The role of natural gas in the transition to achieving sustainable energy for all in Africa

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PRESENTATION

ENGIE, A World Leader in Energy

By

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The Role of Natural Gas in Achieving Sustainable Energy for All in Africa

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ENGIE
A World Leader in Energy
ENGIE is active across the entire energy value chain, in power and natural gas, upstream to downstream.

Key figures at December 31, 2015

- 155,000 employees throughout the world
- €70 billion revenues
- 21 million customers
- Operations in 70 countries

**NATURAL GAS**
- 105 bcm portfolio
- #1 distribution and storage in EU
- #2 transmission network in EU

**LNG**
- 16.4 mtpa portfolio from 6 countries
- #1 importer of LNG in EU
- 14 LNG tankers

**LOW CO₂ POWER**
- #1 IPP in the world
- 117.1 GW installed
- 84% low CO₂ emissions

**ENERGY SERVICES**
- #1 energy services in the world
- 228 district and cooling networks
- 140 millions m² managed
ENGIE transformation, toward low CO₂ & downstream solutions with one core pivot: the gas value chain

- Low CO₂ Power Generation
  - Solar
  - Hydro, Wind
  - Gas

- Global Networks
  - Gas distribution
  - Transmission
  - LNG terminals & sales
  - Storage

- Customer Solutions
  - Integrated solutions for customers:
    - Energy efficiency
    - Energy supply
    - Cities and customers
    - Decentralized renewables
    - Heating/cooling networks

- IPP leader
  - 117 GW, ~85% low CO₂

- Gas value chain

- Global leader in energy services
ENGIE in Africa, a long term energy partner

**POWER**
- 1st independent power producer in South Africa
- Africa’s LARGEST Wind farm in Morocco
- 758 MW of capacity in operation
- 2,056 MW of capacity under construction

**Energy Services**
- Approximately 80 customers
- Present in 17 countries

**Natural Gas**
- Algeria and Egypt
- LNG and E&P
- Nigeria LNG

**Over 50 years of experience on the continent**

**2.8 gigawatts thermal power and renewable energy capacity in operation or under construction**

**€306 million of turnover in 2015**
Africa Gas Outlook
ENGIE Vision
Africa is made of 54 countries and they are substantially different from one another.

Population (million people) | GDP billion/yr (current international $) | Access to electricity (% population) | Electricity (KWh per capita)
--- | --- | --- | ---
187 | 1,993 | 98% | 1,574
349 | 1,410 | 47% | 188
330 | 694 | 23% | 91
127 | 246 | 25% | 167
191 | 1,136 | 43% | 2,061

Sources: IRENA (updated with Statistics refer to UN 2015 (Population), 2014 World Bank (GDP, Electrification Rate)
General trends

DEMOGRAPHY & URBANISATION

• Half of world population growth between now and 2050 (1.2 to 2.5 billion)
• Forecast of huge urbanisation (50 to 70% in 2050)

ECONOMICS & FINANCING

• Over 4% of GPD Growth in last 10 years and for the next 15 years
• External financial flows to Africa increased six-fold since 2000 and will continue

ENVIRONMENTAL PRESSURE

• Diversity of ecosystems: desert and semi-desert, forest and grassland, tropical forest, savanna
• Issues: access to and water quality preservation, desertification, protection of fauna and flora – high sensitivity index

Sources: Oxford Economics, African Economic Outlook data, IMF,
Natural gas in the energy mix of the future

The current context is marked by a trend to strengthen the place of natural gas in the energy mix of the future:

- "Gas is **greener** than any other fuels"
- "Gas is getting even **greener** (biogas, H2)"
- "Gas is flexible and storable, associates perfectly with intermittent **renewable energies** (hydro, wind, solar)"

**THE LINES ARE MOVING** IN FAVOUR OF GAS & MORE DECENTRALIZED PROJECTS

Topics now included in upgrade scenarios

- Renewable gas (biogas, Power to Gas, H₂)
- Gas as New Fuel for Transports (NGV, LNG fueled ships, trucks, trains bio-NGV, Hydrogen)
- Complementarity with major gas and electric networks into adaptation to territories

Gas is flexible and storable, associates perfectly with intermittent renewable energies (hydro, wind, solar)"
Biogas - A solution in rural areas
The household case in China

ENGIE “Rassembleurs d’Energies” invested in SimGas, a social enterprise that develops biogas systems in Tanzania. These solution provides small-scale rural farmers with modular long lasting bio-digesters. They produce both gas for cooking and fertilizers.

• Innovative modular, compact and cost effective “pre-fabricated digesters”

• Reduce energy expenses (traditional fuels)

• Reduce environmental pollution

• Social and health benefits
Centralized and Distributed Solutions to leverage existing natural gas resources and the region’s LNG supply

Gas to Power in countries with national resources, including countries of Gulf of Guinea and Eastern Africa, and sites with potential for LNG import terminals and infrastructure development (e.g. South Africa).

Comprehensive solution for LNG supply, transportation, storage & regasification to industrial customers and remote areas not connected to gas networks.

Multi-modal distribution: by truck or iso-container
Sub-Saharan Africa: Required build-out of infrastructure – pipeline and city gas distribution

- Limited infrastructure build-out to date
- Creation of distribution networks for emerging cities to provide a cleaner burning fuel and for transport (CNG for vehicles)
- Gas to power via combined cycle plants to displace costlier diesel-fired generation and to reduce CO₂ emissions

Challenges:
- Financing and off-take commitments for long-term investments
- Regulatory framework for gas distribution
The 21st Century will be Africa’s Century – in the coming decades global growth increasingly will be pulled by growth on the continent, itself supported by a dynamic and expanding population. And the growth will require new sources of clean and affordable energy.

Engie intends to build on its position in the region and provide innovative solutions to meet these energy needs:

- Renewable Generation, both Distributed and Centralized: Solar, Wind, Biomass, Hydro and Geothermal
- Gas Infrastructure Activities, from gas-fired generation, to LNG, to distributed solutions including small scale LNG
- Energy Services including Energy Efficiency and Facilities Management, and Engineering Consulting
- Four regional offices: Casablanca, Abidjan, Nairobi, Johannesburg