THE ENERGY & MINING SECTORS

By
MR. Aly Ngouille NDIAYE
Minister of Energy & Mines

London, June 17, 2013
Oil or gas have been discovered in three main areas in the Basin:

- Diam Niadio
- Gadiaga / Sadiaratou
- Dome Flore
However only the discoveries in the Dakar Peninsula have been produced:

- Diam Niadio: 8,8 BCF
- Gadiaga/Sadiaratou: 5,9 BCF
- 62500 barrels crude oil (34 API)
- 35600 barrel condensate
Senegalese Government signed 11 Producing Sharing Contracts with 11 oil companies:

- 8 PSC offshore
- 3 PSC onshore

Only three onshore blocks are open for negotiations:

- Sebikhotane
- Saloum and
- Senegal Sud Onshore
Two models of contracts are applicable in Senegal:

1. Production Sharing Contract (PSC)
2. Concession Contract (CC)

The two contracts are similar in many articles, except the fiscal aspects:

- Cost recovery ≠ Amortisation Plan
- Profit Sharing ≠ Royalties
- Income tax = 30% (applied on net profit)
- PETROSEN participation: 10% carried during exploration and 20% after Commercial discovery
DEVELOPMENT PLAN OF SENEGAL ELECTRIC SYSTEM
2013 – 2017
SITUATION IN 2012

- HUGE CRISIS IN ELECTRICITY SECTOR SINCE MORE THAN 10 YEARS WITH
  - PERMANENT DETERIORATION OF THE SERVICE QUALITY (LOAD SHEDDINGS)
  - FINANCIAL PROBLEMS OF SENELEC (UTILITY)
    o Deficit of generation fulfilled by 150 MW Diesel power plant rental at an annual cost of 106.8 billions CFA Francs (217 Millions USD)
    o Very old, saturated networks without any emergency system

- INADAPTED MIX OF ENERGY (85% OF LIQUID FUEL)

- VERY HIGH GENERATION COST OF kWh (170 A 190 FCFA/kWh – C$34/kWh – C$ 38/kWh) WHILE THE kWh IS SOLD TO THE CUSTOMERS AT 118 FCFA/kWh (C$ 23.6/kWh)

- UNAFORDABLE LEVEL OF SUBSIDIES (100 à 120 Milliards FCFA/an ie 200 – 240 Billions USD per year)

- LIMITED ACCESS TO ELECTRICITY FOR THE POPULATION & DIFFICULTES TO ATTRACK INVESTORS
SITUATION IN 2012

UNSERVED ENERGY DUE TO LACKS OF FUEL
- GENERATION FAILURES
- LACKS OF FUEL

2012 ENERGY MIX
- COAL: 0.00%
- HYDRO: 9.92%
- RENEWABLE: 0.00%
- GAS: 2.31%
- DO: 38.51%
- HFO: 49.26%

Cost OF kWh
NEW VISION OF SENEGALESE GOV

Energy Sector Development Policy Letter (ESDPL/LPDSE) signed in October 2012:

« a Senegal where electricity is

• Available in quantity and quality,
• competitive,
• Generated from diversified energy mix including coal, natural gas, hydroelectricity, renewable energy (wind, solar, biomass)
• While Senelec main utility recover its normal operational parameters »

BY YEAR 2017, COST OF kWh ENTRE 12 & 16 USD Cents
ORIENTATION & CAPACITY DEVELOPMENT
PLAN 2013 – 2017

1. CANCELLING OF 210 MW HFO PLANT PROJECTS (POWER BARGES, PPS, MALICOUNDA POWER PLANT)

2. STABILISATION OF SENELEC OWN CAPACITIES ET PRIORITY GIVEN TO IPPS FOR ALL NEW POWER GENERATION EXTENSIONS:
   • ACHIEVEMENT OF THE 2 COAL FIRED POWER PLANT PROJECTS (375 MW)
   • INTRODUCTION OF 476 MW OF NATURAL GAS POWER PLANTS (NG OR LNG)
     o IPP 150 MW GAS TURBINES FIRED WITH LNG
     o IMPORTATION OF 80 MW FROM GAS FIRED POWER PLANT OF NOUAKCHOTT (MAURITANIA)
     o CONVERSION OF 246 MW SENELEC EXISTING HFO UNITS INTO DUAL FUEL WITH NATURAL GAS
   • ACHIEVEMENT OF THE 70 MW IPP DUAL FUEL (HFO/NG) PROJECT OF TAÏBA NDIAYE

3. LARGE INTRODUCTION OF RENEWABLE ENERGY IN THE INERCONNECTED NETWORKS AND IN THE ISOLATED GENERATION CENTERS (ACCORDING TO THE 2012 ESDPL OBJECTIVES: 20% EN 2017)
# NEW CAPACITY EXPANSION
## 2013 - 2017

### EVOLUTION OF INSTALLED CAPACITIES

<table>
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<tr>
<th>INSTALLED CAPACITY</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
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<tr>
<td>HFO</td>
<td>MW</td>
<td>298</td>
<td>346</td>
<td>296</td>
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<tr>
<td>DO</td>
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<td>87</td>
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<td>226</td>
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<td><strong>TOTAL</strong></td>
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<td>605</td>
<td>580</td>
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### REPARTITION OF INSTALLED CAPACITIES (MW)

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ENERGY MIX IMPROVEMENT & GRADUAL DECREASE OF GENERATION COST

2017 ENERGY MIX

- Hydro: 5.03%
- Coal: 25.17%
- Renewable: 18.52%
- Gas: 36.51%
- HFO: 14.77%
- DO: 0.00%

Planned kWh Cost (USD cents)

USD Cent/kWh

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<td>34.5</td>
<td>32</td>
<td>29.5</td>
<td>27</td>
<td>25.5</td>
<td>24</td>
<td>22</td>
<td>20.5</td>
<td>20.2</td>
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NETWORKS IMPROVEMENT

TRANSMISSION

- DEPLOYMENT OF 1520 km OF 225 kV OVERHEAD LINES AND 20 km OF 225 KV UNDERGROUND CABLE TO INTERCONNECT THE MAJOR PART OF THE COUNTRY. FEEDING MINING & AGRO PASTORAL ZONES

DISTRIBUTION

- NETWORKS EXTENSION & DENSIFICATION (224 km MV, 349 DISTRIBUTION CABINS, 329 km LV, 123 000 NEW CUSTOMERS CONNECTIONS)
- UPGRADING MV NETWORK CONTROL CENTER OF DAKAR WITH AN ADDITION OF A DMS
SENEGAL HIGHT VOLTAGE NETWORKS
METERING & DEMAND SIDE MANAGEMENT PROJECTS

1. 3 000 000 CFL FOR 600 000 HOUSEHOLD CUSTOMERS OF SENELEC (2014 – 2015)

2. SUPPLY AND INSTALLATION OF 450 000 PREPAID METERS FOR DOMESTIC CUSTOMERS OF Senelec (FROM 2015 TO 2017)

3. SUPPLY AND INSTALLATION OF 17 000 SMART METERS FOR BIG CONSUMERS, PROFESSIONALS AND INDUSTRIES (FROM 2015 TO 2017)
FUNDING NEEDS

THE PROJECTS USING USUAL TRADITIONAL GENERATIONS (COAL, NATURAL GAS, HYDRAULICS) ARE NOW UNDER DISCUSSIONS WITH SENELEC OR HAVE THEIR PPA SIGNED WITH AN IPP. THE PRIORITARY NEEDS ARE NOW FOR RENEWABLE ENERGY, TRANSMISSION AND DISTRIBUTION PROJECTS

AMOUNT OF NEEDS FOR THE PERIOD 2013 – 2017
739 BILLIONS OF CFA FRANCS ie 1,477 BILLIONS US DOLLARS

<table>
<thead>
<tr>
<th></th>
<th>Amount (Bns FCFA)</th>
<th>Amount (M USD)</th>
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<tbody>
<tr>
<td>Renewable Energy</td>
<td>327,79</td>
<td>655,59</td>
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<tr>
<td>Transmission</td>
<td>319,37</td>
<td>638,74</td>
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<tr>
<td>Distribution</td>
<td>67,10</td>
<td>134,20</td>
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<tr>
<td>Metering &amp; Demand Side Management</td>
<td>16,01</td>
<td>32,02</td>
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<tr>
<td><strong>Total needs</strong></td>
<td><strong>738,67</strong></td>
<td><strong>1477,34</strong></td>
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</table>
EXPECTATIONS OF SENEGAL

- OPPORTUNITIES FOR PROMOTORS TO INVEST IN ENERGY SECTOR SO AS TO ENSURE TO SENEGAL A CONTINUOUS ELECTRICITY WITH GOOD QUALITY AND AFFORDABLE COST

- THIS RELIABLE ENERGY, LESS EXPENSIVE WILL ENABLE COMPETITIVITY OF SENEGALESE ECONOMIC ACTORS AND WILL BOOST PRODUCTION AND SENEGALESE GOODS EXPORTATION
MINING SECTOR
Current Mineral Potential

- Phosphates
- Heavy Mineral Sands (Zircon & Titanium),
- Iron Ore, Gold, Copper, Molybdenum, Lithium,
- Uranium, Tin, Base Metal,
- Clays and Limestone
- Salt,
Mineral Law & Policy

- **Mineral law** based on the French civil law
  - Mining Convention
  - Reduction of transaction costs: requests for permits processed within a maximum of 45 days

- **Mineral Policy Statement of 6 March, 2003**
  - Diversification of mineral production
  - Beneficiation of mineral products before export
  - Lawful rights and interests of investors guaranteed
  - Non-discriminatory principle
  - Protection of the environment
  - Sustainability of mining will be a key objective
  - Design and implementation of GIS database
MINING SECTOR TREND

1960
Phosphates Exploitation

2003–2004
- Decree N°2004–647 of May 17, 2004

2005–2009
- 9th European Development Fund PASMI
- Promotion of the mineral potential
- Institutional capacity building
- Modernization of the geological infrastructures

2009
- Sabodala Gold Exploitation

2010
- Gold, Copper, Platinium, Chromium and Nickel Exploration

2013
- Heavy minerals (zircon and titanium) Exploitation
- Run of Massawa and Goulouma Project (Gold Exploitation)
- Matam Phosphates Mining
Multiple deposits and zones of orogenic gold situated in an emerging Sabodala gold-mining district, where almost ten million ounces of gold resources have been found by Oromin, MDL and Randgold, with geological and structural similarities to known gold mines and deposits in neighboring Mali and elsewhere in West Africa.
Mining Industry: Exploitation

Teranga Gold Corporation

MDL Mineral Deposits Limited

ics
Industries Chimiques du Sénégal

SERPM
Société d’Etudes et de Recherche des Prospectives de Matières

Dangote Group

Ciments du Sahel

SENMINES
Faleme Iron Ore Proven Reserves *
(Tons)

- Hematite: 373,000,000 (57% Fe)
- Magnetite: 258,000,000 (43% Fe)

TOTAL: 631,000,000 Tons
Rail Track

Standard Gauge (1.435 m)

- **Main Track**: Kédougou–Tamba–Bargny (750 km)
  - Iron Ore, Alumina
- **Secondary Track**: Matam–Tamba (185 km)
  - Phosphate
- **Secondary Track**: Diogo–Thies (52 km)
  - Chemical, Zircon, Ilmenite
1. **Stock Yard Area** (483 Ha)
   - Iron Ore Storage Yard (243 Ha)
   - Bulk Commodities Storage (240 Ha)

2. **Trestle** (3 300 m)
   - With Commodity Conveyors and Piers

3. **Petroleum Products Terminal**
Faleme Iron Ore Project Costs Estimation*

- Mine: USD 0.7 billion
- Railroad: USD 1.3 billion
- Port: USD 0.5 billion

Total Project: USD 2.5 billion

* Built by ArcelorMittal in 2009
Thank You For Your Attention