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

16 July 2016

PRESENTATION

Energy Challenge for Africa

By

Thierry Bros, Senior European Gas and LNG Analyst, Société Générale

The views expressed in this document are those of the author(s) and do not necessarily reflect the views of the UNCTAD secretariat.
THE ROLE OF GAS IN THE TRANSITION TO SUSTAINABLE ENERGY FOR ALL IN AFRICA

UNCTAD – Nairobi – 17 July 2016

Dr Thierry Bros Phone: +33 1 58 98 11 70 thierry.bros@sgcib.com

Important Notice: The circumstances in which this publication has been produced are such that it is not appropriate to characterise it as independent investment research as referred to in MiFID and that it should be treated as a marketing communication even if it contains a research recommendation. This publication is also not subject to any prohibition on dealing ahead of the dissemination of investment research. However, SG is required to have policies to manage the conflicts which may arise in the production of its research, including preventing dealing ahead of investment research.
ENERGY CHALLENGE FOR AFRICA

Energy for development

Select best sources available

COP21

Low price

Gas, centralised
Solar, decentralised

Technical & financial
Low cost

Innovative solutions required

Centralised & decentralised
Smart metering

Infrastructure needs
5 ENERGY REVOLUTIONS IN THE LAST 10 YEARS

- **Shale Gas**: Started in the US in 2005
- **Shale Oil**: Ongoing in the US
- **Efficiency**: Started in Europe in 2006
- **Renewable**: Started in Europe, now worldwide
- **Storage**: Jury still out
US GAS PRODUCTION: UP SINCE 2005 THANKS TO SHALE

EUROPE: NO DEMAND GROWTH THANKS TO EFFICIENCY

EU primary energy consumption
down by 10.9% since 2006

European gas demand
down by 18.3% since 2006

On top of the structural decline, tense EU-Russia relations will not favour gas

Source: SG Cross Asset Research/Commodities, BP Statistical Review, Eurostat, IEA
PRIMARY ENERGY CONSUMPTION VS $GDP (1980-2015)

Source: SG Cross Asset Research/Commodities, BP Statistical Review, IMF
AFRICA COMES ON THE ENERGY SCENE AFTER COP21

Source: BP Statistical Review
Sub-Saharan Africa accounts for 2.2% of world energy consumption. It needs to massively increase renewable and gas in terms of volume and % of the mix.

Renewable & gas are available
It’s the perfect match

Source: BP Statistical Review 2016
After the 89% increase in the carbon price support in April 2015, it took seven months for gas for power generation to grow yoy.
GAS FOR EUROPEAN POWER GENERATION?

A 1% switch from coal to gas in EU power generation increases gas demand by c.6bcm

Source: SG Cross Asset Research, Eurostat
IMPLICATIONS & CHALLENGES FOR AFRICA

Gas
- Fast monetisation of gas reserves?

Efficiency
- Follow up

Renewable
- Huge potential (decentralised & low cost)

Storage
- Could allow for a resilient decentralised energy system
INNOVATIVE SOLUTIONS TO FAST-TRACK GAS INDUSTRY

Low cost innovative monetisation of the huge gas reserves offshore Mozambique and Tanzania will benefit all.

Minimum price for producers (cost+)
For FOB LNG could be 4$/MBtu / $1bn/mtpa capex
Acceptable risk for an incumbent buyer with residential market share?

Maximum price for customers

$ / MBtu

Years

T

$f(Spot)$
FOR AFRICA TO BECOME A REGIONAL GAS HUB

Source: SG Cross Asset Research
ANALYST CERTIFICATION
Each author of this research report listed on the cover hereby certifies that the views expressed in the research report accurately reflect his or her personal views, including views about subject securities or issuers mentioned in the report, if any. No part of his or her compensation was, is or will be related, directly or indirectly to the specific recommendations or views expressed in this report.

The information herein is not intended to be an offer to buy or sell, or a solicitation of an offer to buy or sell, any securities or other financial instrument and including any expression of opinion, has been obtained from or is based upon sources believed to be reliable but is not guaranteed as to accuracy or completeness although Société Générale ("SG") believe it to be fair and not misleading or deceptive. SG, and their affiliated companies in the SG Group, may from time to time deal in, profit from the trading of, hold or act as market-makers or act as advisers, brokers or bankers, in relation to the securities, or derivatives of persons, firms or entities mentioned in this publication, or be represented on the board of such persons, firms or entities. Employees of SG, and their affiliated companies in the SG Group, or individuals connected to them may from time to time have a position in or be holding any of the investments or related investments mentioned in this publication. The views of SG reflected in this publication may change without notice. To the maximum extent possible at law, SG does not accept any liability whatsoever arising from the use of the material or information contained herein. Dealing in warrants and/or derivative products such as futures, options, and contracts for differences has specific risks and other significant aspects. You should not deal in these products unless you understand their nature and the extent of your exposure to risk. This publication is not intended for use by or targeted at retail customers. Should a retail customer obtain a copy of this report they should not base their investment decisions solely on the basis of this document but must seek independent financial advice.

The financial instruments discussed in this report may not be suitable for all investors and investors must make their own informed decisions and seek their own advice regarding the appropriateness of investing in financial instruments or implementing strategies discussed herein. The value of securities and financial instruments is subject to currency exchange rate fluctuation that may have a positive or negative effect on the price of such securities or financial instruments, and investors in securities such as ADRs effectively assume this risk. SG does not provide any tax advice. Past performance is not necessarily a guide to future performance. Estimates of future performance are based on assumptions that may not be realized. Investments in general, and derivatives in particular, involve numerous risks, including, among others, market, counterparty default and liquidity risk. Trading in options involves additional risks and is not suitable for all investors. An option may become worthless by its expiration date, as it is a depreciating asset. Option ownership could result in significant loss or gain, especially for options of unhedged positions. Prior to buying or selling an option, investors must review the "Characteristics and Risks of Standardized Options" at http://www.optionsclearing.com/about/publications/character-risks.jsp or from your SG representative. Analysis of option trading strategies does not consider the cost of commissions. Supporting documentation for options trading strategies is available upon request.

CONFLICTS OF INTEREST
This research contains the views, opinions and recommendations of Société Générale (SG) analysts and/or strategists. Analysts and/or strategists routinely consult with SG sales and trading desk personnel regarding market information including, but not limited to, pricing, spread levels and trading activity of a specific fixed income security or financial instrument, sector or other asset class. Trading desks may trade, or have traded, as principal on the basis of the analyst(s) views and reports. In addition, analysts receive compensation based, in part, on the quality and accuracy of their analysis, client feedback, trading desk and firm revenues and competitive factors. As a general matter, SG and/or its affiliates normally make a market and trade as principal in fixed income securities discussed in research reports.
APPENDIX – DISCLAIMER (CONT’D)

Notice to French Investors: This publication is issued in France by or through Société Générale ("SG") which is authorised and supervised by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the Autorité des Marchés Financiers (AMF).

Notice to U.K. Investors: Société Générale is a French credit institution (bank) authorised by the Autorité de Contrôle Prudentiel (the French Prudential Control Authority) and the Prudential Regulation Authority and subject to limited regulation by the Financial Conduct Authority and Prudential Regulation Authority. Details about the extent of our authorisation and regulation by the Prudential Regulation Authority, and regulation by the Financial Conduct Authority are available from us on request.

Notice to Swiss Investors: This document is provided in Switzerland by or through Société Générale Paris, Zürich Branch, and is provided only to qualified investors as defined in article 10 of the Swiss Collective Investment Scheme Act ("CISA") and related provisions of the Collective Investment Scheme Ordinance and in strict compliance with applicable Swiss law and regulations. The products mentioned in this document may not be suitable for all types of investors. This document is based on the Directives on the Independence of Financial Research issued by the Swiss Bankers Association (SBA) in January 2008.

Notice to Polish Investors: this publication has been issued in Poland by Societe Generale S.A. Oddzial w Polsce ("the Branch") with its registered office in Warsaw (Poland) at 111 Marszałkowska St. The Branch is supervised by the Polish Financial Supervision Authority and the French "Autorité de Contrôle Prudentiel". This report is addressed to financial institutions only, as defined in the Act on trading in financial instruments, The Branch certifies that this publication has been elaborated with due diligence and care.

Notice to US Investors: For purposes of SEC Rule 15a-6, SG Americas Securities LLC ("SGAS") takes responsibility for this research report. This report is intended for institutional investors only. Any U.S. person wishing to discuss this report or effect transactions in any security discussed herein should do so with or through SGAS, a U.S. registered broker-dealer and futures commission merchant (FCM). SGAS is a member of FINRA, NYSE and NFA. Its registered address at 245 Park Avenue, New York, NY, 10167. (212)-278-6000.

Notice to Canadian Investors: This publication is for information purposes only and is intended for use by Permitted Clients, as defined under National Instrument 31-103, Accredited Investors, as defined under National Instrument 45-106, Accredited Counterparties as defined under the Derivatives Act (Québec) and "Qualified Parties" as defined under the ASC, BCSC, SFSC and NBSC Orders.

Notice to Singapore Investors: This publication is provided in Singapore by or through Société Générale ("SG"), Singapore Branch and is provided only to accredited investors, expert investors and institutional investors, as defined in Section 4A of the Securities and Futures Act, Cap. 289. Recipients of this publication are to contact Société Générale, Singapore Branch in respect of any matters arising from, or in connection with, the publication. If you are an accredited investor or expert investor, please be informed that in SG's dealings with you, SG is relying on the following exemptions to the Financial Advisers Act, Cap. 110 ("FAA"): (1) the exemption in Regulation 33 of the Financial Advisers Regulations ("FAR"), which exempts SG from complying with Section 25 of the FAA on disclosure of certain interests in securities; (2) the exemption set out in Regulation 34 of the FAR, which exempts SG from complying with Section 27 of the FAA on recommendations; and (3) the exemption set out in Regulation 35 of the FAR, which exempts SG from complying with Section 36 of the FAA on disclosure of certain interests in securities.

Notice to Hong Kong Investors: This report is distributed in Hong Kong by Société Générale, Hong Kong Branch which is licensed by the Securities and Futures Commission of Hong Kong under the Securities and Futures Ordinance (Chapter 571 of the Laws of Hong Kong) ("SFO"). This publication does not constitute a solicitation or an offer of securities or an invitation to the public within the meaning of the SFO. This report is to be circulated only to “professional investors” as defined in the SFO.

Notice to Japanese Investors: This publication is distributed in Japan by Societe Generale Securities (North Pacific) Ltd., Tokyo Branch, which is regulated by the Financial Services Agency of Japan. This publication is intended only for the Specified Investors, as defined by the Financial Instruments and Exchange Law in Japan and only for those people to whom it is sent directly by Societe Generale Securities (North Pacific) Ltd., Tokyo Branch, and under no circumstances should it be forwarded to any third party. The products mentioned in this report may not be eligible for sale in Japan and they may not be suitable for all types of investors.

Notice to Korean Investors: This report is distributed in Korea by SG Securities Korea Co., Ltd which is regulated by the Financial Supervisory Service and the Financial Services Commission.

Notice to Australian Investors: Societe Generale is exempt from the requirement to hold an Australian financial services licence (AFSL) under the Corporations Act 2001 (Cth) in respect of financial services, in reliance on ASIC Class Order 03/824, a copy of which may be obtained at the web site of the Australian Securities and Investments Commission, http://www.asic.gov.au. The class order exempts financial services providers with a limited connection to Australia from the requirement to hold an AFSL where they provide financial services only to wholesale clients in Australia on certain conditions. Financial services provided by Societe Generale may be regulated under foreign laws and regulatory requirements, which are different from the laws applying in Australia.

http://www.sgcib.com. Copyright: The Société Générale Group 2016. All rights reserved.

This publication may not be reproduced or redistributed in whole in part without the prior consent of SG or its affiliates.
SG LEADER IN GLOBAL CROSS ASSET RESEARCH

Macro & Strategy

#1 Overall Macro
#1 Global Strategy
#1 Multi Asset Research
#1 Global Economics

Fixed Income

#1 Overall Credit Strategy
#1 Overall Trade Ideas
#2 in Sovereigns
8 sector teams in the Top 3

Commodities

#1 Best Overall Commodity Research
#1 Oil Research
#1 Gas Research
#1 Base Metals Research
#1 Soft Commodities Research
#1 European Power, Coal, Emissions Research

Equity

#2 Quantitative/Database Analysis
#1 Index Analysis
#1 SRI Research
15 sector teams in the Top 10