Colombian Electric Power System

New Projects

Latest Investment Opportunities
1. Invest in Colombia.
2. Colombia’s Electricity Sector.
4. Public calls. How does it work?
1. Invest in Colombia

2. Colombia’s electricity sector


4. Public calls. How does it works?

5. Public calls. New projects
Colombia’s worldwide headlines

Bloomberg and Forbes highlighted Colombia as an investment focal point

Colombia: A rediscovered country
For decades the rugged Andean landscape harboured crime and violence, but today regional pride is emerging in a revived economy.

Colombia Rising

Colombia: Latin America’s rising star

Colombia is one of the countries with the biggest potential for foreign investment
Why invest in Colombia?

- In terms of population, Colombia is twice as populous as Australia and bigger than all Central America.
- In Colombia 55% of the population is less than 30 years old. There are seven metropolitan areas with over one million people.
- Colombia is the world’s second most biodiverse country and is among the 12 megadiverse countries of the planet.
- Colombia is the only country in South America with access to both, the Atlantic and the Pacific ocean.
- Colombia has preferential access to more than 1.5 billion consumers, due to international trade agreements.

Source: Proexport
Why invest in Colombia?

- **Economic Stability**
- **Highly Qualified Manpower** (Technical and Professional)
- **Stable Legal System**
- **Export Platform and Privileged Access to World Markets** (FTAs with almost 50 countries, including Korea, European Unión, Canada and USA).
Why invest in Colombia?

Special Arrangements to Boost Foreign Trade

Infraestructure

Respect for Private and Intellectual Property.

Stable Democracy (National Security and Peace Process Breakthroughs)
Why invest in Colombia?

The Top 3 Risk Rating Agencies awarded Investment Grade to Colombia.

Source: Proexport
Economic indicators

GDP growth: 4.2%. December 2012

Exports of Goods and Services: US$ 60,667 MM
5.7% growth rate
Unemployment rate 9.6%. December 2012

Controlled inflation 2.4%

Colombia’s economy has achieved to stay afloat with positive economic growth, even better than other major economies in Latin America.
Foreign Companies in Colombia
1. Invest in Colombia

2. Colombia’s electricity sector


4. Public calls. How does it works?

5. Public calls. New projects
## Colombia’s electricity sector

<table>
<thead>
<tr>
<th>Management and Policy</th>
<th>Ministry of Mines and Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>Mining and Energy Planning Unit</td>
</tr>
<tr>
<td>Regulation</td>
<td>Energy and Gas Regulatory Commission</td>
</tr>
<tr>
<td>Surveillance</td>
<td>Superintendent of Public Services</td>
</tr>
<tr>
<td>System Operation and Market Administration</td>
<td>XM - Markets Experts</td>
</tr>
<tr>
<td>Technical Consulting</td>
<td></td>
</tr>
</tbody>
</table>

- Planning Advisory Committee of Transmission - CAPT
- National Operation Council - CON
- Advisory Committee for Coordination and Follow Country Energy Situation - CACSSE
Composition of Colombian electricity sector

GENERATION (G)
Energy production from primary sources

Wholesale Market
- Competition on short-term deals, the Energy Exchange
- Competition in contract offers to retailers and large customers

TRANSMISSION (T)
Energy transport at voltage levels above 220 kV

Regulated Revenue
- Natural monopoly
- Competition for the expansion since 1999
- Free access to the network
- National stamp fee
- National collection and distribution of revenue to owners through the LAC (XM)
DISTRIBUTION (D)
Energy transport at voltage levels below 220 kV

Regulated Charges
- Natural monopoly
- Maximum Charges regulated by voltage level for each regional and local system
- Subtransmission Remuneration: Maximum income
- Payment Distribution: Maximum Charges

COMMERCIALIZATION (C)
Purchase of energy in the wholesale market and retail sales for users. Trade cycle management the customers

Energy purchase Sale and Customer Management
- Transfer of the purchase price to the fare
- Regulated charges for the regulated market
- Open range to the unregulated market

Distribution networks.

City of Bogotá D.C.
Numbers of the sector in Colombia

<table>
<thead>
<tr>
<th>CONCEPT</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>US $ 472 Billion</td>
</tr>
<tr>
<td>GDP growth</td>
<td>4.20%</td>
</tr>
<tr>
<td>Natural Gas proved reserves</td>
<td>5.73 Tcft</td>
</tr>
<tr>
<td>Oil proved reserves</td>
<td>2377 MBBL</td>
</tr>
<tr>
<td>Coal Reserves</td>
<td>16.643 MTon</td>
</tr>
<tr>
<td>Generation capacity</td>
<td>14.360MW</td>
</tr>
<tr>
<td>Energy demand</td>
<td>59.366 GWh</td>
</tr>
<tr>
<td>Peak power load</td>
<td>9.504 MW</td>
</tr>
<tr>
<td>Peak power demand growth</td>
<td>6.58%</td>
</tr>
<tr>
<td>Energy traded in the stock market</td>
<td>17.019 GWh</td>
</tr>
<tr>
<td>Declared firm energy for the reliability charge</td>
<td>61.175 GWh</td>
</tr>
<tr>
<td>Total energy traded</td>
<td>84.195 GWh</td>
</tr>
<tr>
<td>Value of the transactions carried out in the energy market</td>
<td>US$ 5.7 Billion</td>
</tr>
<tr>
<td>Activity</td>
<td>Registered</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Generation agents</td>
<td>50</td>
</tr>
<tr>
<td>Transmission agents</td>
<td>11</td>
</tr>
<tr>
<td>Distribution agents</td>
<td>30</td>
</tr>
<tr>
<td>Commercialization agents</td>
<td>92</td>
</tr>
<tr>
<td>Regulated users borders</td>
<td>7.189</td>
</tr>
<tr>
<td>Nonregulated users borders</td>
<td>5.422</td>
</tr>
<tr>
<td>Street lighting border</td>
<td>403</td>
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</tbody>
</table>
**Numbers of the sector in Colombia**

<table>
<thead>
<tr>
<th>Generation Capacity</th>
<th>Capacity</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>Capacity</td>
<td></td>
</tr>
<tr>
<td>Hydraulic</td>
<td>9,315</td>
<td>64%</td>
</tr>
<tr>
<td>Thermal</td>
<td>4,515</td>
<td>31%</td>
</tr>
<tr>
<td>Smaller (&lt;= 20 MW)</td>
<td>662.3</td>
<td>4.6%</td>
</tr>
<tr>
<td>Cogeneration</td>
<td>63.4</td>
<td>0.4%</td>
</tr>
<tr>
<td>Total generation capacity</td>
<td>14,555.7</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

**Installed capacity (2013)**
- 14,555.7 MW
- 9,315 (64%)
- 4,515 (31%)
- 662.3 (4.6%)
- 63.4 (0.4%)

**Generation (Dic 2013)**
- 5,323.3 GWh-month
- 3,621.6 (68%)
- 1,369.5 (25.7%)
- 300.1 (5.6%)
- 32.1 (0.6%)
## Generation Projects Underway

<table>
<thead>
<tr>
<th>Name</th>
<th>Capacity [MW]</th>
<th>Type</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoyá</td>
<td>78</td>
<td>Hydropower</td>
<td>abr-13</td>
</tr>
<tr>
<td>Cucuana</td>
<td>60</td>
<td>Hydropower</td>
<td>oct-13</td>
</tr>
<tr>
<td>Gecelca 3</td>
<td>164</td>
<td>Thermal</td>
<td>dic-13</td>
</tr>
<tr>
<td>Termocol</td>
<td>201.6</td>
<td>Thermal</td>
<td>dic-13</td>
</tr>
<tr>
<td>Sogamoso, unidad 3</td>
<td>266.7</td>
<td>Hydropower</td>
<td>feb-14</td>
</tr>
<tr>
<td>Sogamoso, unidad 3 y 2</td>
<td>533.3</td>
<td>Hydropower</td>
<td>abr-14</td>
</tr>
<tr>
<td>Sogamoso, unidad 3, 2 y 1</td>
<td>800</td>
<td>Hydropower</td>
<td>may-14</td>
</tr>
<tr>
<td>El Popal</td>
<td>19.9</td>
<td>Hydropower</td>
<td>jun-14</td>
</tr>
<tr>
<td>El Quimbo</td>
<td>420</td>
<td>Hydropower</td>
<td>dic-14</td>
</tr>
<tr>
<td>San Miguel</td>
<td>42</td>
<td>Hydropower</td>
<td>dic-15</td>
</tr>
<tr>
<td>Ambeima</td>
<td>45</td>
<td>Hydropower</td>
<td>dic-15</td>
</tr>
<tr>
<td>Carlos Lleras</td>
<td>78.1</td>
<td>Hydropower</td>
<td>dic-15</td>
</tr>
<tr>
<td>Tasajero II</td>
<td>160</td>
<td>Thermal</td>
<td>dic-15</td>
</tr>
<tr>
<td>Gecelca 3.2</td>
<td>250</td>
<td>Thermal</td>
<td>dic-15</td>
</tr>
<tr>
<td>Termonorte</td>
<td>88.3</td>
<td>Thermal</td>
<td>dic-17</td>
</tr>
<tr>
<td>Ituango, unidad 1</td>
<td>300</td>
<td>Hydropower</td>
<td>sep-18</td>
</tr>
<tr>
<td>Porvenir II</td>
<td>351.8</td>
<td>Hydropower</td>
<td>dic-18</td>
</tr>
<tr>
<td>Ituango, unidades 1 y 2</td>
<td>600</td>
<td>Hydropower</td>
<td>dic-18</td>
</tr>
<tr>
<td>Ituango, unidades 1, 2 y 3</td>
<td>900</td>
<td>Hydropower</td>
<td>mar-19</td>
</tr>
<tr>
<td>Ituango, unidades 1, 2, 3 y 4</td>
<td>1,200.00</td>
<td>Hydropower</td>
<td>jun-19</td>
</tr>
<tr>
<td>Ituango, unidades 1, 2, 3, 4 y 5</td>
<td>1,500.00</td>
<td>Hydropower</td>
<td>sep-21</td>
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<tr>
<td>Ituango, unidades 1, 2, 3, 4, 5 y 6</td>
<td>1,800.00</td>
<td>Hydropower</td>
<td>dic-21</td>
</tr>
<tr>
<td>Ituango, unidades 1, 2, 3, 4, 5, 6 y 7</td>
<td>2,100.00</td>
<td>Hydropower</td>
<td>mar-22</td>
</tr>
<tr>
<td>Ituango, unidades 1, 2, 3, 4, 5, 6, 7 y 8</td>
<td>2,400.00</td>
<td>Hydropower</td>
<td>jun-22</td>
</tr>
</tbody>
</table>

### Graph

- **Orange Line**: Generation Capacity
- **Red Line**: Maximum Demand
- **Green Line**: Mean Demand
- **Blue Line**: Minimum Demand
Existing network:

- **220 kV**
- **500 kV**

<table>
<thead>
<tr>
<th>Transmission lines</th>
<th>Length Km</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 - 115 kV</td>
<td>10.267</td>
</tr>
<tr>
<td>138 kV</td>
<td>15.5</td>
</tr>
<tr>
<td>220 - 230 kV</td>
<td>11.679.9</td>
</tr>
<tr>
<td>500 kV</td>
<td>2.436.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24.399.1</strong></td>
</tr>
</tbody>
</table>
1. Invest in Colombia

2. Colombia’s electricity sector


4. Public calls. How does it work?

5. Public calls. New projects
Responsibility on service supply

The State and local authorities function and the provision of service

- Supplying electricity demand under economic criteria and financial feasibility
- Ensure an efficient operation, safe and reliable in the sector activities

What does the Mining and Energy Planning Unit – UPME do?

- It is responsible, among other things, of the electricity demand projections and Generation and Transmission Expansion Plan.

What is the Generation and Transmission Expansion Plan?

The Expansion Plan identifies the scheme deficiencies and determines the expansion in generation and transmission infrastructure

- Generation plants are built by interest and initiative of the agents.
- Transmission projects are built by an investor selected through a public call.
DEMAND PROJECTIONS: POWER AND ENERGY

**GENERATION (indicative)**
- Resource analysis (availability and prices)
- Projects in construction stage and defined expansion
- Scenarios
- Requirements (additional to the Reliability Charge)

**TRANSMISSION (Required)**
- Long Term Overview
- Current network diagnostics
- Medium and short-term analysis
- Signs to Network Operators - STR
- STN Projects Public calls

**Requirements (additional to the Reliability Charge)**
- Energy not supplied
- Network Fatigue
- Reducing losses STN
- Reduced operating costs and restrictions
- Reliability and safety
- Cost of rationing

**Reliability Charge Projects (Auction)**

**Reliability Charge Projects (Auction)**
Generation Capacity Expansion

Expansion by Fuel

Under those assumptions, the system require the installation of 3,100 MW and those established by the Reliability Charge. The first reinforcement it would require in the 2021.
Under those assumptions, the system require the installation of 3,340 MW and those established by the Reliability Charge. The first reinforcement it would require in the 2021.
Between both alternatives, exists a difference of generation capacity around of 240 MW. Anyway for the three demand scenarios the marginal cost of the 4B alternative is less in comparison with the alternative 4. The average savings are 3.37, 6.87 y 6.88 US$/MWh in maximum demand, mean demand and minimum demand.
The interconnection is in operation in 2018 (300 MW)

Hydroelectric Project Chan II (214 MW) – 2020 (Panamá)
Export added throughout the entire period.

The maximum value of exportation is located around 4,350 GWh throughout the 2016. This value represent the 4.5 % of the projected demand for this year.

Between 2016 and 2018, the net energy flow decreases, because during this period Ecuador expected build some generation projects.
Progress:

• Between 2011 and 2012 agreements were signed between the authorities of Bolivia, Chile, Colombia, Ecuador and Peru, in order to promote the development of the electrical integration of the Andean countries.

• Resources were negotiated with the BID for $1.4 MUS in order to develop Planning and Regulatory studies.

• Two studies were contracted:
  ✓ Infrastructure Planning
  ✓ Regulatory Harmonization

• The work is done in 4 phases with 3 deliverables

• Those studies are in the final phase.

• The integration involves high regulatory arrangements and infrastructure investments (500 kV AC and HVDC Technology)
Projects underway

<table>
<thead>
<tr>
<th>PROJECTS</th>
<th>PUBLIC CALL</th>
<th>TRANSMISSION AGENT</th>
<th>OFFER</th>
<th>MILLIONS US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUEVA ESPERANZA 500/230 kV</td>
<td>UPME 01-2008</td>
<td>EPM</td>
<td>$ 20.23</td>
<td></td>
</tr>
<tr>
<td>SOGAMOSO 500/230 kV</td>
<td>UPME 04-2009</td>
<td>ISA</td>
<td>$ 38.60</td>
<td></td>
</tr>
<tr>
<td>ARMENIA 230 kV</td>
<td>UPME 02-2009</td>
<td>EEB</td>
<td>$ 10.43</td>
<td></td>
</tr>
<tr>
<td>ALFREZ 230 kV</td>
<td>UPME 01-2010</td>
<td>EEB</td>
<td>$ 6.45</td>
<td></td>
</tr>
<tr>
<td>QUIMBO 230 kV</td>
<td>UPME 05-2009</td>
<td>EEB</td>
<td>$ 89.23</td>
<td></td>
</tr>
<tr>
<td>CHIVOR II, NORTE, BACATÁ 230 kV</td>
<td>UPME 03-2010</td>
<td>EEB</td>
<td>$ 44.84</td>
<td></td>
</tr>
<tr>
<td><strong>Total Invest</strong></td>
<td></td>
<td></td>
<td><strong>$ 209.79</strong></td>
<td></td>
</tr>
</tbody>
</table>
These projects must be in service between 2015 and 2020.

Defined in the expansion plan 2012-2025
These projects must be in service between 2015 and 2020.

Defined in the expansion plan 2013-2027
### Projects Cost – Public Calls

<table>
<thead>
<tr>
<th>Project</th>
<th>Cost Millions USD $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ituango 500 kV</td>
<td>$ 427,17</td>
</tr>
<tr>
<td>Southwest Area Reinforcement 500 kV</td>
<td>$ 291,69</td>
</tr>
<tr>
<td>Caribbean Coast Reinforcement 500 kV</td>
<td>$ 225,88</td>
</tr>
<tr>
<td>1st Eastern Area Reinforcement 500 kV</td>
<td>$ 186,07</td>
</tr>
<tr>
<td>Guayabal 220 kV</td>
<td>$ 84,65</td>
</tr>
<tr>
<td>2nd Eastern Area Reinforcement 500 kV</td>
<td>$ 84,52</td>
</tr>
<tr>
<td>Chinú - Moteria -Uraba 220 kV</td>
<td>$ 72,82</td>
</tr>
<tr>
<td>La Loma 500 kV</td>
<td>$ 44,42</td>
</tr>
<tr>
<td>Tuluni - Ambeima 230 kV</td>
<td>$ 41,74</td>
</tr>
<tr>
<td>Caracoli 220 kV</td>
<td>$ 38,01</td>
</tr>
<tr>
<td>* Rio Cordoba 220 kV</td>
<td>$ 19,00</td>
</tr>
<tr>
<td>Suria 230 kV</td>
<td>$ 18,31</td>
</tr>
<tr>
<td>Porce III 500 kV Reinforcement</td>
<td>$ 15,57</td>
</tr>
<tr>
<td>2nd Circuit Cartagena Bolivar 220 kV</td>
<td>$ 8,19</td>
</tr>
<tr>
<td>* Complementary works Caracoli 220 kV</td>
<td>$ 5,99</td>
</tr>
<tr>
<td>* Reforma 230 kV</td>
<td>$ 3,90</td>
</tr>
<tr>
<td><strong>TOTAL COST OF PROJECTS</strong></td>
<td><strong>$ 1,564,03</strong></td>
</tr>
</tbody>
</table>

* Projects in definition process
The “expansions” projects, are constructed by the owner of the assets.

<table>
<thead>
<tr>
<th>Projects</th>
<th>Execution mechanism</th>
<th>Cost M USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>FACTs (SVC - STATCOM)</td>
<td>Expansions</td>
<td>$276,05</td>
</tr>
<tr>
<td>Malena 220 kV</td>
<td>Expansions</td>
<td>$8,30</td>
</tr>
<tr>
<td>Caño Limon 230 kV</td>
<td>Expansions</td>
<td>$4,06</td>
</tr>
<tr>
<td><strong>TOTAL COST OF PROJECTS</strong></td>
<td></td>
<td><strong>$288,40</strong></td>
</tr>
</tbody>
</table>

The “expansions” projects, are constructed by the owner of the assets.
1. Invest in Colombia

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4. Public calls. How does it work?

5. Public calls. New projects
Stages, responsible and responsibilities

<table>
<thead>
<tr>
<th>STAGES</th>
<th>Responsible and responsibilities</th>
</tr>
</thead>
</table>
| **Stage 1** Planning | UPME, Generators, Transmitters and Operators  
  ✓ Identifying needs and definition of projects  
  ✓ Expansion Plan |
| **Stage 2** Preparation call | UPME, Generators and Operators  
  ✓ Preparation of specifications and technical conditions of the project  
  ✓ Identify early warnings |
| **Stage 3** Public Call | UPME  
  ✓ Adjudication to whoever presents the best offer  
  ✓ Constitution guarantee and establishment as a transmitter |
| **Stage 4** Project Execution | Investor  
  ✓ Designs, supplies, route definition, environmental licensing, socialization, permits, right of way, construction, commissioning, operation and maintenance |
Auditor Process: Questions, answers and addendums

Investor Process: Questions, answers and addendums

Investor Selection

Documents for the formalization revenue and compliance concept

- Bank guarantee
- Enrollment and registration as transfer agent
- Fiduciary contract for the payment to the Auditor
- Schedule

CREG resolution to make official the revenues to investor (IAE)

Start of the public call
Publication of sheetfed

Auditor Process: Questions, answers and addendums

Auditor Selection (Report cost the investor)

Start Execution
Execution Stage

Start Execution

- Environmental License
- Permissions
- Detailed design
- Procurement of supplies

- Construction and assembly work
- Testing and commissioning
- Operation and maintenance

- Alternatives environmental diagnostic - DAA
- Environmental Impact Study - EIA
- Prior Consultation - Ethnic Communities
Explanation

- The investor is responsible for the design, supply, route definition, environmental licenses, socialization, permits, rights of way, construction, commissioning, operation and maintenance. Art. 52 and 85 of the Law 143/1994, Resolution MME (Mining and Energy Ministry) 180924/2003 and Resolution CREG (Energy and Gas Regulatory Commission) 022/2001

- The investor selected is the one with the lowest present value of the revenues expected during the first 25 years of operation of the project, discounted at the rate established by CREG.

- The project will have an auditor or controller selected by UPME, who certifies the compliance of the schedule and technical obligations.

- Along with the offer, it must be presented a commitment to provide a bank guarantee in case of selection as successful bidder. After selection, the bank guarantee is approved by the system operator.
Explanations

- Successful bidders who are not agents of the Colombian electricity sector yet have to incorporate as transmission agent with the exclusive purpose of performing into the National Transmission activity.
- The selection gives the right to receive the revenue for the offer and obliges the investor to execute the project according to the requirements of selection documents and applicable technical standards. CREG issues a resolution that approves such revenues.
- There is no contract between the investor and the State.
- The project cost is transferred to the tariff.
- The transmitter is paid by the Liquidator and Accounts Manager - LAC, that is part of the System Operator. The collection is made through the tariff.
- After the 25 year period the assets can remain into the system and paid according to reposition costs.
1. Invest in Colombia

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4. Public calls. How does it work?

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<table>
<thead>
<tr>
<th>PROJECTS</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
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<tr>
<td></td>
<td>s o n d</td>
<td>f m a m j j a s o n d</td>
<td>f m a m j j a s o n d</td>
<td>f m a m j j a s o n d</td>
</tr>
<tr>
<td>1</td>
<td>2nd transformer 500/230 kV in Copey substation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2nd C Bolivar - Cartagena 220 kV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Project Tuluni 230 kV</td>
<td></td>
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<td>4</td>
<td>Project Suria 230 kV</td>
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<td>5</td>
<td>Project Caracoli 220 kV</td>
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<tr>
<td>6</td>
<td>Project Montería 220 kV</td>
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<td>7</td>
<td>Project Guayabal 220 kV</td>
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<tr>
<td>8</td>
<td>Project La Loma 500 kV</td>
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<td>Project: Ituango 500 kV Connection of the Ituango hydroelectric plant</td>
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<td>Río Córdoba 230 kV (*)</td>
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The numbers correspond to project execution time

Blue: Public Calls – selection
Light orange: Execution
Projects description
Expansion Plan 2012-2025

Project Caracolí 220 kV:

- Construction of new substation Caracolí 220 kV and related modules, projected near the municipality of Malambo - Atlantic, southeast of the city of Barranquilla.
- Construction of a 220 kV single circuit line with an approximate length of 27 km, from the new substation Caracolí 220 kV to the substation Flores 220 kV.
- Construction of a 220 kV single circuit line with an approximate length of 27 km, from the new substation Caracolí 220 kV to the substation Sabanalarga 500/220 kV.

Date of entry: Nov/2016.

Project Montería 220 kV:

- Construction of new substation Montería 220 kV and related modules, located in the city of Montería – Córdoba.
- Construction of a 220 kV single circuit line with an approximate length of 60 km, from the new substation Montería 220 kV to the substation Chinú 500/220 kV.
- Construction of a 220 kV single circuit line with an approximate length of 128 km, from the new substation Montería 220 kV to the substation Urabá 220 kV.
- Installation of 450 MVA of transformation 500/220 kV in the substation Chinú 500/220 kV.

Date of entry: Nov/2016.
**Project Suria 230 kV:**

- Construction of new substation Suria 230 kV and related modules, located near the city of Villavicencio – Meta.
- Construction of a 230 kV double circuit line with an approximate length of 27 km, from the new substation Suria 230 kV to a point on the existing transmission line Guavio - Tunal 230 kV to reconfigure the lines in Guavio - Suria 230 kV and Suria – Tunal 230 kV.

**2nd Circuit Bolívar Cartagena 220 kV:**

- Construction of a 220 kV single circuit line with an approximate length of 18 km, from the substation Bolívar 500/220 kV to the substation Cartagena 220 kV. (Includes the related modules)
Project Guayabal 220 kV:

- Construction of new substation Guayabal 220 kV and related modules, located in the city midtown of Medellín - Antioquia.
- Construction of a 220 kV single circuit line with an approximate length of 16 km, from the new substation Guayabal 220 kV to the substation Bello 220 kV.
- Construction of a 220 kV single circuit line with an approximate length of 12 km, from the new substation Guayabal 220 kV to the substation Ancón Sur 220 kV.

Projects description
Expansion Plan 2012-2025

Date of entry: Nov/2016.
Project Tuluní 230 kV:

- 2nd circuit Betania – Mirolindo 230 kV, with an approximate length of 206 Km.
- Construction of a 230 kV double circuit line with an approximate length of 22 km, from the new substation Tuluní 230 kV to a point on the existing transmission line Betania - Mirolindo 230 kV to reconfigure the lines in Betania - Tuluní 230 kV and Tuluní – Mirolindo 230 kV.

Date of entry: August/2016.

Project La Loma 500 kV:

- Construction of new substation La Loma 500 kV and related modules, projected near the municipality of El Paso – Cesar.
- Construction of a 500 kV two single circuit line with an approximate length of 10 km, from the new substation La Loma 500 kV to a point on the existing transmission line Copey - Ocaña 500 kV to reconfigure the lines in Copey – La Loma 500 kV and La Loma – Ocaña 500 kV.

Date of entry: 30/11/2016.
Porce III 500 kV Reinforcement:  

Date of entry: **30/06/2018**.

- Construction of a 500 kV two single circuit line with an approximate length of 6.25 km, from the substation Porce III 500 kV to a point on the future transmission line Ituango - Sogamoso 500 kV to reconfigure the lines in Ituango – Porce III 500 kV and Porce III – Sogamoso 500 kV.

* The Ituango - Sogamoso 500kV line layout must ensure a distance of 6.25 Km to substation Porce III 500 kV.

1st Eastern Area Reinforcement:  

Date of entry: **30/09/2017**.

- Construction of new substation Norte 500 kV and related modules, located near the municipality of Gachancipa – Cundinamarca.
- Installation of one transformer 500/220 kV with 450 MVA of capacity in the substation Norte 500/230 kV, with an overload capacity of 20%
- Construction of a 500 kV single circuit line with an approximate length of 257 km, from the substation Sogamoso 500 kV to the new substation Norte 500 kV.
- Construction of a 500 kV single circuit line with an approximate length of 87 km, from the substation Nueva Esperanza 500 kV to the new substation Norte 500 kV.
2nd Eastern Area Reinforcement: 

Date of entry: 30/09/2020.

- Construction of a 500 kV single circuit line with an approximate length of 190 km, from the substation La Virginia 500 kV to the substation Nueva Esperanza 500 kV. (Includes the related modules)

Caribbean Coast Reinforcement: 

Date of entry: 30/09/2018.

- Construction of a 500 kV single circuit line with an approximate length of 131 km, from the substation Cerromatoso 500 kV to the substation Chinú 500 kV.
- Construction of a 500 kV single circuit line with an approximate length of 200 km, from the substation Chinú 500 kV to the substation Copey 500 kV.
- Installation of 450 MVA of transformation 500/220 kV in the substation Copey 500/220 kV.
Southwest Area Reinforcement:

Date of entry: 30/09/2018.

- Construction of new substation Alférez 500 kV and related modules, located near the city of Cali – Valle del Cauca.
- Installation of two transformers 500/220 kV each with 450 MVA of capacity in the substation Alférez 500/230 kV, each with an overload capacity of 20%.
- Construction of a 500 kV single circuit line with an approximate length of 158 km, from the New substation Medellín 500 kV to the substation La Virginia 500 kV.
- Construction of a 500 kV single circuit line with an approximate length of 183 km, from the substation La Virginia 500 kV to the substation Alférez 500 kV.
- Construction of a 500 kV single circuit line with an approximate length of 35 km, from the substation San Marcos 500 kV to the substation Alférez 500 kV.
- Construction of a 230 kV double circuit line with an approximate length of 2 km, from the substation Alférez 230 kV to a point on the existing transmission line Juanchito - Pance 230 kV to reconfigure the lines in Juanchito – Alférez 230 kV and Alférez – Pance 230 kV.
Project Ituango (Connection of the Ituango hydroelectric plant): Date of entry: 30/06/2018.

- Construction of new substation Ituango 500 kV and related modules, located near to the generation plant hidroituango located in Antioquia.
- Construction of new substation Medellín 500 kV and related modules, located near the city of Medellín - Antioquia.
- Installation of two transformers 500/220 kV each with 450 MVA of capacity in the substation Medellín 500/230 kV, each with an overload capacity of 20%.
- Construction of a 500 kV two single circuit line with an approximate length of 110 km each, from the new substation Ituango 500 kV to the substation Cerromatoso 500 kV.
- Construction of a 500 kV single circuit line with an approximate length of 260 km, from the new substation Ituango 500 kV to the substation Sogamoso 500 kV.
- Construction of a 500 kV single circuit line with an approximate length of 260 km, from the new substation Ituango 500 kV to the new substation Medellín 500 kV.
- Construction of a 230 kV double circuit line with an approximate length of 10 km, from the new substation Medellín 230 kV to a point on the existing transmission line Occidente - Ancón 230 kV to reconfigure the lines in Occidente – Medellín 230 kV and Medellín – Ancón 230 kV.
- Construction of a 230 kV single circuit line with an approximate length of 10 km, from the new substation Medellín 220 kV to the substation Ancón 230 kV.
More Information: http://www1.upme.gov.co/

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THANKS