical restrictions. However, he says that there are sequences of feldspathic gneisses little contaminated with biotite, associated with the Las Brisas formation. In Cojedes, feldspar deposits are associated with white micropegmatites present throughout the granite complex. The rock is constituted by microcline crystals with large quartz inclusions that may have been formed by recrystallization of the micropegmatite.

Resourses/ reserves

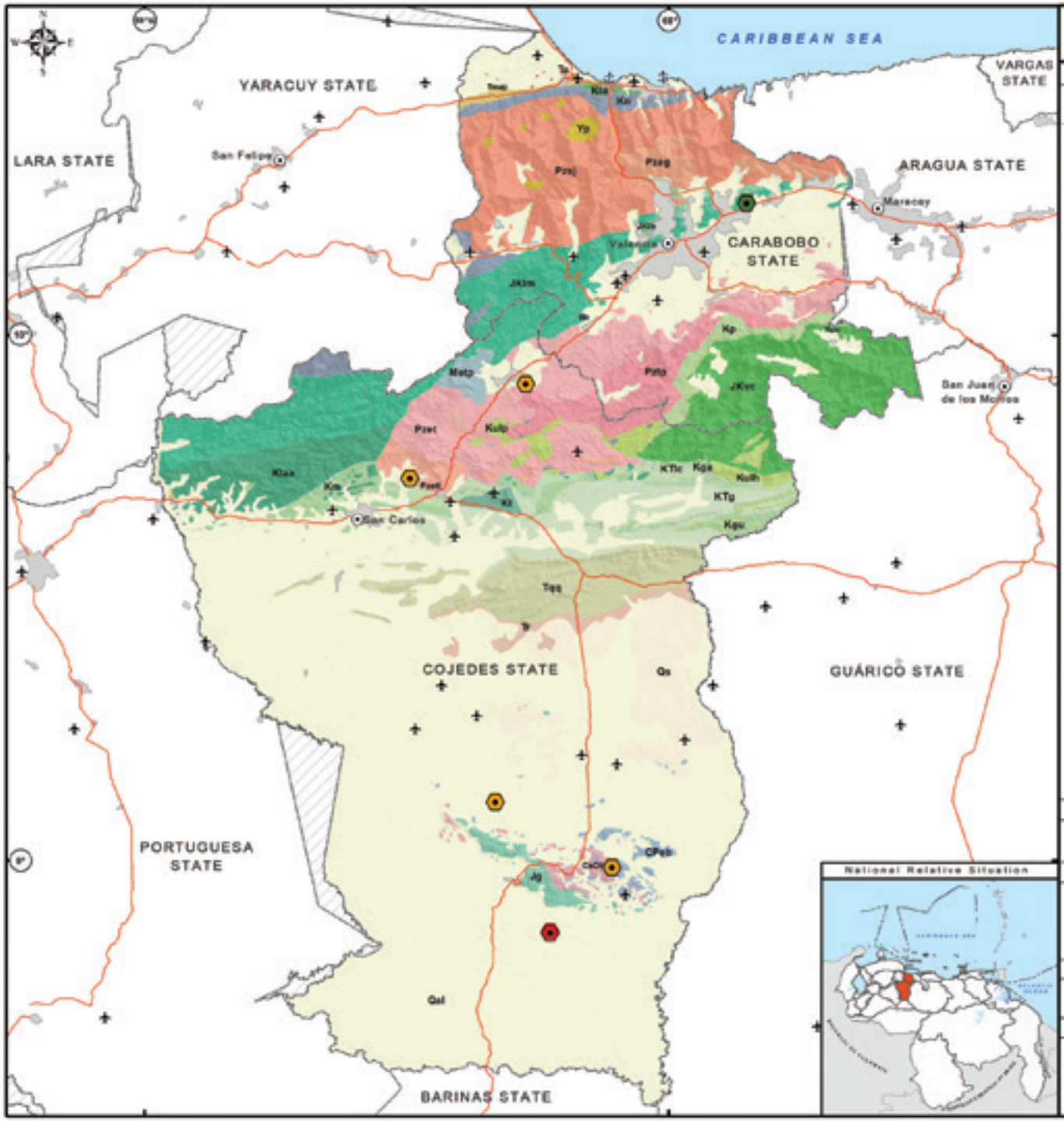
The resources are in the order of 4 770 629 tons.

Production



Main Uses

For the manufacture of glass and ceramics. Its main applications are earthenware for walls, sanitary ware, porcelain, polishes and enamels.



COJEDES AND CARABOBO STATES GEOLOGICAL MAP

CONTENTS

Geological Units

(Grp.= Group, Fm.= Formation, fms.= formations, Mbr.= Member, w.d.= without differencing)

NON CONSOLIDATED SEDIMENTS

- **Qal** Alluvium. (Pleistocene to Holocene)
- **Qs** Sediments without differencing. (Pleistocene)

SEDIMENTARY AND VOLCANIC ROCKS

CENOZOICO

- **Tmagc** Maporita Fm., Conglomerate, sandstone, clays, shale and marlstone. (Miocene to Pliocene)
- **Tqq** Quebradón fms., Guiamare, Naricual w.d., Shales, sandstone and conglomerate, claystone. (Oligocene a Miocene)
- **Tr** Robleicito Fm., Shales. (Eocene to Miocene)
- **Tu** Urama Fm., Shales, sandstones and limestones. (Eocene)

MESOZOIC TO CENOZOIC

- **KTg** Guárico Fm., Sandstones, shales, limestones, w.d. (Cretaceous to Eocene)
- **KTlc** Los Cajones Mbr. Guárico Fm., sandstones, shales, limestones. (Cretaceous to Eocene)

MESOZOIC

- **Kga** Garrapata Fm., Conglomerate, sandstones, siltstone, shales and limestones. (Upper Cretaceous).
- **Km** Mucaria Fm., Shales and limestones. (Upper Cretaceous)
- **Kt** Volcanicals of the Tiramuto. Metatobas, lavas, tuffaceous siltstone and flanitic shales (Cretaceous)
- **Klaa** Agua Blanca, Araure, Cojedes fms., w.d. Conglomerate, sandstone, limestone. (Lower Cretaceous).
- **Jg** Volcanical Suite of Guacamayas. Tubes, breccia, conglomerate, lava flows and tubaceous sandstones (Jurassic)
- **Kgu** Guayuta Grp, w.d. Shales and limestones. (Upper Cretaceous)

METAMORPHIC AND INTRUSIVE ROCKS

MESOZOIC

- **Mo** Ultramafic rocks. (Mesozoic)

METAMORPHIC AND INTRUSIVE ROCKS

MESOZOIC

- **Kulp** Las Placitas Phyllite, Pilancones volcanics, w.d. (Upper Cretaceous)
- **Kp** Parascotas Phyllite. (Upper Cretaceous)
- **Kcu** Chacao Ultramafics. (Cretaceous)
- **Kn** Nirgua Complex, Metamorphic suite of the Coast. (Cretaceous)
- **Kulh** Las Hermanas metavolcanics (Cretaceous)
- **Kta** Tacagua Schist, Antimano Marble w.d., Metamorphic suite of the Coast. (Cretaceous)
- **JKvc** Villa de Cura volcanosedimentary w.d (Cretaceous)
- **JKlas** Las Mercedes and Chuspita Schists, w.d., Caracas Metasedimentary. (Jurassic to Cretaceous)
- **JKlb** Las Brisas Schist, Metasedimentary suite of Caracas. (Jurassic to Cretaceous)
- **Metp** Tinaquillo Peridotite. (Mesozoic)

PALEOZOIC

- **CPeb** Granitic suite of El Baúl. (Carboniferous to Permian)
- **CaOb** Metamorphic suite of El Barbasco. Phyllite, Granite, metasedimentary rocks and metasiltstone (Cambrian to Ordovician)
- **Pzett** Tinaco Complex, trondhjemite. (Paleozoic)
- **Pzet** Tinaco Complex, w.d. Hornablendic gneiss and associated rocks.(Paleozoic)
- **Pzag** Metamorfic rocks, metamorphic suite of El Avila. Schists and gneiss (Ordovician to Permian)
- **Pzsj** San Julián Complex, Metamorphic suite of El Ávila. Schist, gneiss. (Paleozoic)
- **Pztp** Tucutunemo Phyllite. (Paleozoic)

PROTEROZOIC

- **Yp** Peña de Mora Augengneiss, Metamorphic asociation of El Avila (Middle Proterozoic)

Suggested Areas for Prospecting and Exploration

Feldspar · Granite · Marble

Simbology and Conventional Signs

- State Capital
- Water courp
- Trunk Road
- Overlapped Zone
- Urban perimeter
- Port
- International Division
- Regional Division
- Airport

Graphic Scale

10 5 0 10 20 30 40 Km.

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Cartographic proyection and coordinates system used was SIRGAS-REGVEN

National Relative Situation

PHOSPHATES

Occurrence and geology

Venezuela has important deposits of phosphates, these of late Cretaceous or Tertiary age. Commercial deposits of phosphates have been located in the states of Falcón, Zulia and Táchira, and deposits in Lara, Mérida and Trujilo. An extensive strip that goes from Lizardo to Santa Cruz de Bucaral in Falcón, which includes the region of Sanare-Yaracuy and Riecito.

In Zulia, in the easternmost region of the Sierra de Perija, west of the town of Villa del Rosario to the town of Los Angeles del Tocuco. In Mérida, in a strip that extends from Jají to Las Hernández and, finally, those located in Táchira, in the areas of La Llanada, Lobatera, La Molina, La Blanca, Las Adjuntas, San Jacinto, Berlin, El Pueblito, El Corozo, Independencia, Abejales and Navay; which are associated with the Moon formation, a unit of the upper Cretaceous, which is in contact with the Capacho and Colón formations.

Resourses/ reserves

The most important deposits of phosphates are found in Táchira, where it is estimated that the highest levels are concentrated, with 79% of all the phosphate resources that exist in Venezuela. The reserves of the Lizardo deposit have been estimated at almost 18.6 million tons of phosphatic rocks from an area of 75 hectares explored through the drilling of 300 soundings of an average depth of 50 meters. The reserves contain 20% P_2O_5 and 38% SiO_2. The reserves of aluminum phosphate are 3.9 million tons.

In the Falcón state, specifically in the Monte Oscuro creek, in the vicinity of Lizardo, it is observed that the P_2O_5 has background values greater than 1%, which is not normal, since the local background is usually less than 0.1 % of P_2O_5 and never greater than 0.2%; which indicates the presence of a phosphate deposit (Burgos, 1987). Likewise, two possible phosphate deposits were identified in the Cerro El Tambor area, one associated with a phosphatic conglomerate with thicknesses of 15 meters and concentrations of 30% in P_2O_5, and another residual deposit forming terraces of soils with average concentrations of 12 , 42% of P_2O_5 (García, 1998).

On the other hand, in the Chiguará region of Mérida state, a possible reserve of phosphate rocks is reported that could exceed 50 million tons, whose characteristics in terms of potassium, sulfur, fluorine and P_2O_5 percentage make it superior to the phosphates of La Molina, Lobatera (state Táchira) and Riecito (Falcón), (Useche, 1984). Venezuela is the fifth country with the highest phosphate rock base reserves, since it has 1982 million tons of phosphate reserves that represent 57% of the country's main non-metallic mineral resources.

In the Navay area, Pequivén reports resources and reserves of 65 million tons in the Los Monos-Tomates field, while in the Las Lindas-Los Bancos field it reports 14.6 million tons of phosphate rock.

Production

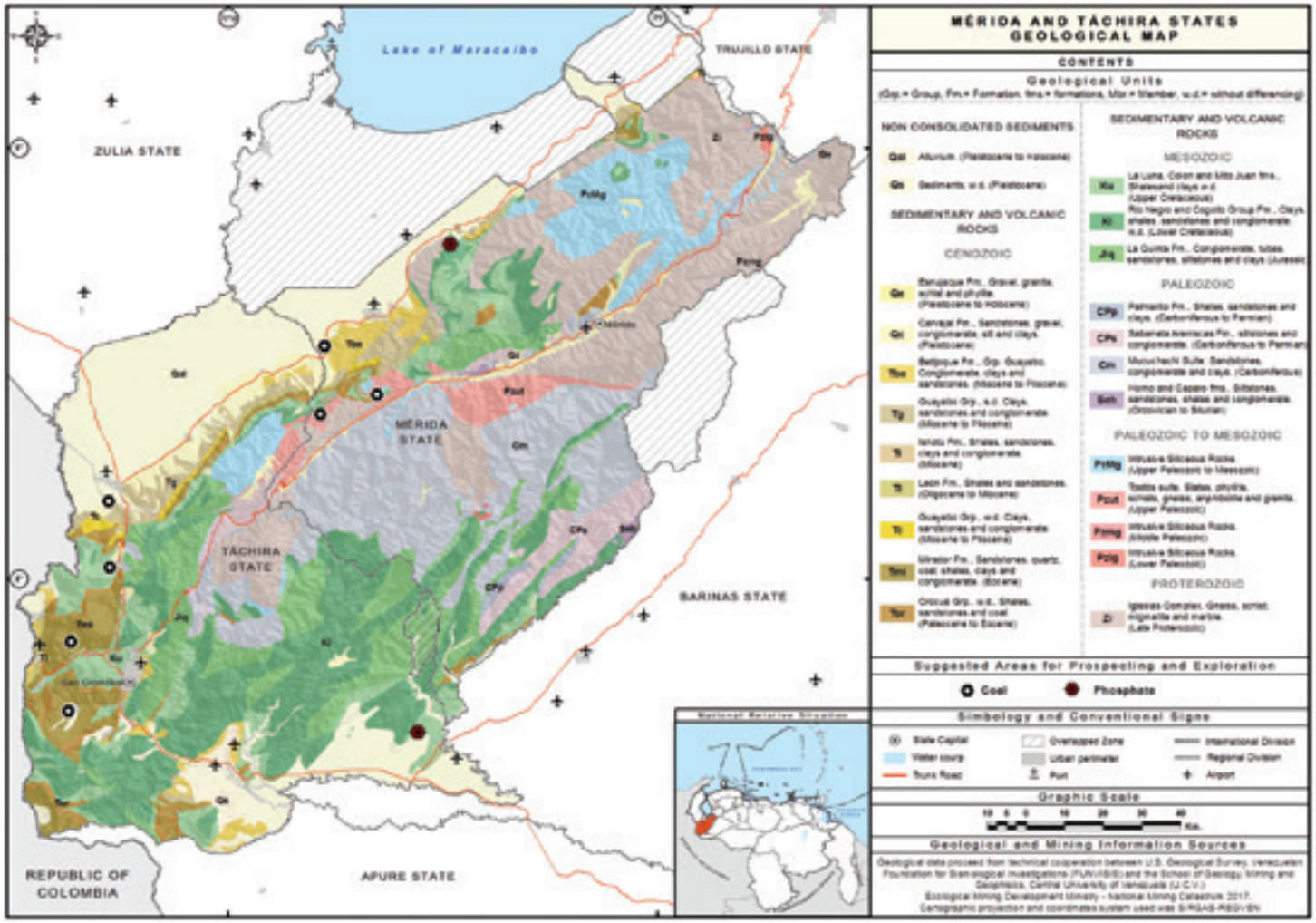
2008: 266 162 t
2009: 362 753 t
2010: 76 153 t
2011: 167 741 t
2012: 162 435 t
2013: 106 354 t
2014: 35 820 t
2015: 26 324 t

Tenors

Reservoir
Los Monos-Tomates: tenor 17% phosphate.
Las Lindas-Los Bancos deposit: tenor 10% phosphates.

Main Uses

- Fertilizers.
- The monazite [(Ce, La, Y, Th) PO4] is another phosphate that is the main ore of thorium (Th), radioactive element that is used to obtain atomic energy.
- They are used in balanced foods and beverages.
- Ceramics, water softeners, cleaning products, soaps, detergents and insecticides, among other uses.



MARBLE

Occurrence and geology

The exploitation of marble in Venezuela takes place in the central states and the deposits belong to the metamorphic series of the Cordillera de la Costa. In our country, white marble deposits are located only in Puerto Cabello and on the island of Margarita, although the Antillean formation commercially presents a carbonated zone, in which the dolomitic levels are included by a thick crystallized, dense, homogeneous dolomitic limestone, solid, varying between white and very light gray. The layer is stratigraphically located between schistose zones. In Southeast Falcon, there is an important reserve of brown marbles, currently exploited by the private industrial sector.

Resourses/ reserves

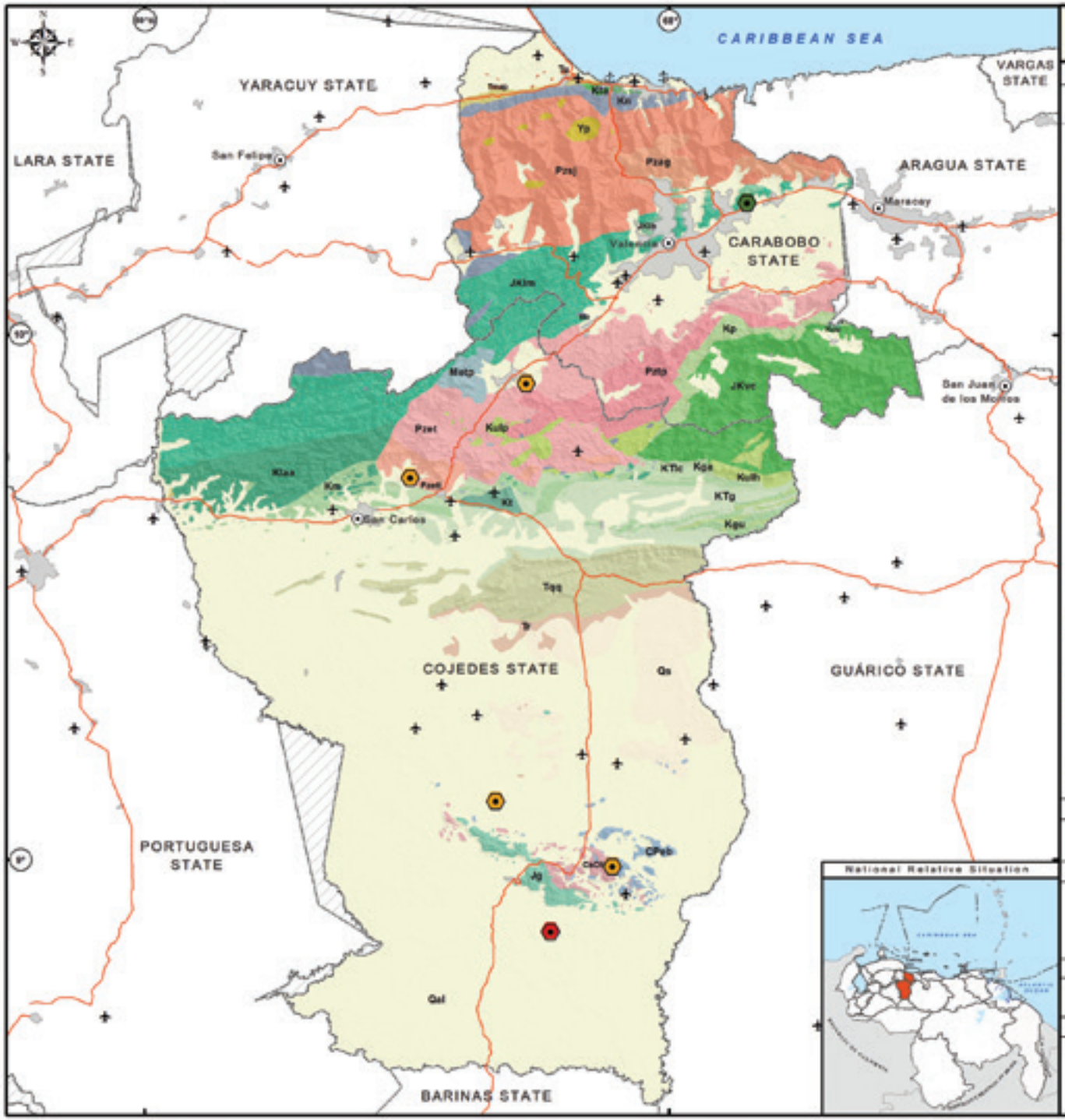
There are no data available on marble resources and reserves in the national territory.

Production

Since 1993, no information is available on the volumes produced by companies producing this mineral because of the contemplated in the Organic Law on Decentralization, Limitation and Transfer of Jurisdiction of Public Power, in Article 11, ordinal 2, wherein States are transferred to the exclusive jurisdiction in the regime, administration and exploitation of construction and ornamental stones or of any other species, in which marble is included. Therefore, many marble producing companies do not report the volume produced to the respective ministry, but to the administration of the state where the exploitation of the mineral takes place.

Main Uses

- As ornamental rock in cemeteries (tombstones), in churches, in floors, sculptures, etc.
- Being polished or sculpted is what makes its great use in construction, decoration and beautiful sculptures.
- Its great brightness without any addition, depending on the type of marble, makes it of great sculptural and decorative value, valued since antiquity.
- Also used for cements, ceramic materials, obtaining lime, for loading, portland cement manufacturing, in the chemical industry, as flux in metal mines, in the optical industry, among others.



COJEDES AND CARABOBO STATES GEOLOGICAL MAP

CONTENTS

Geological Units

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NON CONSOLIDATED SEDIMENTS

- Qal — Aluvium. (Pleistocene to Holocene)
- Qs — Sediments without differencing. (Pleistocene)

SEDIMENTARY AND VOLCANIC ROCKS

CENOZOICO

- Tmap — Maporita Fm., Conglomerate, sandstone, clays, shale and marlstone. (Miocene to Pliocene)
- Tgq — Quebradón fms., Guiamare, Naricual w.d., Shales, sandstone and conglomerate, claystone. (Oligocene a Miocene)
- Tr — Robleclo Fm., Shales. (Eocene to Miocene)
- Tu — Urama Fm., Shales, sandstones and limestones. (Eocene)

MESOZOIC TO CENOZOIC

- KTg — Guárico Fm., Sandstones, shales, limestones, w.d. (Cretaceous to Eocene)
- KTlc — Los Cajones Mbr. Guárico Fm., sandstones, shales, limestones. (Cretaceous to Eocene)

MESOZOIC

- Kga — Garrapata Fm., Conglomerate, sandstones, siltstone, shales and limestones. (Upper Cretaceous).
- Km — Mucaria Fm., Shales and limestones. (Upper Cretaceous)
- Kl — Volcanicals of theTiramuto. Metatobas, lavas, tuffaceous siltstone and flanitic shales (Cretaceous)
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- Kgu — Guayuta Grp, w.d. Shales and limestones. (Upper Cretaceous)

METAMORPHIC AND INTRUSIVE ROCKS

MESOZOIC

- Mo — Ultramafic rocks. (Mesozoic)

METAMORPHIC AND INTRUSIVE ROCKS

MESOZOIC

- Kulp — Las Placitas Phyllite, Pilancones volcanics, w.d. (Upper Cretaceous)
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- JKvc — Villa de Cura volcanosedimentary w.d (Cretaceous)
- JKm — Las Mercedes and Chuspita Schists, w.d., Caracas Metasedimentary. (Jurassic to Cretaceous)
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Feldspar · Granite · Marble

Simbology and Conventional Signs

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Graphic Scale

10 5 0 10 20 30 40 Km.

Geological and Mining Information Sources

Geological data proceed from technical cooperation between U.S. Geological Survey, Venezuelan Foundation for Sismological Investigations (FUNVISIS) and the School of Geology, Mining and Geophisics, Central University of Venezuela (U.C.V.)
Ecological Mining Development Ministry - National Mining Catastrum 2017.
Cartographic proyection and coordinates system used was SIRGAS-REGVEN

Cartography and scale in the Venezuelan mining project

The official reference cartography available in Venezuela consists of coverage indexes at scales 1: 500 000, 1: 250 000, 1: 100 000 and 1: 25 000, which were developed using analogical restitution methods during the last four decades of the 20th century. At the end of which the digital component was introduced in the processes inherent to the preparation and publication of territorial information, giving rise to ortho-rectified collections at a scale of 1: 25 000 and 1: 50 000. Of note in this regard are the Cartosur I and Cartosur II projects, developed by the Simon Bolivar Geographical Institute of Venezuela, based on the processing of radar images at a scale of 1: 50 000 for the entire Guayanian Massif, a cartographic base that is being complemented and updated using products from the Venezuelan satellites Miranda and Sucre.

For the development of mining in Venezuela, the use of remote sensing in the processes of cartographic nature associated to the formulation, execution, monitoring and control of the different sectoral projects, flag approach, which is part of the vision of the project, is particularly strategic. Ministry of Popular Power for Ecological Mining Development, in perfect synchrony with the Bolivarian Agency for Space Activities (BASA), the governing body on the subject.

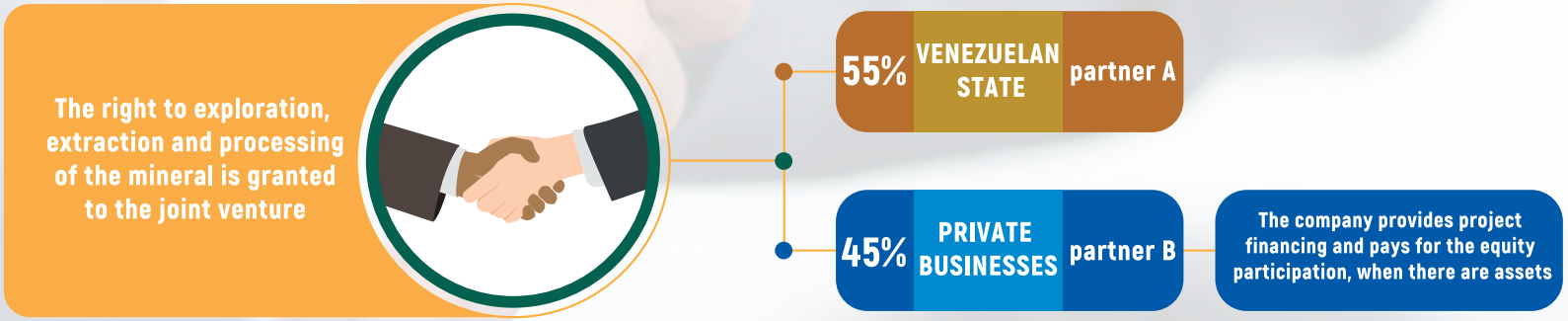
The updating of the coverage index at a scale of 1: 50 000 will allow the standardization of territorial information databases, generated by institutions with associated competences, such as environment, agriculture, land, indigenous communities, security and defense, integrating in a single compendium, the base information required for the promotion of prospecting and mining exploration projects.

Business models

Formation of joint ventures

The formation of joint ventures is carried out through an association between the Bolivarian Republic of Venezuela through the Venezuelan Mining Corporation (CVM), with other public or private organizations, national or international, in which the Venezuelan State (partner A) has a participation of not less than 55% of the share capital and the private (partner B) the remaining 45%.

The participation of partner B is constituted by the contributions of the financing of the project and the assets contributed for the productive process. The State will grant the joint venture the rights to explore, extract and process the minerals, through the Ministry of People's Power for Ecological Mining Development.



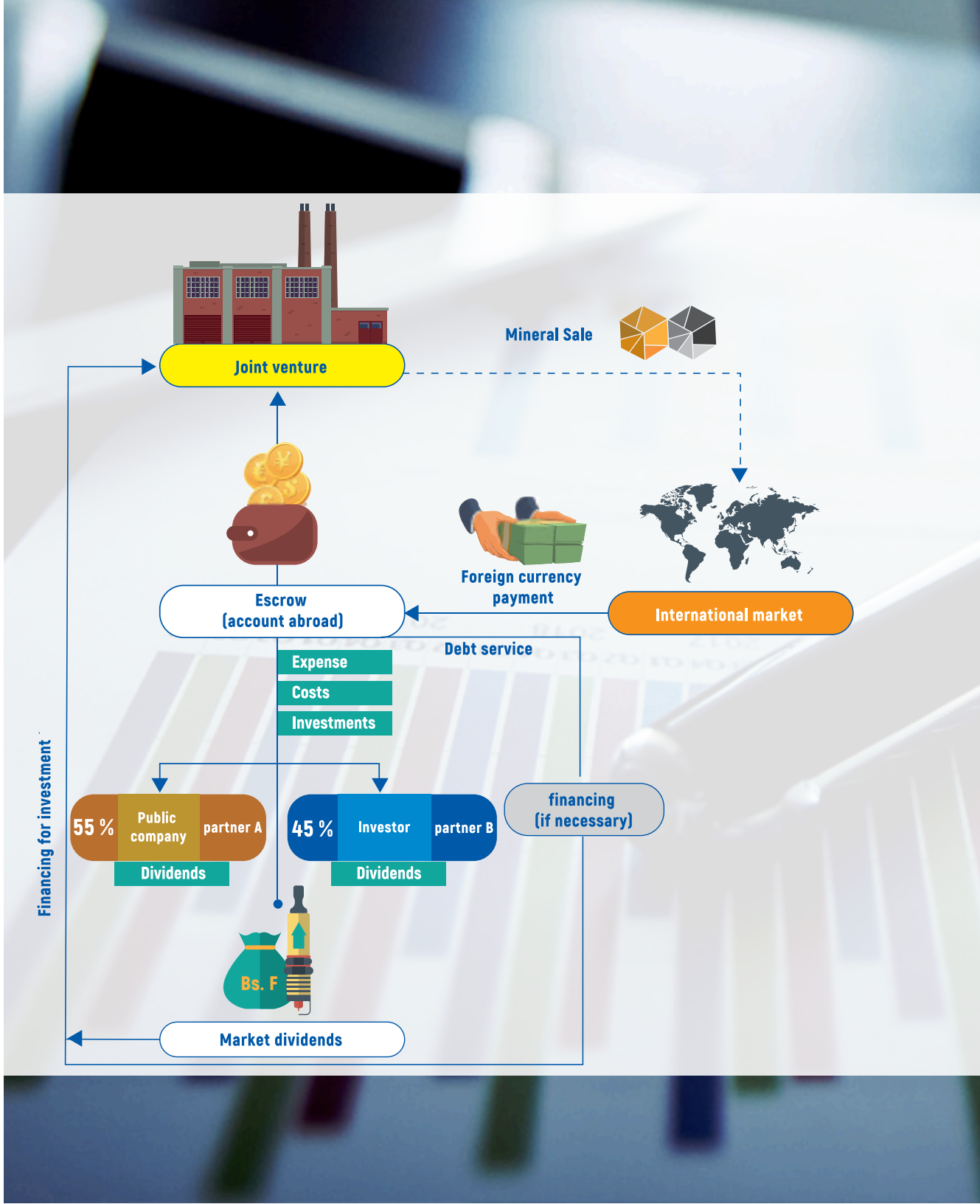
Once the joint venture has been established, partner B may carry out sales and commercialization of minerals in international markets, on behalf of the joint venture. These transactions are made in foreign currency and deposited in a trust in a bank abroad, jointly between partner A and partner B in the name of the joint venture; likewise, the trust will operate according to the following premises.

- **Payment of operations of the mixed company:** Transfer of funds to cover costs and expenses, as well as new investments of the company.

- **Payment of obligations:** Transfer of funds for the payment of fiscal and parafiscal contributions.

- **Debt service:** Collection and transfer of the resources necessary for the execution of the project, either provided by the partners or by an external financier, as well as the payment of the principal and interest corresponding to the acquired debt.

- **Distribution of dividends:** Transfer of funds to members according to their shareholding (55% to partner A and 45% to partner B).



Strategic alliances

The strategic alliance constitutes a cooperation mechanism between the Bolivarian Republic of Venezuela, through the Venezuelan Mining Corporation (CVM), and public or private organizations, to combine efforts, strengths and abilities, in order to obtain goods, services or works associated with the mining value chain.

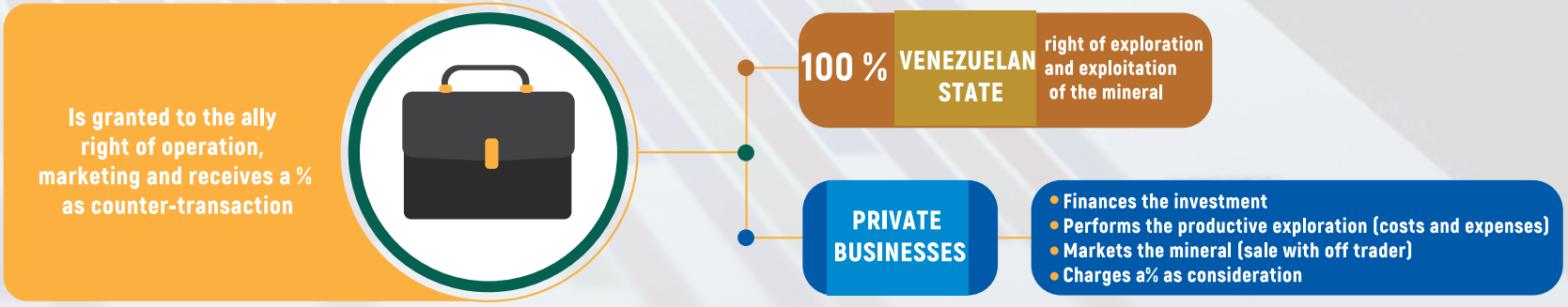
The strategic alliance operates in accordance with the following premises:

The state:

- It keeps the property at 100%.

The public or private organization:

- Finance the investment.
- Perform the productive operation.
- Market the mineral.
- It charges a percentage of the profits obtained.



Main joint ventures constituted by the Ministry of People's Power for Ecological Mining Development

- **Blue Gold Ecosocialist Mining Joint Venture:** Established to carry out exploration of coltan, in which the national company SUPRACAL, C.A., participates with 40 years of experience, dedicated to the manufacture and distribution of lime, in its different shades: quick lime, hydrated lime, agricultural lime and lime paste. Also, currently develops a wide experience in the manufacture and distribution of electrical materials throughout the national territory.

- **Parguaza Ecosocialist Mining Joint Venture, A.S:** Constituted to conduct exploration of coltan, in which the national company Corporación Faoz, C.A. participates.
- **Siembra Minera Ecosocialist Mining Joint Venture:** Constituted for the development of the Brisas-Cristinas Auriferous Project in the state of Bolívar, in southeastern Venezuela. The company Gold Reserve Inc. participates in the business of acquisition, exploration and development of mining projects. The company is the successor issuer of the Gold Reserve Corporation that was founded in 1956.

Tax premises for mineral exploitation projects

MINERAL EXPLOITATION PROJECT FISCAL PREMISES			
CONCEPT	**ALICUOTA (%)**	**TAXABLE BASE**	**LEGAL BASE**
Science and Technology Tax	0,5	Gross income Previous year	Law of Science and Technology
Sports Tax	1	Net Income from Exercise	National Sports Law
Sports Tax	1	Operating Profit for the Year	National Anti-drug Law
Income Tax (ISLR by its initials in Spanish)	34	Net Income from Exercise	Law of income tax
Value Added Tax (VAT)	12	National Purchase Value	Law of Value Added Tax
Council tax	Range between 15 and 10	Gross Income from Exercise	Ordenanza Municipal
Operating Tax (Except Gold-Coltan-Diamond)	3	Commercial Value in Mina	Municipal Ordinance
Special Advantage	3	Gross Income from Exercise	
Social Mining Fund	0,5	Gross Income from Exercise	
Royalties	Range between 3 and 13	Gross Income from Exercise	Gold Law (Deductibles of the ISLR by its initials in Spanish)

Legal framework of the mining sector in Venezuela

Companies interested in forming a joint venture or strategic alliance with the Bolivarian Republic of Venezuela, to develop mining activities, should take into account the regulatory framework that governs the matter in our country:

- Constitution of the Bolivarian Republic of Venezuela (CRBV).

- Mining Law and its Regulations, published in Official Gazettes No. 5382, dated September 28th, 1999, and No. 37 155, dated March 9, 2001, respectively.

- Organic Law of the Environment, published in Official Gazette Extraordinary No. 5 833 dated December 22nd, 2006.

- Criminal Law of the Environment, published in Official Gazette No. 39 913, dated May 2nd, 2012.

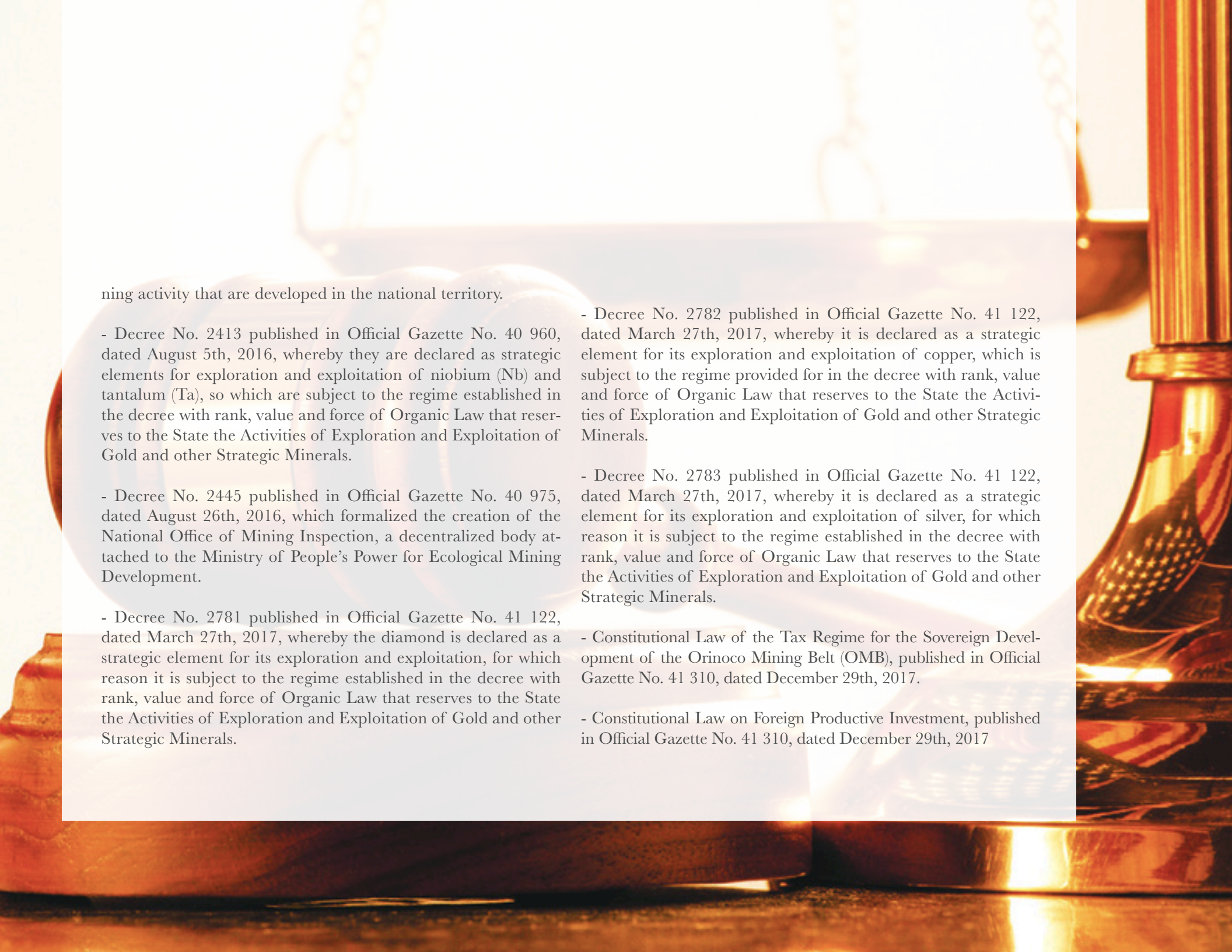
- Decree No. 9052 published in Official Gazette No. 39 945, dated June 15th, 2012, whereby the decree is issued with the rank, value and force of Law that regulates and promotes the new joint associative forms between the State, the community and private initiative for the development of the national economy.

- Decree No. 2165 published in Official Gazette Extraordinary No. 6210, dated December 30th, 2015, whereby the decree is issued with the rank, value and force of an Organic Law that reserves to the State the Exploration and Exploitation Activities of the Gold and other Strategic Minerals.

- Decree No. 2248 published in Official Gazette No. 40 855, dated February 24, 2016, whereby the creation of the National Strategic Development Zone Arco Minero del Orinoco was formalized.

- Decree No. 2350 published in Official Gazette No. 40 922 dated June 9th, 2016, through which the Ministry of People's Power for Ecological Mining Development was created.

- Decree No. 2412 published in Official Gazette No. 40 960 dated August 5th, 2016, which prohibits the use, possession, storage and transportation of mercury (Hg) as a method of obtaining or treating gold and any another metallic or non-metallic mineral, in all the stages of the mi-



ning activity that are developed in the national territory.

- Decree No. 2413 published in Official Gazette No. 40 960, dated August 5th, 2016, whereby they are declared as strategic elements for exploration and exploitation of niobium (Nb) and tantalum (Ta), so which are subject to the regime established in the decree with rank, value and force of Organic Law that reserves to the State the Activities of Exploration and Exploitation of Gold and other Strategic Minerals.

- Decree No. 2445 published in Official Gazette No. 40 975, dated August 26th, 2016, which formalized the creation of the National Office of Mining Inspection, a decentralized body attached to the Ministry of People's Power for Ecological Mining Development.

- Decree No. 2781 published in Official Gazette No. 41 122, dated March 27th, 2017, whereby the diamond is declared as a strategic element for its exploration and exploitation, for which reason it is subject to the regime established in the decree with rank, value and force of Organic Law that reserves to the State the Activities of Exploration and Exploitation of Gold and other Strategic Minerals.

- Decree No. 2782 published in Official Gazette No. 41 122, dated March 27th, 2017, whereby it is declared as a strategic element for its exploration and exploitation of copper, which is subject to the regime provided for in the decree with rank, value and force of Organic Law that reserves to the State the Activities of Exploration and Exploitation of Gold and other Strategic Minerals.

- Decree No. 2783 published in Official Gazette No. 41 122, dated March 27th, 2017, whereby it is declared as a strategic element for its exploration and exploitation of silver, for which reason it is subject to the regime established in the decree with rank, value and force of Organic Law that reserves to the State the Activities of Exploration and Exploitation of Gold and other Strategic Minerals.

- Constitutional Law of the Tax Regime for the Sovereign Development of the Orinoco Mining Belt (OMB), published in Official Gazette No. 41 310, dated December 29th, 2017.

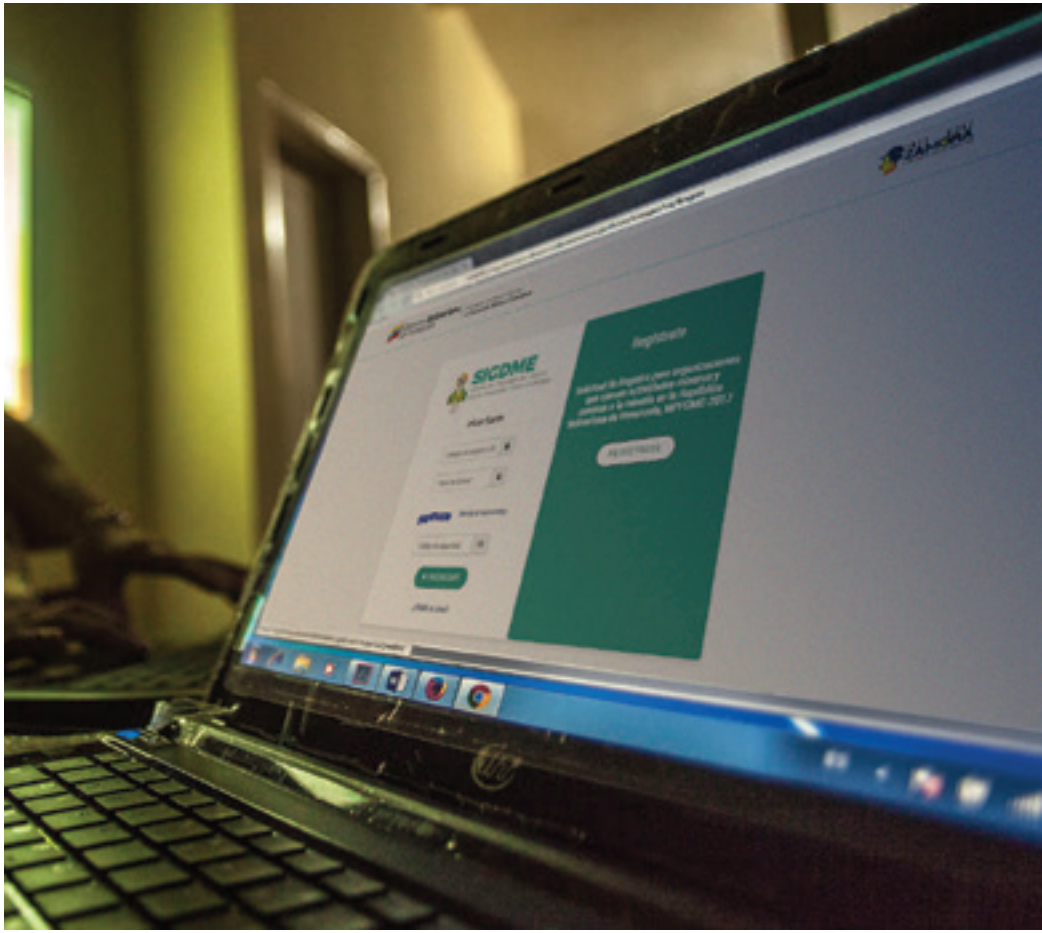
- Constitutional Law on Foreign Productive Investment, published in Official Gazette No. 41 310, dated December 29th, 2017

Information and Communication Technology at the service of mining in Venezuela

The Bolivarian Government, through the Ministry of People's Power for Ecological Mining Development, complying with the provisions of Decree 2165 published in Official Gazette No. 6210, dated December 30, 2015, by means of which the decree is issued with Range, value and force of Organic Law that reserves to the State the Activities of Exploration and Exploitation of Gold and other Strategic Minerals, has advanced all the activities necessary to put the Unique Mining Registry system into operation, in accordance with the following:

> Article 41: The Unique Mining Registry is created, attached to the Ministry of Popular Power with competence in the area of mining, which will have as its function the administration and management of information, monitoring and control of natural and legal persons of a public or private nature. develop the activities reserved in this decree with rank, value and force of law. The Ministry of Popular Power in the matter of mining will be responsible for designing, activating, controlling and unifying in a single computing platform any record associated with the primary, related or auxiliary activities that exist around gold and other strategic minerals.

To comply with the aforementioned decree, the Ministry, through its Technology Information Office, has developed the Integrated



Management System for Ecological Mining Development (SIGDME by its initials in Spanish).

The SIGDME is composed of five large areas of attention, the main one being the Unique Mining Registry (RUM by its initials in Spanish), whose main objective is the identification of all public and private companies, national and international, whose economic activity is related to mining, including all related activities of this area..

The second objective of SIGDME is the identification of minerals, mines, and areas of mining exploitation, which is linked to the Venezuelan catalog of Economic Activities and the of Venezuelan catalog of Mining Products prepared by the National Institute of Geology and Mining (INGEOMÍN by its initials in Spanish) in partnership with the National Institute of Statistics (INE by its initials in Spanish)

The third element is the management of mining projects, when integrated into the geographic information module, will efficiently manage all cadastral data. And, finally, there is the Digital Management of Mining Procedures, which will automate the generation of all the guides of mobilization and inspection of the entire mining area and collection of taxes.

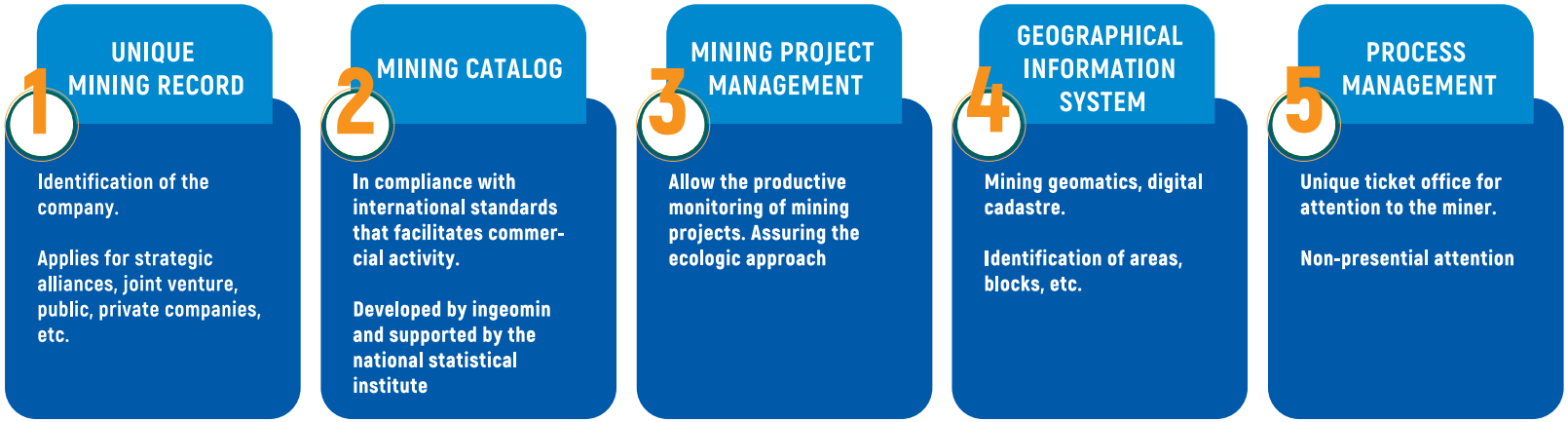
Who must register in the Single Mining Register?

All natural and legal persons of public or private nature that develop primary, related and auxiliary activities related to mining, from small, medium and large mining.

The registration is made through the web portal of the Ministry of the Popular Power for Ecological Mining Development *(http://desarrollominero.gob.ve)*, in the Integrated System of Management and Ecological Mining Development (SIGDME), in which registration is made and the data requested from the company is loaded in a reliable and private manner.

During November 2017, the first stage of the UPRM began to operate, which allowed updating the data at the national level of the people and companies dedicated to the mining sector, as well as to better characterize this sector and identify the strengths and shortcomings existing, for better management and planning of mining activity in Venezuela.

Source: OTIC, 2017



Documents and information required from foreign companies for the formation of joint ventures or strategic alliances

Legal aspects

Certified copy of the following documents:

- Registration in the Unique Mining Registry (UMR).

- Identification document of the national or international company, articles of incorporation / bylaws and modifications, duly registered with a certified translation and apostilled when it was in a language other than Spanish.

- Shareholders' book or minutes of assemblies where there are modifications of commercial name, object, stock composition and capital increases or decreases, updates of the board of directors or any other requested by the MPPDME. With certified translation and apostille when it was in a language other than Spanish.

- Legal document stating the identity and character with which he acts on behalf of the company, with certified translation and apostille when he was in a language other than Spanish, accompanied by a copy of his identity document (identity card or passport).

- Curricular synthesis with photographic image of the legal representative of the company or person authorized by it to celebrate the act in question.
- Declaration under oath that the capital of the investment plan comes from activities of legitimate commercial nature, with certified translation and apostille when it was in a language other than Spanish.

- Companies or companies that express their intention to associate with the Bolivarian Republic of Venezuela to set up a joint venture to explore, certify reserves and exploit minerals, must comply with the provisions of articles 18 and 19 of the decree with the rank and force of the Law of Mines.

Legal aspects (consortium or alliances)

Certified copy of the following documents:

- In case the company is a consortium (alliance), each of its members will provide the information requested in the legal aspects mentioned above.

- Additionally, probative document of the consortium relationship (alliance) between the indicated companies, with certified and apostilled translation, when it was in a language other than Spanish.

- Document of authorization of the consortium (alliance) to begin negotiations with the Bolivarian Republic of Venezuela for a possible joint venture to explore, certify and exploit the reserves of the selected mineral, with certified translation and apostille, when it was in a language other than Spanish.

Financial aspects of the company

- Audited financial statements of the last three years of the company (imperative), with certified translation and apostille when they were in a language other than Spanish.

- Declaration of ISLR (income tax) of the last three years of the applicant company, with certified and apostilled translation when it was in a different language than Spanish.

- Descriptive report and management report of the last three years of the company, indicating experience in mining projects and any other information that demonstrates its technical, economic and financial capacity in the mining sector.

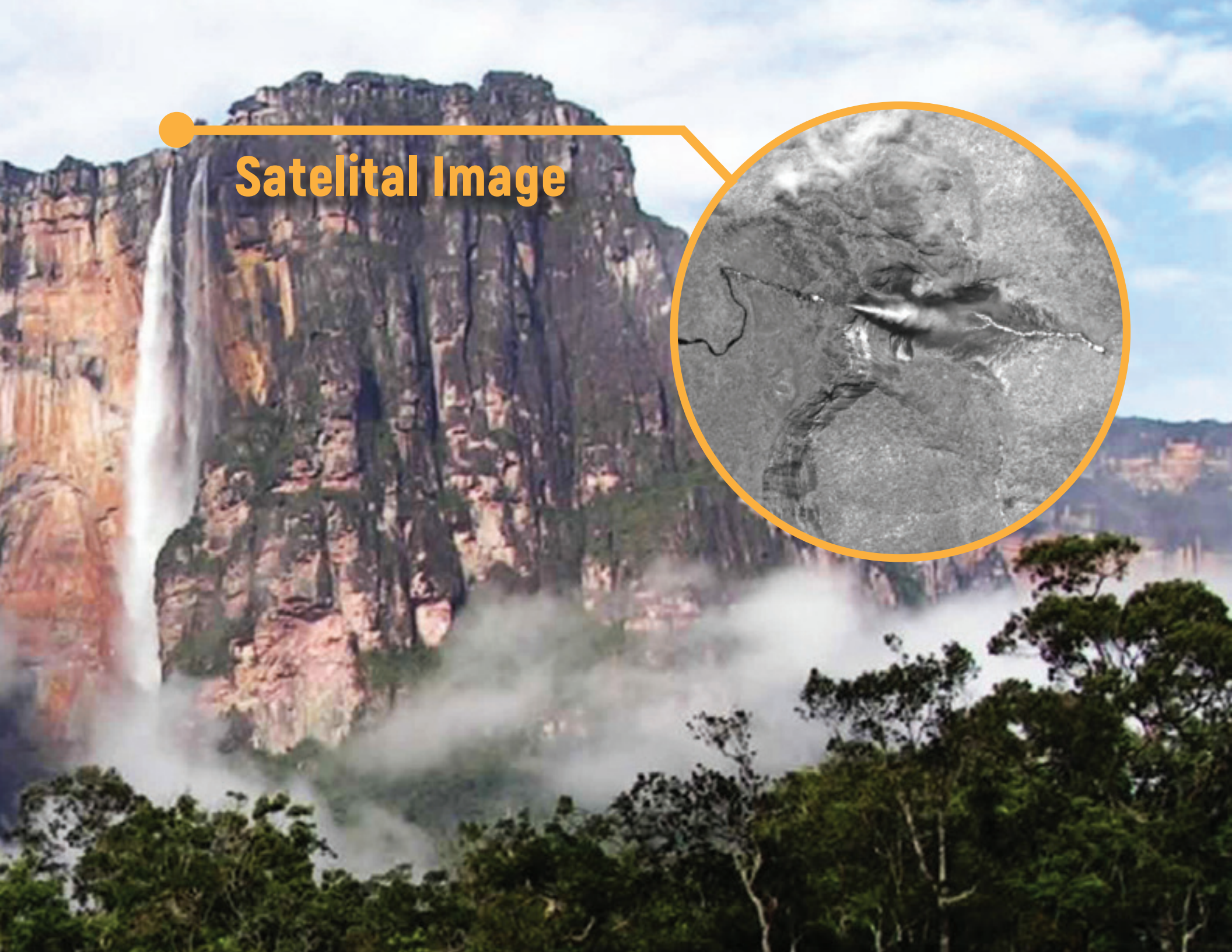
Technological challenges for ecological mining development

In Venezuela, the mining activity is being carried out with greater responsibility in different aspects. In terms of technological challenges, they consist of the practice of mineral extraction in a responsible manner, which ranges from the planning and organization of the territory, the redefinition of work areas, incorporation of clean technologies and efficient consumption of resources (using less energy, less water), co-responsibility in complying with environmental laws, training and guaranteeing the participation of indigenous peoples and communities, up to the compensation of damages that in the past the irresponsible mining activity left us.

Since it is impossible to select the places where the mineral deposits are located, it is necessary to establish a model of mining development that is sustainable, where the extraction of minerals is carried out in a responsible manner; for this it is necessary to plan knowing the potentialities and restrictions of the physical, social and cultural characteristics of a region.

The satellite Antonio José de Sucre, acronym VRSS-2, is the third that Venezuela placed in orbit. Its objective is to take high resolution images of the Venezuelan territory and surrounding areas. Its cameras, one with a high panchromatic and multispectral spectrum and another infrared, will be used to observe soil, biodiversity, hydrography and human settlements in greater detail.

The Sucre Satellite comes to perfect a work done by the Miranda satellite over these five years, both for the exploration of mining and the protection of our borders and to strengthen the work of the Orinoco Mining Arc, with more information and data for specify better actions in the economic and productive development of the country.


Satelital Image

Incorporation of Clean Technologies

The Ministry of People's Power for Ecological Mining Development evaluates the development of new technologies to extract gold from the Orinoco Mining Belt (Bolívar State) in a way that is more environmentally responsible and efficient. The strategy focuses on thinking about an engineering with a planetary conception, whose main characteristics are to be sustainable, taking into account variables such as climate change, the inversion of magnetic poles, the dramatic importance of energy and water, as well as relations with communities; therefore, companies require more reliable, safe and sustainable processes.

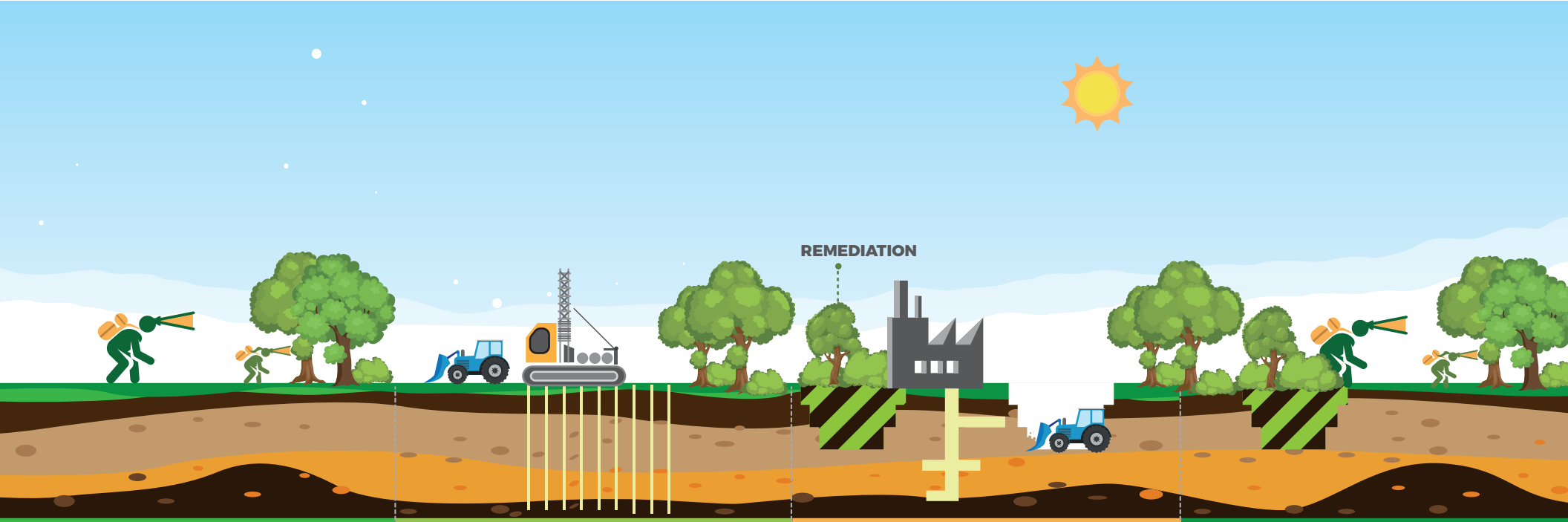
Currently, as a incorporation of clean technologies, cyanidation plants are being used, completely eliminating the use of mercury as a processing method in the production of gold, complying with Decree 2412 published in the Official Gazette of the Bolivarian Republic of Venezuela. No. 40 960 dated August 5th, 2016.

With the support of allied research institutes, such as the Foundation Institute of Engineering for Research and Technological Development (FIIIDT), the Venezuelan Institute for Scientific Research (IVIC), the Institute for Advanced Studies (IDEA), engineering developments are being designed to enable a better recovery of the mineral, without the use of chemicals, through gravimetry and electromagnetism, ensuring that its operation requires less water, less energy and causes less damage to the environment.

Prospecting

- Remote sensors,
- geomatic.
- Potential methods of geophysics,
- Geography,
- Remote sensing

7 Months



Exploration

- Calicatas
- Perforations,
- Cores,
- Sample and analysis, chemical and geologica

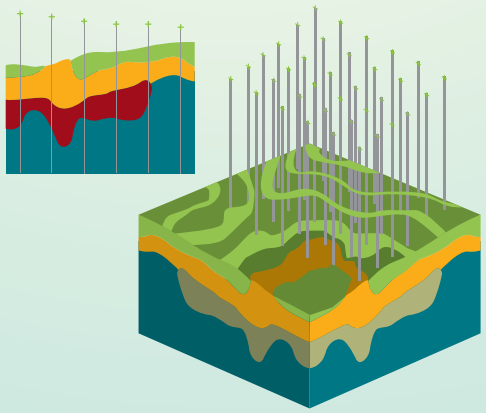
Requirements

- TDR environmental
- Requirements,

2 Years

Certification

- Geological Model
- Mine Model
- Reservecalculatio



1 Years

Exploitation

- Extraction
- Processing
- Marketing
- Supply

75-100 Years

Exploration

Relevant Actions:

- Mitigation
- Environmental remediation

Cycle Restart

Environmental responsibility

Remediation and recovery of areas degraded by irresponsible mining

With the support of research institutes in Venezuela and other countries, lines of research are being developed on techniques of remediation and recovery of areas degraded by the liabilities of the irresponsible inherited mining, ranging from bioremediation to the subsequent use that must have the areas once recovered.

Fulfilling environmental laws

After the strategic importance of minerals in the world, the Bolivarian Republic of Venezuela has set itself the challenge of solving the growing needs of society in a sustainable manner, without causing depletion or degradation of natural and energy resources, while also avoiding increasing social inequalities ; for this, strict compliance with our environmental regulations must be done.

In this sense, the corresponding environmental and sociocultural impact studies are carried out, as established in the Constitution of the Bolivarian Republic of Venezuela, which have a complete analysis of natural and socio-cultural physical characteristics that allow the establishment of exploration and mining exploitation plans, considering the protection and conservation of areas of high environmental sensitivity from the physical and social point of view. This information allows the identification of the environmental impacts that could be generated after the execution of the projects, to formulate in a technical way the preventive and corrective measures in order to guarantee the sustainability of the mining development.

> Article 129 of the Bolivarian Constitution of Venezuela: All activities likely to cause damage to ecosystems must be previously accompanied by environmental and socio-cultural impact studies. (...)

In the contracts that the Republic celebrates with natural or juridical persons, national or foreign, or in the permits that are granted, that involve the natural resources, it will be considered included even if it is not express, the obligation to conserve the ecological balance, to allow access to and transfer of technology on mutually agreed terms and to restore the environment to its natural state if it is changed, in the terms established by law.

Prohibition on the use of mercury

The Bolivarian Government in the constant search to maintain and protect the environment for the benefit of the Venezuelan population, ensuring that they move in an environment free of contamination and considering that mercury is one of the metals susceptible to causing greater environmental damage and risk to the human health and other organisms, issued Decree No. 2412, published in Official Gazette No. 40 960 dated

August 5th, 2016, regarding the prohibition of the use of mercury (Hg):

Article 1: The use, possession, storage and transportation of mercury (Hg) is prohibited as a method of obtaining or treating gold and any other metallic or non-metallic mineral in all stages of the mining activity that take place in the national territory.

On the other hand, in article 3, it is established that the effective fulfillment of the decree must be guaranteed, for which work is being carried out in outreach programs with the small miners and in the populations located within the areas for mining use, for the purposes of mercury and its prohibition. Likewise, technological alternatives for the process of extraction and processing (installation of cyanidation plants with environmental controls, gravimetry methods, among others) are being disclosed and, at the same time, several diagnoses are being made to determine possible areas contaminated by mercury, in order to formulate the corresponding corrective measures.

For the Venezuelan Government, the guarantee of human life and health is paramount and, in this sense, it protects and promotes this indispensable right, for which the regulation and prohibition of contaminating and harmful mining activities for people and the environment.

POTENTIAL FOR DEVELOPMENT OF MINING PROJECTS

AVAILABILITY FOR THE ENERGETIC SUPPLY OF DIVERSE SOURCES:
HYDROELECTRICITY, GAS AND FUEL

INFRASTRUCTURE OF LAND, SEA AND AIR TRANSPORT:
HIGHWAYS, ROADS, ROADS, PORTS AND AIRPORT

PROFITABLE MINING PROJECTS THAT MEET INTERNATIONAL STANDARDS

GEOGRAPHICAL LOCATION, WHICH ALLOWS THE APPROACH WITH THE MOST ACTIVE PORTS IN THE WORLD, FAVORING MARKET DIVERSIFICATION

GREAT POTENTIAL OF MINING, METAL AND NON-METALLIC RESOURCES

HIGHLY QUALIFIED AND EXPERIENCED HUMAN RESOURCES

TELECOMMUNICATIONS:
TELEPHONY, INTERNET AND SATELLITE TECHNOLOGY

MOTOR MINERO

#ConCienciaDePueblo



Gobierno
Bolivariano
de Venezuela

Ministerio del Poder Popular
de **Desarrollo Minero Ecológico**