



# ENERGY CHALLENGES & OPPORTUNITIES IN SUB-SAHARAN AFRICA

May 2013



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# SUSTAINABLE ENERGY FUTURE

## ISING ENERGY DEMAND, SUPPLY PRESSURE, CLIMATE CHANGE



**9 billion**  
people, **75%**  
living in cities

**(2 billion**  
more than  
today)



**2 billion**  
vehicles

**(800 million**  
at the moment)



Many **millions**  
of people will  
rise out of  
energy poverty;  
with higher  
living standards  
energy use rises



Energy demand  
could **double**  
from its level  
in 2000..  
.. while CO<sub>2</sub>  
emissions must be  
**half** today's to  
avoid serious  
climate change



Twice as  
efficient, using  
**half** the energy  
to produce each  
dollar of wealth



**3** times more  
energy from  
renewable  
sources

# ENERGY LANDSCAPE

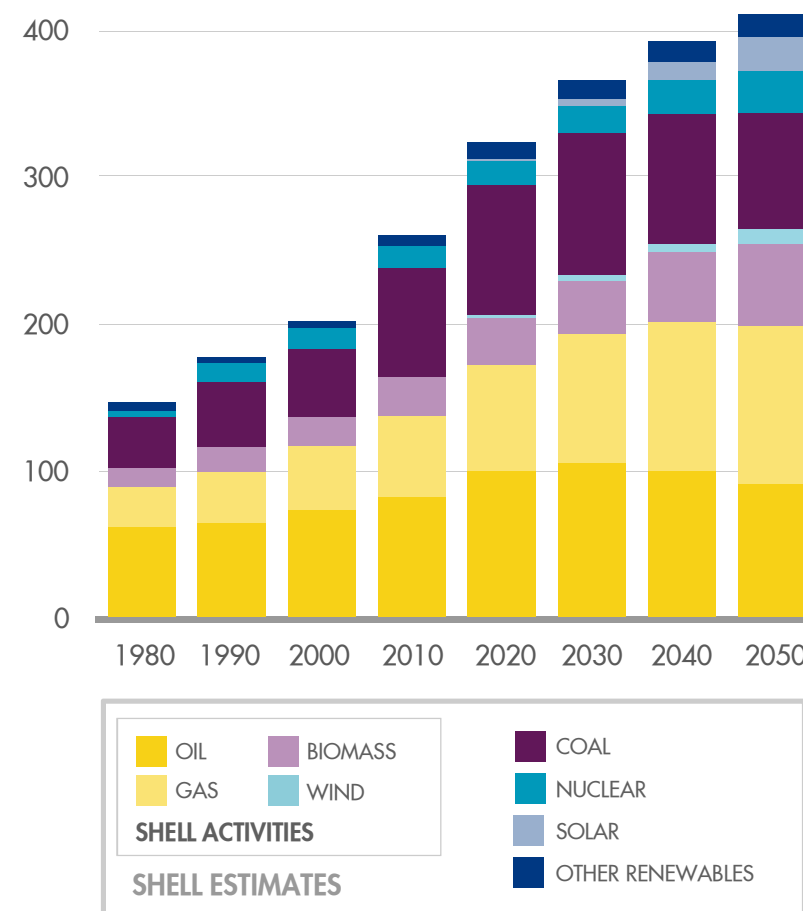
## RIISING GLOBAL ENERGY DEMAND

100 = Global primary energy demand 2000



## ROBUST LONGER TERM FUNDAMENTALS

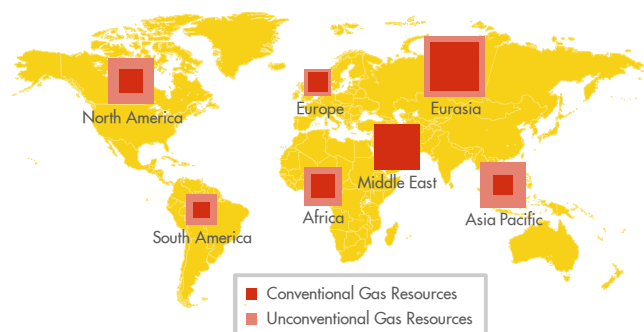
Energy demand outlook in million boe/d



# THE CASE FOR GAS

## ABUNDANT

- Abundant global gas resources, growing and geographically diverse
- Can supply >250 years of current global gas production

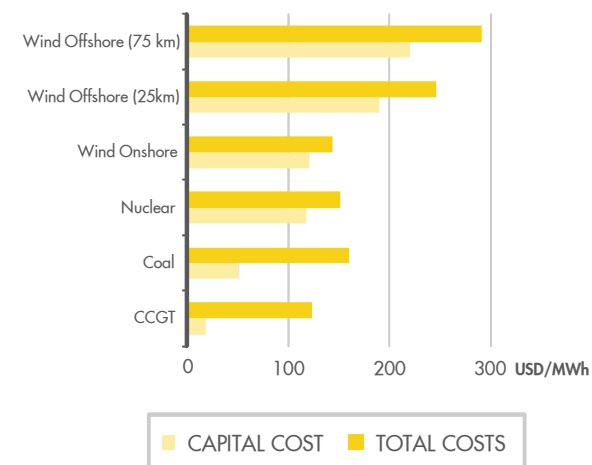


## ACCEPTABLE

- **CCGT:** gas-fired power compared to coal:
  - 30% more energy efficient
  - Emit around half the CO<sub>2</sub>
  - Better complement to wind power
- Replacing coal with gas for electricity generation is the cheapest and fastest way to meet CO<sub>2</sub> reduction targets

## AFFORDABLE

- CCGT cheapest to build
- Similar total cost to coal and nuclear



## NATURAL GAS: A DESTINATION FUEL

Source: IEA World Energy Outlook, Wood Mackenzie, Shell Interpretation

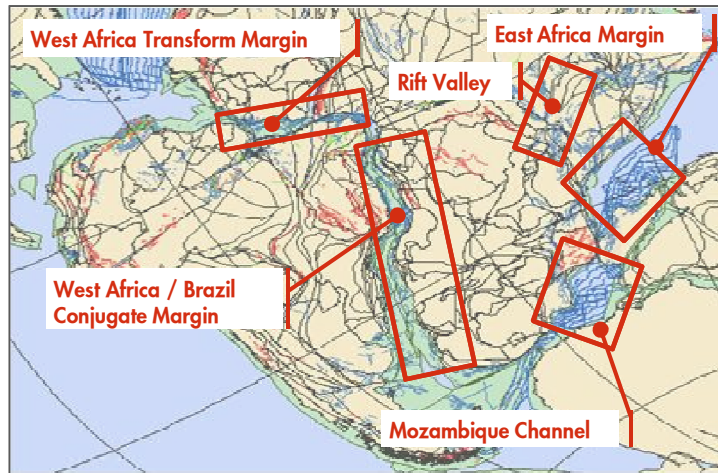
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CCGT: Combined Cycle Gas Turbine  
Total Cost = Capital + Fuel + Operating

Source: DECC (Mott MacDonald) June 2010

# INDUSTRY SUB-SAHARAN AFRICA ACTIVITY 2003-2012

## GEOLOGY

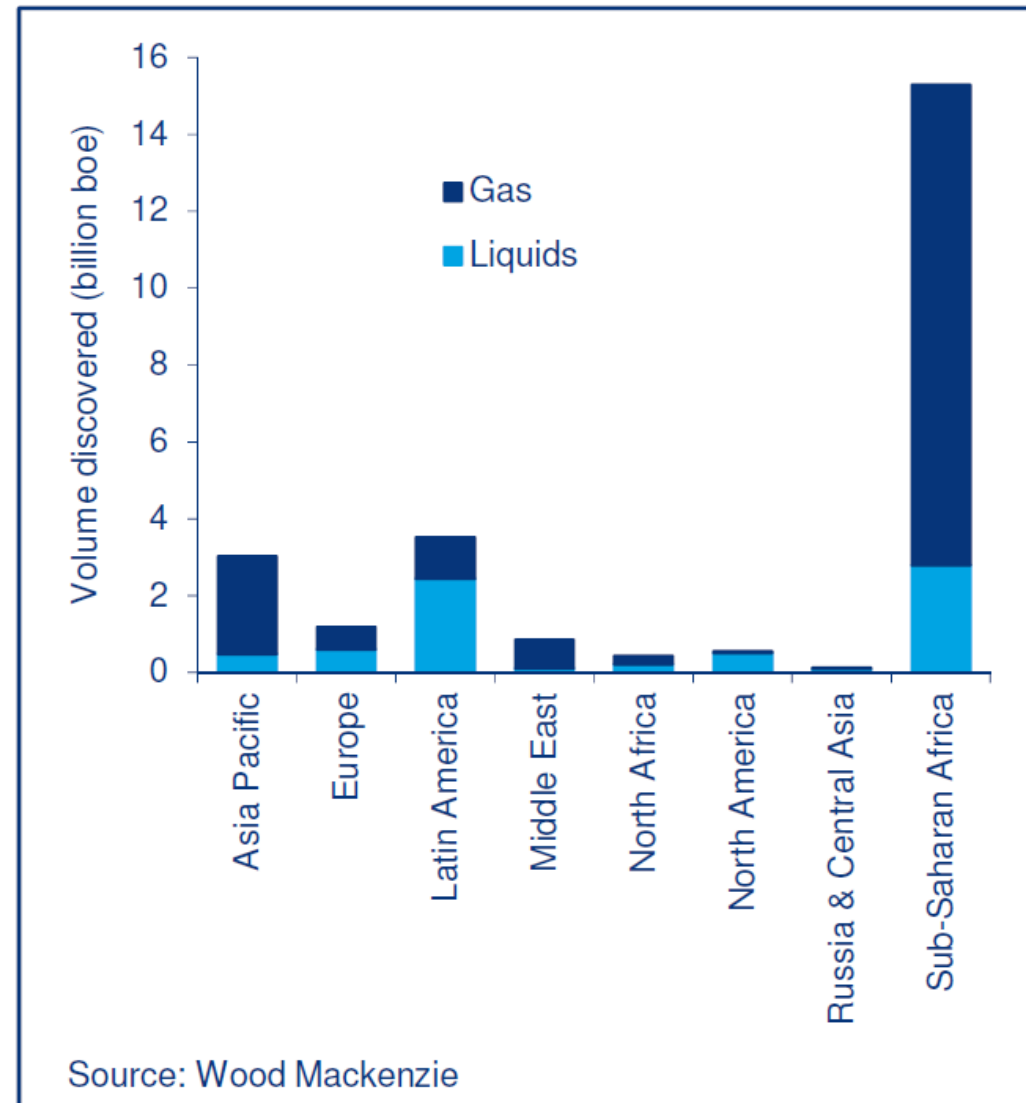


## LINKING GLOBAL BASIN KNOWLEDGE

- Sub-Saharan Africa (SSA) is attracting great interest from exploration industry.
- 2012 is the most successful for exploration over the last ten years in SSA.
- Estimated discovered volumes in SSA over 15 billion boe in 2012

(source: Wood Mackenzie)

## New field resources discovered in 2012, by region



# A LONG HISTORY OF DEEPWATER DEVELOPMENT

## BRAZIL – BC10



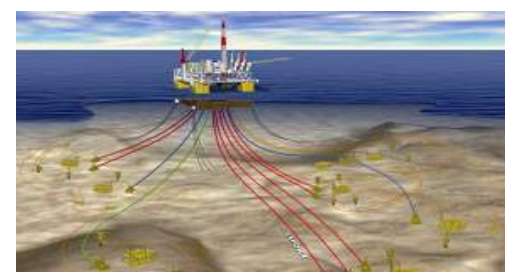
FPSO CONSTRUCTION

## GOM - PERDIDO

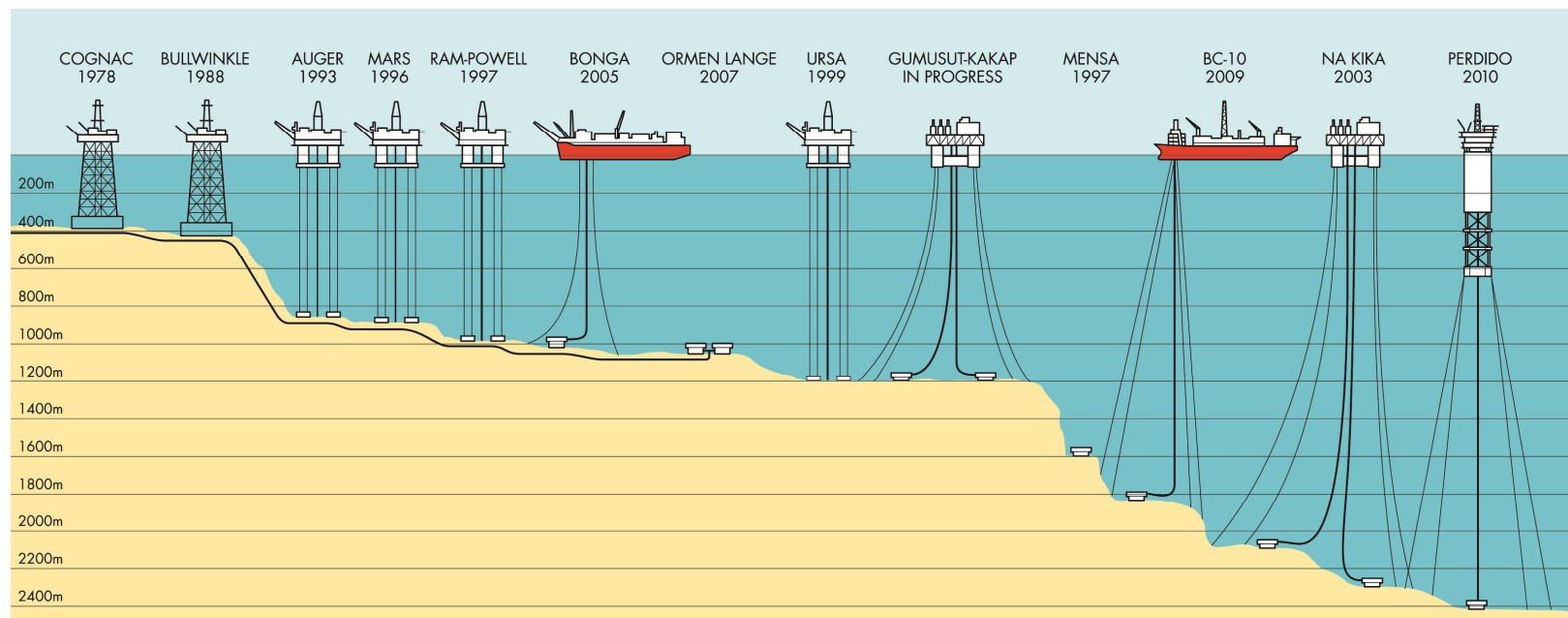


PERDIDO SPAR HULL

## MALAYSIA - GUMUSUT



DEEPWATER SEMI-SUBMERSIBLE





# SHELL TECHNOLOGY AND LNG LEADERSHIP

## *Onshore LNG*



**50+ years of LNG development and operating experience in remote locations**

- Designing for lowest life-cycle costs
- Flawless start-up program
- Highest plant utilizations in industry
- Local staff participations > 95%

## *Floating LNG*

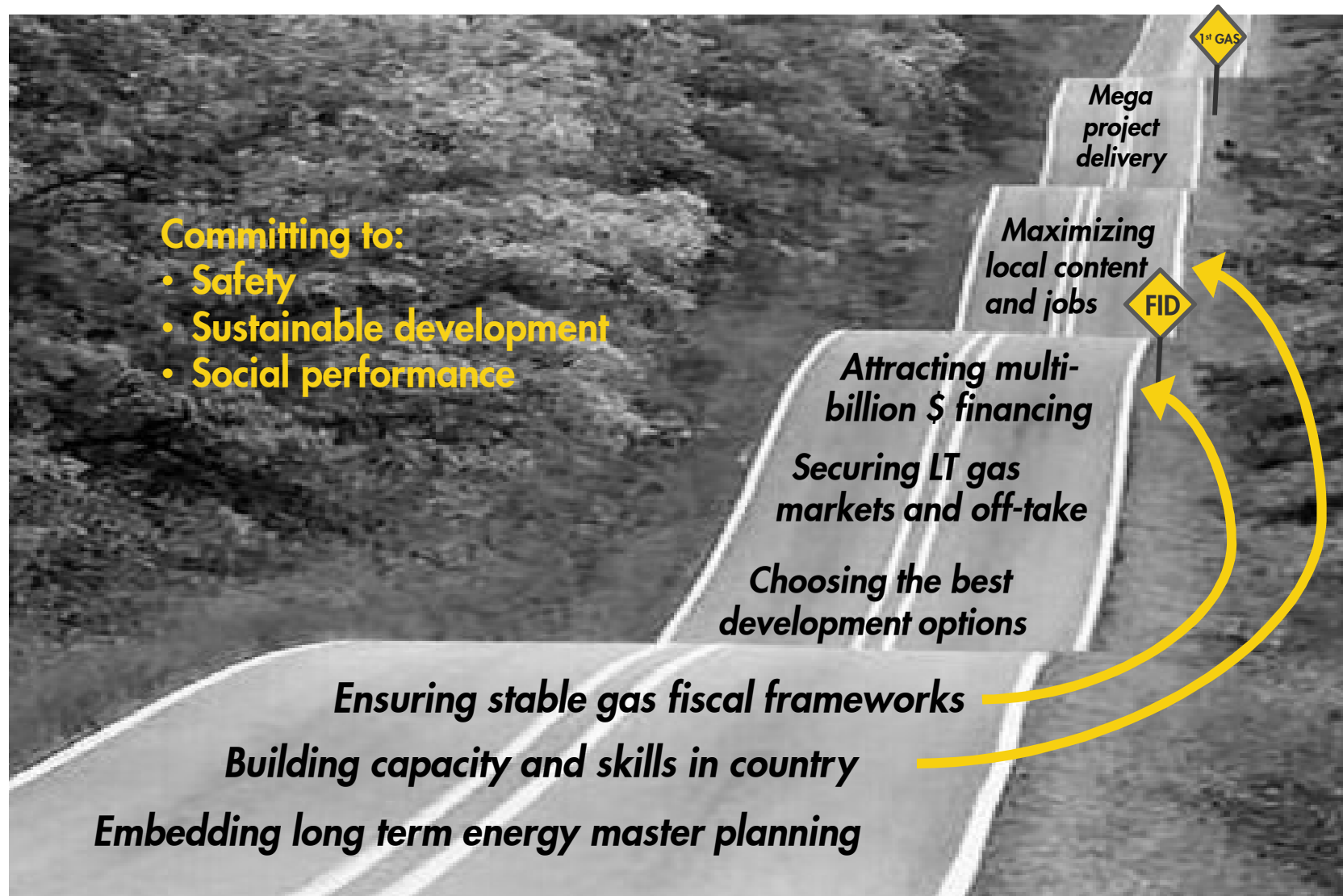


**Unique and mature floating LNG solution to develop offshore deepwater gas fields**

- Cost competitive
- Quick to deploy
- Low environmental footprint
- Large impact for economy



# A JOURNEY IN NATURAL GAS - WHAT IT TAKES



# WORKING IN TRUE PARTNERSHIPS

## Shell as partner for Governments and National Oil Companies



- Contributing to national development
- Accessing, utilising and monetising energy resources
- Ensuring security of energy supplies
- Building capacity and fostering regional talent
- Long experience in joint ventures
- Committing to safety, sustainable development and social performance

