

TRANSFORMING SUB-SAHARAN AFRICA VIA ENERGY SECTOR REFORM AND INVESTMENT



Presentation to “Energy in Namibia” Conference
November 4, 2015

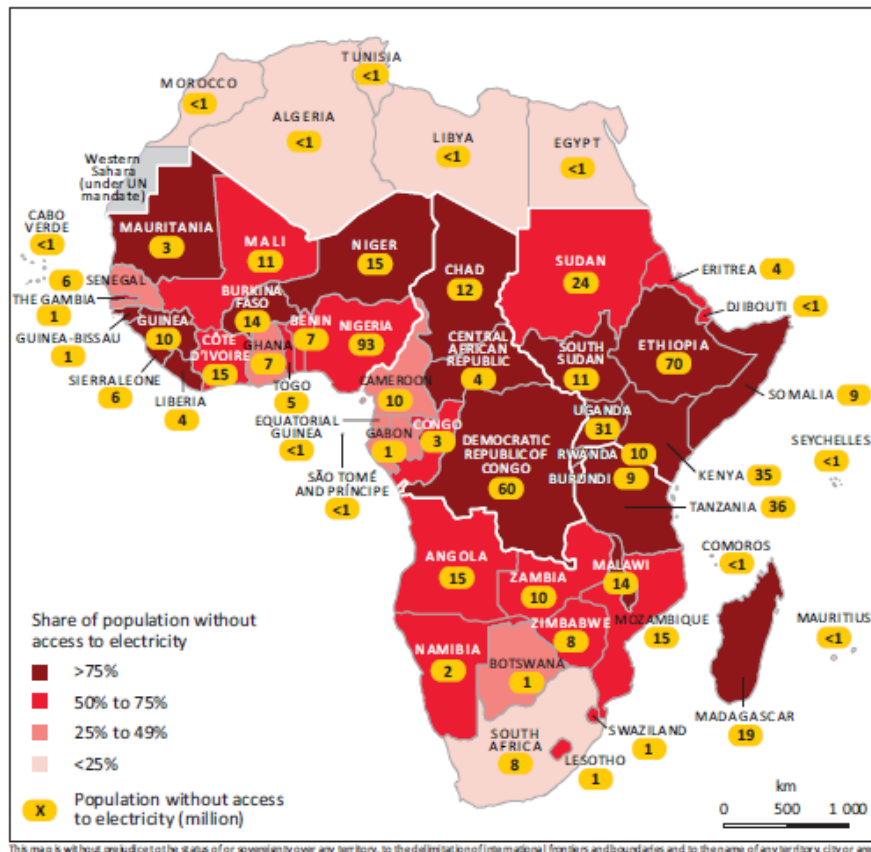
OUTLINE

- Addressing development challenges in the presence of vast unharnessed energy resource potential in SSA
- Transforming SSA: high-impact investment opportunities for public private partnerships

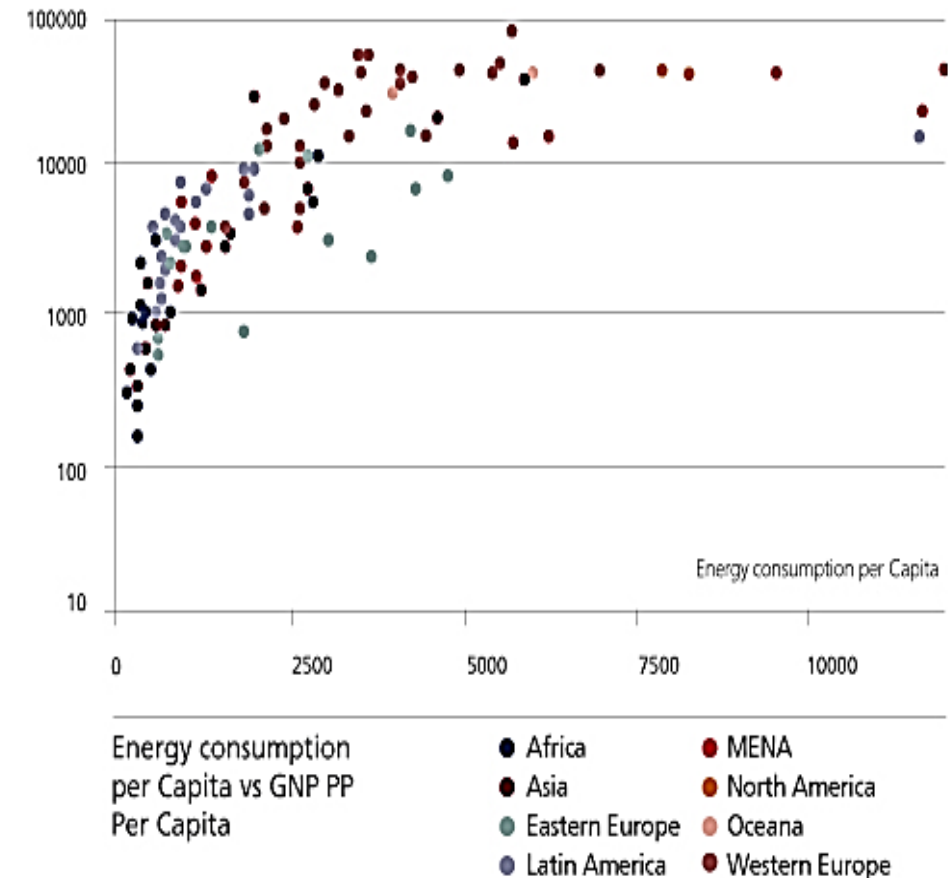
AFRICA'S ENERGY DEVELOPMENT CHALLENGE

*Increased energy access leads to **economic growth**, **poverty reduction**, and **shared prosperity***

- **600 million** people and **10 million SMEs** have no access in Africa
- Energy growth is not keeping pace with GDP growth

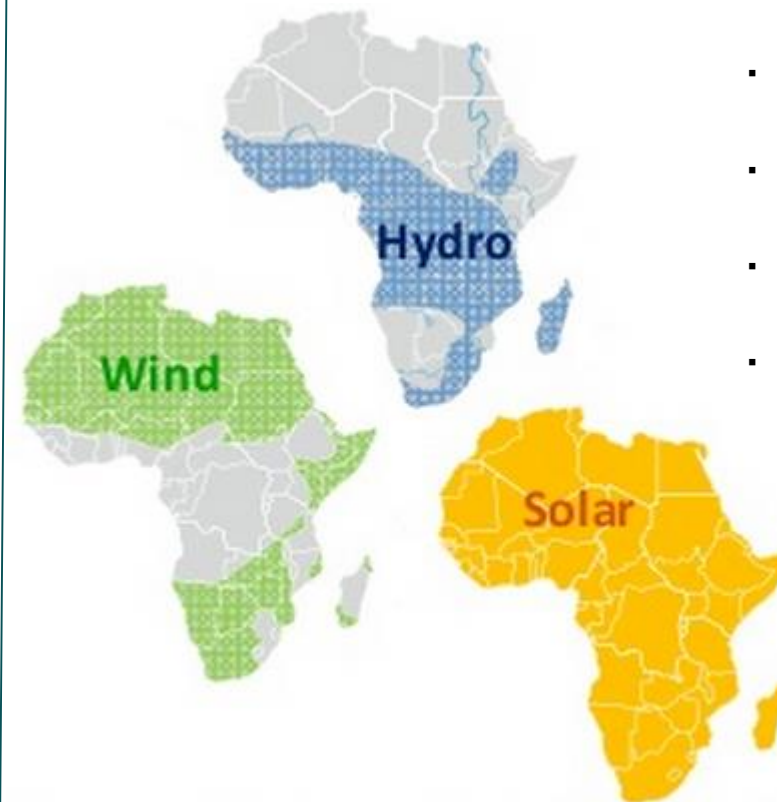
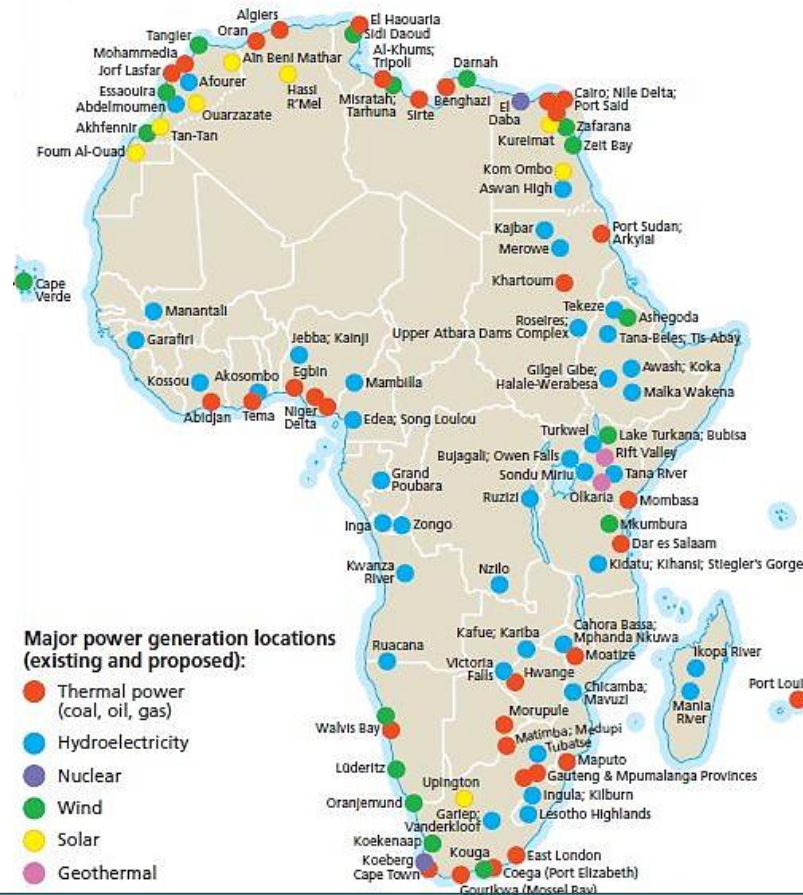


Source: EU and World Bank Estimates



AFRICA'S ENERGY RESOURCE POTENTIAL

- ❑ Abundance of **low carbon, low cost** energy development resources
 - ❑ **45 GW of feasible Hydropower** - One of Africa's most promising drivers for green growth
 - ❑ **Major reserves of Natural Gas** - West: Nigeria, Gulf of Guinea, East: Mozambique, Tanzania
 - ❑ **15 GW of Geothermal potential** - African Rift Valley
 - ❑ **Over 1,000 GW of Wind and Solar** - Needs to be economically dispatched with attentive siting and infrastructure



- Over 1,000 GW of Wind and Solar
- 45 GW of feasible Hydropower
- 15 GW of Geothermal potential
- Major reserves of Natural Gas

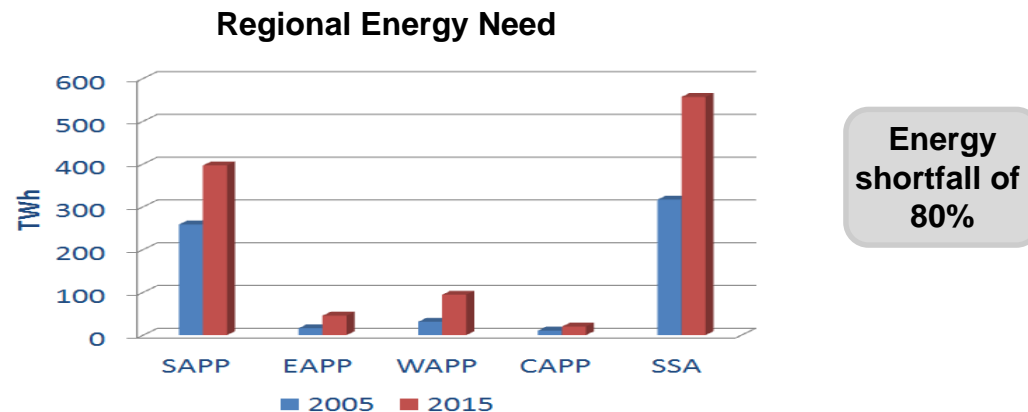
Source: Africa Energy Outlook and World Bank Estimates

GREATER INVESTMENT NEEDED TO HARNESS RESOURCE POTENTIAL: ELECTRICITY SUPPLY GAP

Africa needs to add 6-7 GW of installed capacity annually for universal access by 2030

BUT

- ❑ Currently, about **1-2 GW** of new installed capacity deployed a year.
- ❑ Access growing no more than **1%** per year in the last decade
- ❑ At this rate, less than **60%** of Africans will have electricity in their homes by 2030



GREATER INVESTMENT NEEDED TO HARNESS RESOURCE POTENTIAL: INVESTMENT GAP

Africa needs up to \$40-50 billion yearly for universal access by 2030

BUT

- ❑ **Currently, \$9-10 billion** invested yearly to provide first access to modern energy

Investment Needed

| African Power Pool Regions | Avg. Yearly Investment (\$B) | Cumulative Till 2020 (\$B) |
|----------------------------|------------------------------|----------------------------|
| CAPP | 6.5 | 52.0 |
| EAPP | 14.5 | 116.0 |
| SAPP | 18.5 | 148.0 |
| WAPP | 10.5 | 84.0 |
| Total | 50.0 | 400.0 |

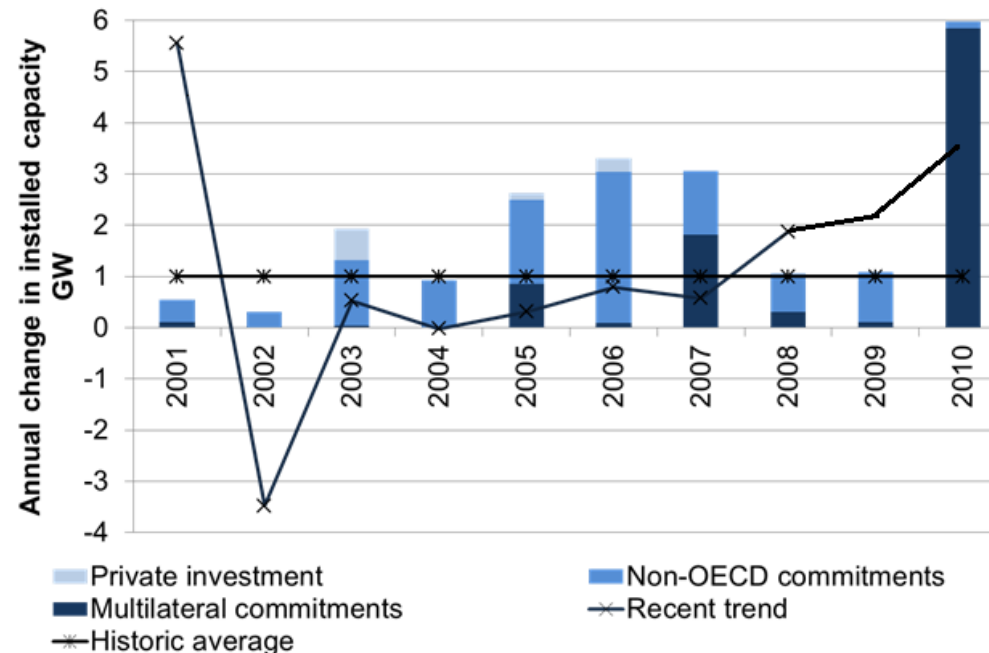
**Financing
shortfall of
80%**

Current Investment Trend

| Financiers | Avg. Yearly Investment (\$B) | Cumulative Till 2020 (\$B) |
|---------------------|------------------------------|----------------------------|
| World Bank | 1.5 | 12.0 |
| Other Multilaterals | 1.5 | 12.0 |
| Emerging financiers | 2.0 | 15.0 |
| Private sector | 5.0 | 41.0 |
| Total | 10.0 | 80.0 |

UNTAPPED POTENTIAL FOR PRIVATE SECTOR INVESTMENT

- ❑ **Private sector investments in energy in Africa is 1% of all such investments** in developing regions (vs. 34% for South Asia, 26% for LAC, or 25% for ECA)
- ❑ Six SSA countries concentrate 80% of these investments*
- ❑ Leveraging **private sector partnerships** with innovative mechanisms/increased focus on instruments such as **guarantees** critical



THE WORLD BANK GROUP

- **The World Bank**
 - **International Bank for Reconstruction and Development (1944)**
 - **International Development Association (1960)**
- **International Finance Corporation (1956)**
- **International Centre for Settlement of Investment Disputes (1966)**
- **Multilateral Investment Guarantee Agency (1988)**

TWIN GOALS OF THE WORLD BANK GROUP

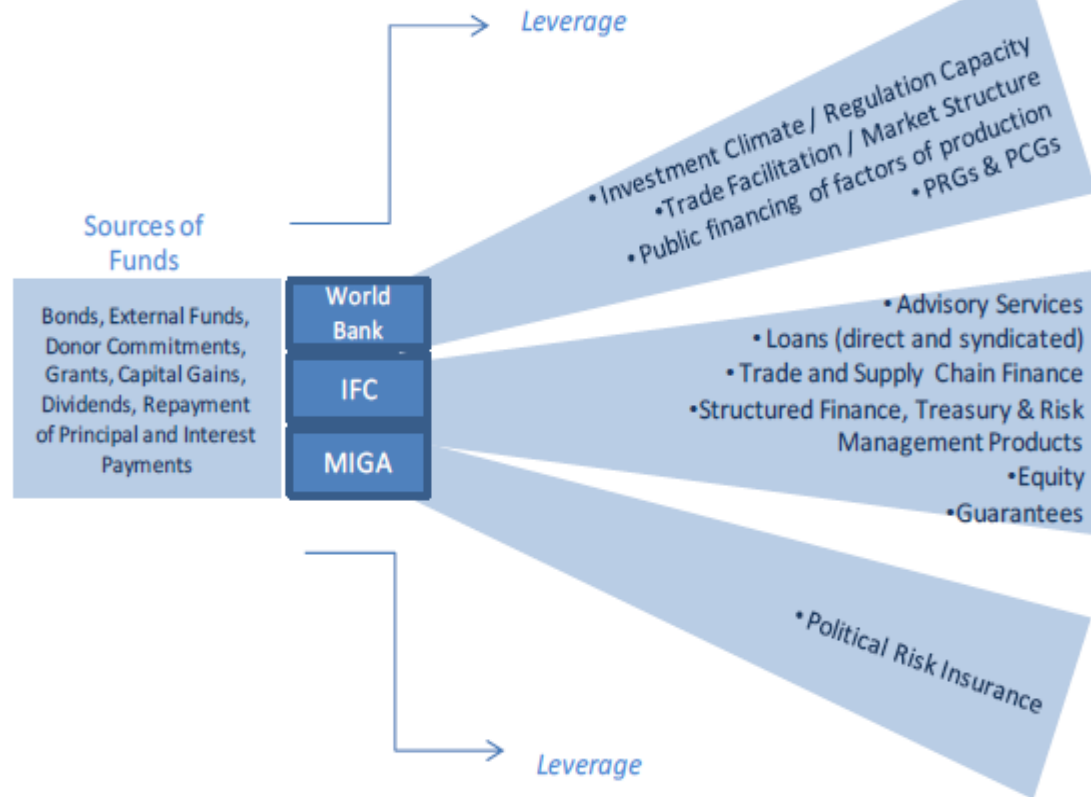
- **End extreme poverty and boost shared prosperity by 2030**
 - Reduce the percentage of people in this world living on less than US\$1.25 per day to 3% by 2030
 - Promote income growth of the bottom 40% of the population in every developing nation

ROLE OF THE WBG INSTITUTIONS



LEVERAGING PARTNERSHIPS TO SCALE UP INVESTMENTS

Significantly increasing investment: a challenge but also opportunity to leverage partnerships



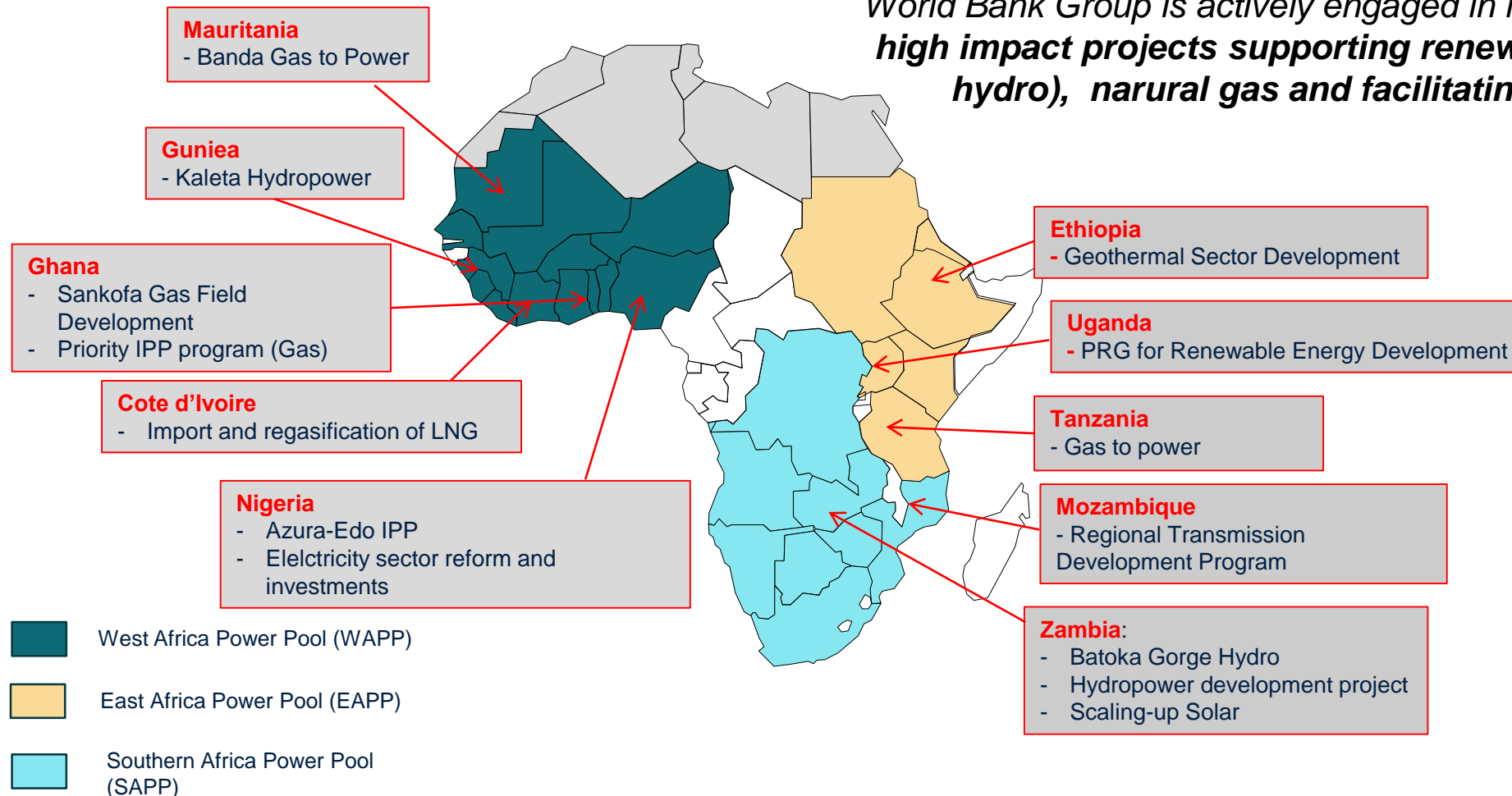
- ***Limited public resources can be utilized to **reduce investment risk** and promote growth***

OUTLINE

- Addressing development challenges in the presence of vast unharnessed energy resource potential in SSA
- Transforming SSA: high-impact investment opportunities for public private partnerships

OPPORTUNITIES FOR TRANSFORMATIVE IMPACT

World Bank Group is actively engaged in investment in large-scale high impact projects supporting renewables (including large hydro), natural gas and facilitating electricity trade



EAST AFRICA POWER POOL

GEOHERMAL SECTOR DEVELOPMENT PROJECT (ETHIOPIA)



Overview

- Estimated installed capacity: 70+ MW
- Estimated cost: US\$ 220 million
- Phase 1: Confirm the geothermal resources and support the Government in establishing its institutional framework for geothermal development using World Bank concessional financing
- Phase 2: 1st geothermal site developed through public finance: government contribution + concessional financing from development partners
- 2nd geothermal site developed as PPP: with upstream reconnaissance, exploration and test drilling supported through public (concessional) financing + competitivel bidding to attract private financing in production field development and power plant construction



Benefits to Governments and Utilities

- Improved country's electricity generation mix;
- strengthening the Government's agenda to expand access through increase in base load electricity generation potential and reliability of supply;
- Facilitated export to neighboring countries;
- Improved capacity of EEP; and strengthened institutional, legal and regulatory framework to attract private capital to geothermal development;
- Eventual transfer of cost savings from policy and business environment improvements to electricity consumers through a competitive tariff.

Projected Timeline

| Activity | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|------|------|------|------|------|------|------|
| Aluto Site | | | | | | | |
| Drilling of wells, preparation of feasibility studies | | | | | | | |
| Construction of a power plant | | | | | | | |
| Alalobad Site | | | | | | | |
| Surface exploration | | | | | | | |
| Drilling tests | | | | | | | |
| PPP tender and construction | | | | | | | |

SINGIDA WIND PROJECT (TANZANIA)



Overview

- Estimated installed capacity: 100 MW
- Estimated cost: US\$280 million
- Structuring: IPP with private financing, no concessional financing foreseen
- Expected to be the first operating wind IPP in Tanzania
- Part of a series of wind farm projects situated east of Singida, Northern Tanzania, approximately 700 km from Dar-es-Salaam.
- Will benefit from the close proximity (about 11 kilometers) to the prospective high voltage (400 kV) transmission infrastructure, to be commissioned in March 2016.
- An international private sector developer has been developing the project with a local partner.
- IFC has taken an equity stake in the project. WB requested to provide guarantees to cover the risks of the national electric utility,



Photo: Dana Smillie / World Bank

Benefits to Governments and Utilities

- Increase generation capacity for the existing and new consumers, thus supporting expanding access;
- Supporting the Government in its goal to increase share of wind generation capacity in country's fuel mix
- Complementary to the existing hydropower generation as the windiest months typically fall during the dry season.
- Stable wind energy tariff over the years (as no fuel source is required which could cause fluctuations in the tariffs); in the longer term wind energy is likely to become cheaper.

Projected Timeline

| Activity | 2015 | 2016 | 2017 | 2018 |
|-------------------|------|------|------|------|
| PPA negotiations | | | | |
| Financial closure | | | | |
| Commissioning | | | | |
| Operation | | | | |

GAS-FIRED POWER PLANT PROJECT (TANZANIA)



Overview

- Estimated installed capacity: 250 MW
- Estimated cost: US\$250 million
- Structuring: PPP/ IPP
- The Government has developed a gas-to-power program, which includes investments in the gas producing fields, gas transport infrastructure, and power plants.
- The Government is looking for private investors to develop a gas-fired power plant of about 250 MW, under a long-term power purchase agreement with TANESCO.
- TANESCO has hired a transaction advisor, financed from an IDA Credit, to help structure the transaction and identify investors.



Benefits to Governments and Utilities

- Increase generation capacity for the existing and new consumers, thus supporting expanding access;
- Attract private investment in the power sector, reducing pressure on public financing and electricity tariffs;
- Mitigate the variability of hydropower and the risk of electricity shortages during the “dry periods” in a cost-effective manner.

Projected Timeline

| Activity | 2015 | 2016 | 2017 | 2018 | 2019 |
|--------------------------------------|------|------|------|------|------|
| Preparation of transaction documents | | | | | |
| Selection of developer | | | | | |
| Financial Closure | | | | | |
| Construction | | | | | |

PARTIAL RISK GUARANTEE FOR RENEWABLE ENERGY DEVELOPMENT (UGANDA)



Overview

- Estimated installed capacity: 200 MW
- Estimated cost: US\$ 160 million
- Structuring: Partial Risk Guarantee to support IPP financing
- GoU's GET FiT program intends to fast-track about 20 small-scale renewable energy generation projects, promoted by private developers to transform Uganda's energy mix within a period of 3-5 years.
- Series of WB (IDA) Guarantees harnesses renewable energy resources, including small hydro, solar and wind by promoting small private power producers (SPPPs) by complimenting GET FiT.
- Reduced cost of financing for the developers with partial risk guarantee support



Photo: Raihan Elahi / World Bank

Benefits to Governments and Utilities

- Attract more private investment to develop Uganda's renewable energy resources;
- Help the Government to maintain current level of Feed in Tariff;
- Quick signing of contracts, with use of standard Power Purchase Agreement and Implementation Agreement.

Current status and next step

- The Project is at implementation stage.
- About 5 small hydro projects and 2 small solar PV projects have signed PPA and IA. (Projects received financing from DFIs and did not require Bank supported PRG).
- Muvumbe hydro power project (6.5 MW) is raising funds from conventional banks and have requested support from PRG to reduce its cost of financing.
- WB is closely working with Muvumbe to offer PRG support to this project.
- Muvumbe PRG is expected to become operational in 2016.

SOUTHERN AFRICA POWER POOL

BATOKA GORGE HYDRO POWER PROJECT (ZAMBIA AND ZIMBABWE)



Overview

- Estimated installed capacity: 1,600 – 2,400 MW
- Estimated cost: US\$ 2 – 2.6 billion
- Structuring: TBD
- The Project shall also entail construction of other infrastructure such as power transmission lines, access roads and housing.
- Project ranks high as a least cost (unit cost of generation) option for both Zambia and Zimbabwe.



Photo: World Bank

Benefits to Governments and Utilities

- Increased base-load generation capacity;
- Increased reliability of electricity supply in both countries
- Increased capacity to connect new consumers to the national grids of the two countries, this supporting access expansion agenda;
- Possibility to export electricity to wider Southern Africa region.

Projected Timeline

| Activity | 2015 | 2016 | 2017 | 2018 | 2019 | 2021 | 2022 | ... |
|--------------------------------------|------|------|------|------|------|------|------|-----|
| Preparation of feasibility study | | | | | | | | |
| Project approved for financing (exp) | | | | | | | | |
| Construction (exp) | | | | | | | | |

HYDROPOWER DEVELOPMENT (ZAMBIA)



Overview

- Estimated installed capacity: ~500 MW
- Estimated cost: TBD
- Structuring: Technical Assistance and Guarantee to support IPPs
- Objective is to improve efficiency of Zambia's procurement process to allow GoZ to award contracts to qualified developers to construct hydropower plants following a transparent and competitive process
- World Bank may finance feasibility studies of selected hydropower plants and help the GoZ in following a transparent and competitive procurement process to award contracts for up to 500 MW of hydro power plants.
- WB technical assistance to manage a procurement process
- WB may also provide risk enhancement options, upon Government's request.
- Private sector entering the procurement process with assurance that bid evaluation will be carried out as per a pre-determined timeline



Benefits to Governments and Utilities

- A transparent and competitive procurement process to select qualified developers;
- Preparing bidding documents based on findings of a feasibility study to reduce development risk;
- Speedy contract award after bid evaluation.

Current status and next step

- Discussion between the Government and the World Bank is ongoing.
- Preparation of a Technical Assistance project would commence upon receiving a formal request from the Government of Zambia by the World Bank.

GUARANTEE FOR UTILITY SCALE SOLAR (ZAMBIA)



Overview

- Estimated installed capacity: 300 MW
- Estimated cost: US\$ 60 million as guarantee
- Structuring: World Bank Guarantee to promote PPP approach
- Private sector sponsors will be selected following open and transparent procurement process, to set up solar PV power plants of 50 MW size each, at different locations
- Government of Zambia has signed a Financial and Advisory Services Agreement with IFC.
- IFC will act as the Government's Transaction Advisor to manage a procurement process for the first two 50 MW solar PV power plants.
- Standardized bidding document developed by WBG's Scaling Solar initiative, along with a model Power Purchase Agreement will be used.
- World Bank will provide a Guarantee to reduce payment risks of the electricity purchaser (ZESCO) from up to 300 MW of solar PV power plants, with private sector investment financing



Benefits to Governments and Utilities

- Ensuring predictability of the process through:
 - a transparent and competitive procurement while awarding utility-scale solar PV power plants;
 - using standard contract documents to ensure efficiency;
 - disallowing any negotiations on a Power Purchase Agreement;
- Complimenting large hydropower reservoirs with utility-scale solar PV plants, thus increasing overall power supply reliability in Zambia and facilitating access expansion.

Projected Timeline

| Activity | 2015 | 2016 | 2017 |
|--------------------------------------|------|------|------|
| Preparation of transaction documents | | | |
| Selection of developer | | | |
| Financial Closure | | | |
| Construction | | | |

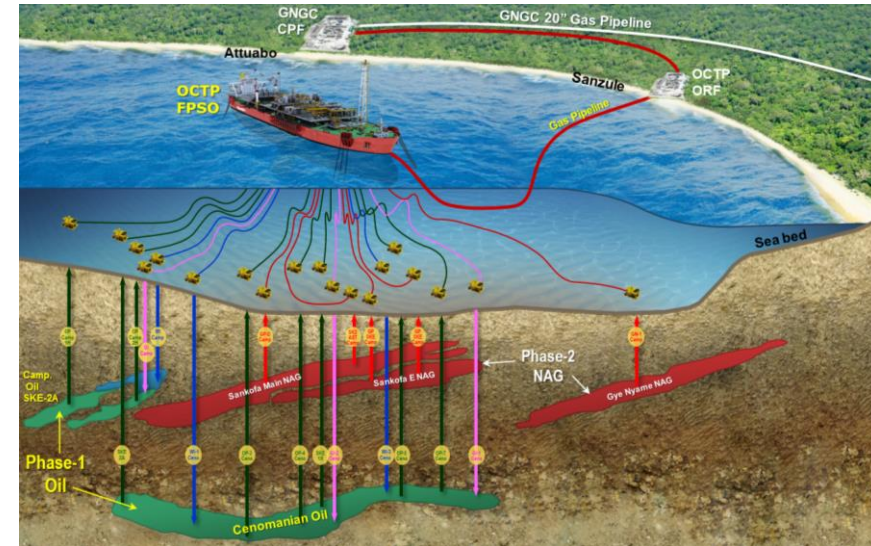
WEST AFRICA POWER POOL

SANKOFA GAS FIELD DEVELOPMENT (GHANA)



Overview

- \$171 mmcf/d of base-load supply for nearly 15 years - sufficient to supply up to 1,000MW of power generation
- Sankofa will come on line in the first half of 2018 (production at other Ghanaian gas fields is expected to start declining in 2020)
- Sankofa non-associated gas fields is part of the OCTP block together with separate oil field.
- OCTP Block will be developed by Eni and Vitol Group together with GNPC of Ghana.
- The total cost of over the lifetime of the OCTP (oil and gas) is US\$ 7.9 billion.



Project Impact

- Project offers large fiscal benefits to the Government in the form of royalties and taxes from oil and gas sales
- Project will be a game-changer for the power sector
 - *signification reduction of power generation cost through fuel price savings*
 - *Possibility to increase generation capacity*

Risk and how they are mitigated

- Macro: Fiscal management risks at sovereign level can spill over to energy sector
- Downstream Energy Sector risks: The time lag between investment decision and First Gas (three years from now) provides a time window to move forward on improving efficiency and reestablishing the financial equilibrium of the sector.
- Security structure (including cash waterfall of National Oil & Gas company, Cash Collateral, and WBG guarantees) reduces risks for GoG

PRIORITY IPP PROGRAM (GHANA)



Overview

- Ghana has one of the highest access rates in West Africa (70%) but still has a lot of suppressed demand
- Jubilee, Ten and Sankofa gas will come on line in 2016-2018 – availability of gas will unlock investments in the IPP program
- The Government of Ghana is engaging in a priority IPP program with a cumulative installed capacity of 1,500 MW
- World Bank Group gearing up to provide support in terms of financing and guarantees

Benefits to Governments and Utilities

- Increase access to sustainable and reliable energy
- Reduced reliance on expensive liquid fuel for power generation
- Ensuring a gas offtaker for gas fields that will become online in 2016-18 and that will bring important government revenues
- Increase visibility of Ghana as destination for private investment

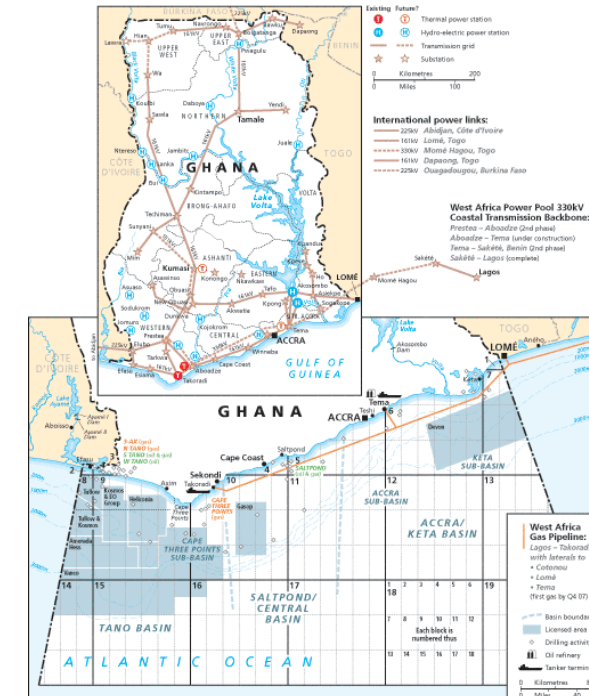


Table 1: Planned IPP Developments

| Plant/Developer | MW | Assumed Start |
|-----------------|-----|---------------|
| Amandi | 192 | 2018 |
| Jacobsen | 360 | 2018 |
| EDF/VRA | 200 | 2017 |
| Ghana1000 | 375 | 2019 |
| Globeleq | 375 | 2019 |

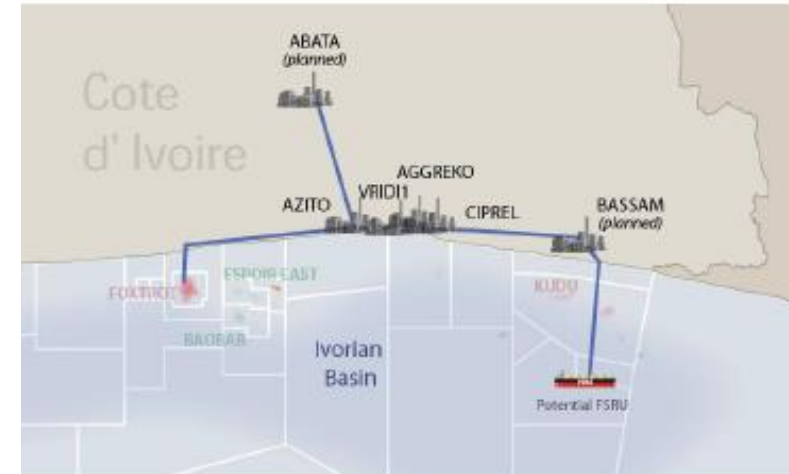
Source: World Bank Team due diligence

IMPORT AND REGASIFICATION OF LNG (COTE D'IVOIRE) - 1

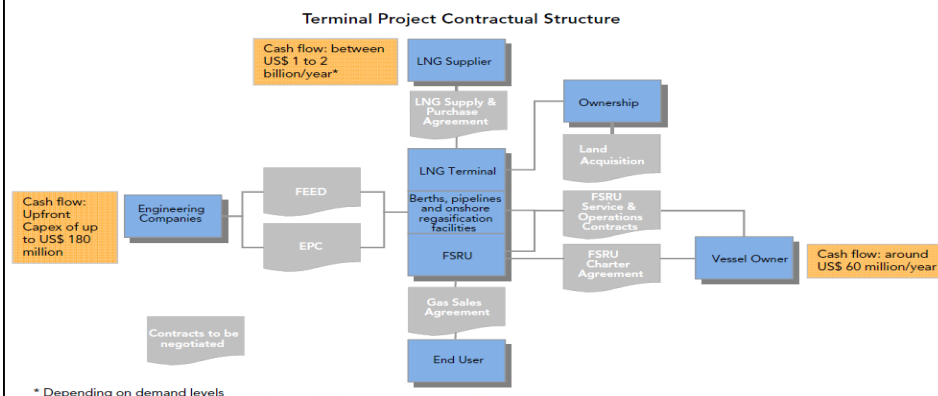


Overview

- Growing power demand in Cote d'Ivoire and sub-region
- A recent World Bank study has confirmed that the import of liquefied natural gas (LNG) via a Floating Storage and Regasification Unit (FSRU) is a viable option for Cote d'Ivoire
- Estimated cost of terminal infrastructure up to US\$ 180 million
- Complex negotiations with multiple public and private parties key to a successful outcome
- Gas supplied can generate up to 3,000 MW of power



Contractual Structuring of a Terminal Project Agreements required for project realization

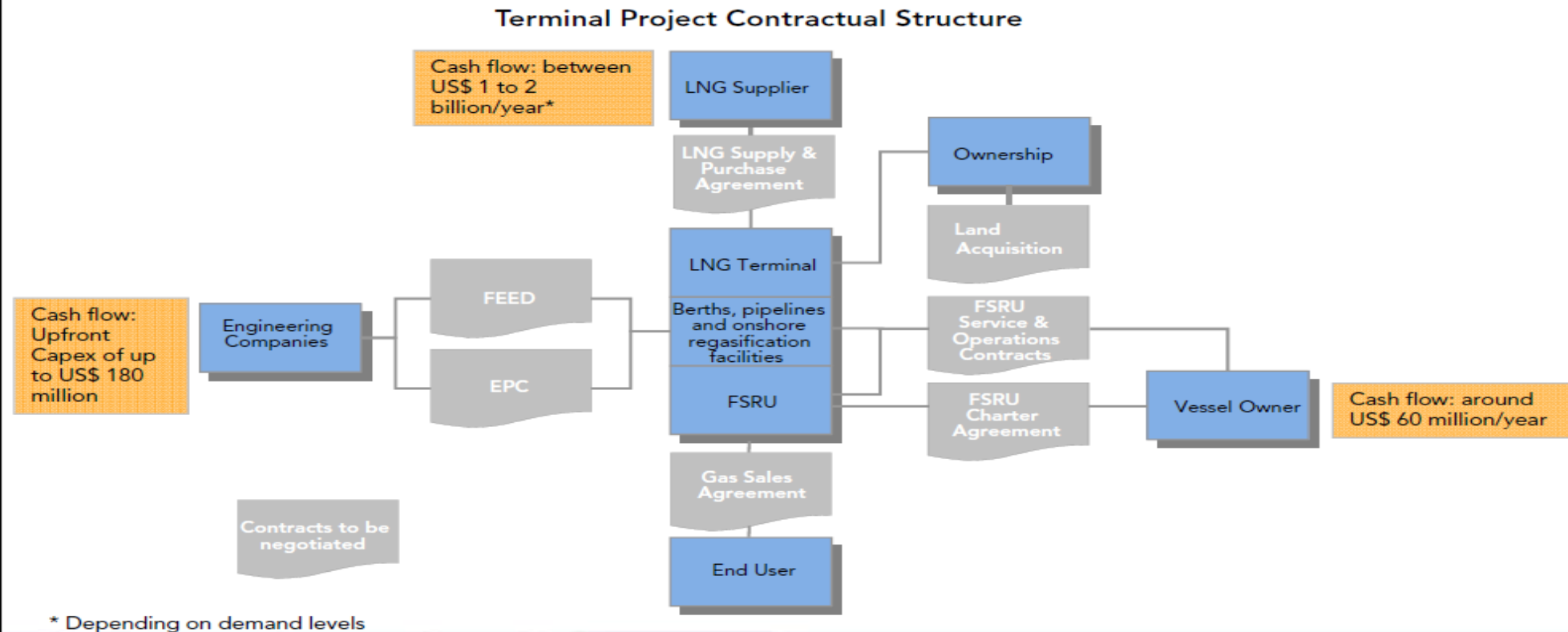


Benefits to Governments and Utilities

- Increase access to sustainable and reliable energy;
- Energy Security for West Africa Power Pool;
- Allow Cote d'Ivoire to continue to export power to neighboring countries and to become an energy hub for the region;
- Opportunity of importing, storing and regasifying liquefied natural gas (LNG) at lower cost;
- Diversification of the sources of supply in natural gas for the country.

IMPORT AND REGASIFICATION OF LNG (COTE D'IVOIRE) - 2

Contractual Structuring of a Terminal Project Agreements required for project realization



AZURA-EDO IPP (NIGERIA)



Overview

- \$900 million project cost, 459 MW gas-fired IPP to be build in Edo State Nigeria
- Financing provided by 6 equity investors and a large consortium of 14 financial institutions (including 9 DFIs)
- Flagship transaction for the ongoing power sector reforms
- WBG's multiple key roles: WB PRG covers for lenders, IFC arranger & provider of senior and subordinated debt, MIGA PRI for lenders and investors....in addition to pioneering balanced, bankable contracts and engaging in continuous sector dialogue.



WBG Instruments

- IBRD: providing two separate PRGs, a direct debt cover for commercial lenders of \$117 million, and a Liquidity PRG backing the Power Purchase Agreement payments from the national offtaker, NBET
- IFC: co-MLA for DFI senior debt tranche, mobilizing \$177.5 million of senior and \$35 million subordinated debt financing. In addition, IFC is providing \$50 million of senior and \$30 million of subordinated debt for its own account.
- MIGA: providing PRI both for equity, and \$117 million of commercial bank funded senior debt

A landmark project for Nigeria

- ✓ A pathfinder for the IPP market in Nigeria: the first IPP emerging from Nigeria's power sector reform effort to reach financial closure.
- ✓ Its expected low cost of generation: levelized cost of \$10.5c/kWh vs. \$30-50c/kWh for self-generated electricity
- ✓ The replicability of its structure – template PPA / PCOA agreements established.

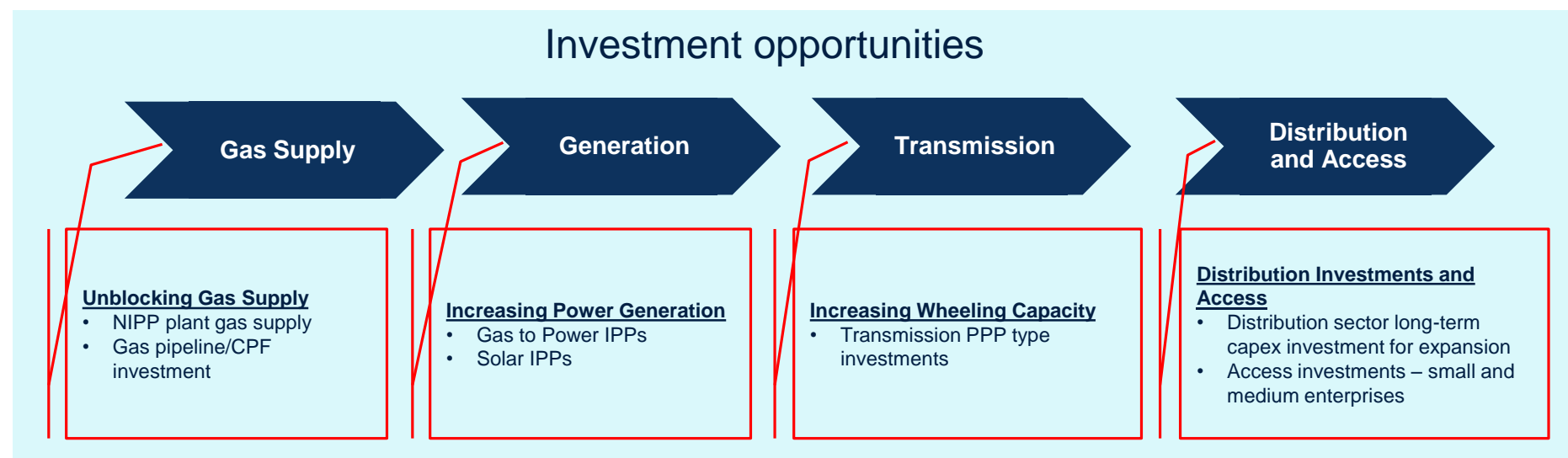
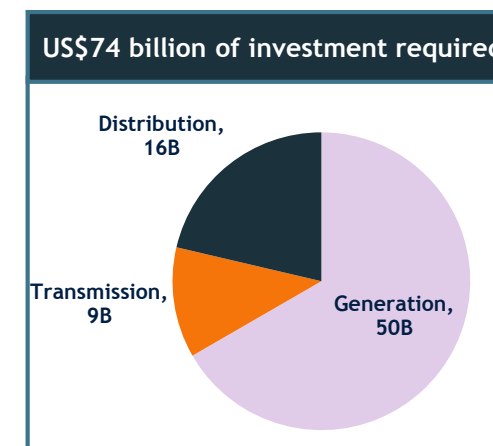


INVESTMENTS ALONG THE ENERGY VALUE CHAIN (NIGERIA)



Inaugural address of President Buhari confirmed priority of energy sector and commitment to comprehensive reform across the value chain:

- Institutional Reform – unbundling of utilities, stronger independent regulator, gas aggregation company, central buyer (Nigerian Bulk Electricity Trading PLC, NBET)
- Cost-Reflective Tariff Regime – Multi Year Tariff Order (MYTO)
- Asset Privatization – 5 generation companies (GENCOs) and 10 distribution companies (DISCOs) have been privatized
- Generation - target installed capacity of 40,000 MW by 2020 (against ~3500MW available today), including pipeline of Independent Power Projects (IPPs)
- Transmission Company of Nigeria (TCN) under Management Contract
- Privatized DISCOS to catalyze investments to achieve rapid turn-around of dilapidated infrastructure and improved service delivery
- World Bank Group and other IFIs/donors are backstopping reform and investments

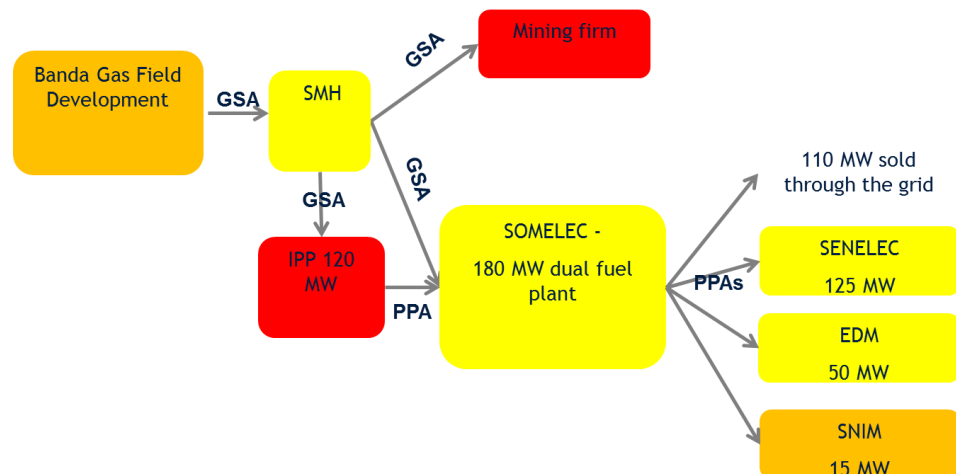
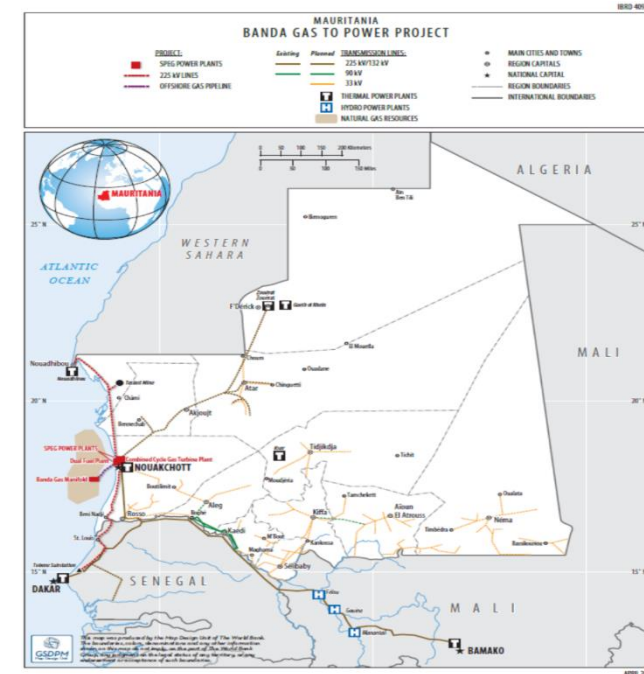


BANDA GAS TO POWER IN MAURITANIA (WITH EXPORTS TO SENEGAL AND MALI)



Overview

- Gas field could produce up to 60 mmscfd
- Expected commissioning early 2019
- Bidding process for selection of private gas developer to be launched early 2016
- Estimated US\$ 1 billion for upstream and downstream projects combined
- 300 MW of gas fired capacity to serve power in Mauritania, Senegal and Mali of which 180MW already in place
- Structured as a PPP with governments of Mauritania, Senegal and Mali as shareholders
- WBG is providing transaction support, financing and guarantees



Benefits to Governments and Utilities

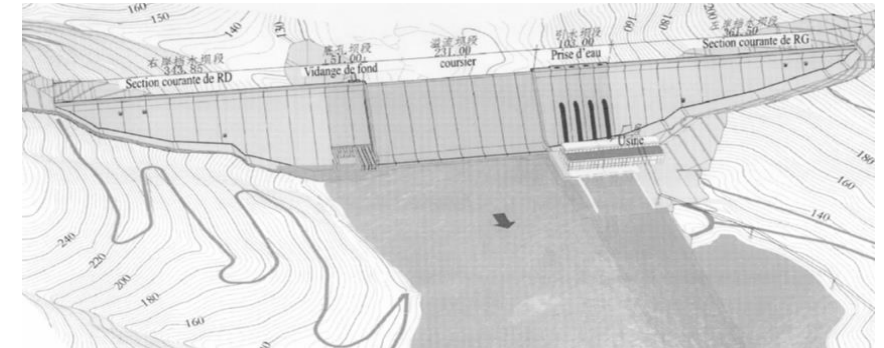
- Increase access to sustainable and reliable energy
- Cost reduction of supply by reduced reliance on expensive liquid fuel for power generation
- Certainty: project will provide utilities with power at fixed tariffs over a 20 year period
- Increase visibility of Mauritania as destination for private investment

SOUAPITI HYDROPOWER DEVELOPMENT (GUINEA)



Overview

- Two phase development:
- First phase - 400 MW capacity (241 km² reservoir, 15,000 people to be resettled, estimated cost US\$1.1 Billion)
- Souapiti will also regulate the Konkoure River, thus increasing firm capacity of the 240 MW Kaleta dam
- Offtakers include: i) Guinean national utility EDG, ii) mining companies and iii) exports to neighboring countries (OMVG and CLSG)
- IDA is financing the feasibility study to help structure the project as a PPP while AfDB is financing environmental and social studies
- Bidding process for selection of private developer to be launched by end of 2015



Benefits to Governments and Utilities

- Increase access to energy services (currently estimated at 12%);
- Enable mining projects: Competitive energy provided by Souapiti will enable mining projects, such as Simandou iron ore project, to materialize resulting in job creation, increased exports and enhanced government revenues;
- Create revenues through power export and reduce cost of supply in neighboring countries, substituting to expensive fuel oil;
- Regulate Konkoure River flows: The project will increase firm capacity of the 240 MW Kaleta dam and facilitate further hydropower development in Guinea;

Projected Timeline

| Activity | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|------------------------------------|------|------|------|------|------|------|------|
| Feasibility update and bankability | ■ | | | | | | |
| Selection of Concessionaire | | ■ | | | | | |
| Financial closure | | | ■ | | | | |
| Construction | | | | ■ | ■ | ■ | ■ |
| COD | | | | | | | ◆ |

KENIE HYDROPOWER PROJECT (MALI)



Overview

- Estimated installed capacity: 42 MW
- Estimated cost: US\$165 M
- Structuring: PPP with IDA guarantees and IFC Financing
- Located on the Niger River, 35 km downstream of Bamako
- Run-of-the-river dam: 1km long dam with a max height of 8 m, with 3x14MW units
- Generate nearly 200 GWh/year with a peak load of 34.4MW



Benefits to Governments and Utilities

- Increase access to energy services (currently estimated at 30%);
- Reduce reliance on expensive diesel generation and required government subsidies;
- Provide energy to small businesses resulting in job creation, increased exports and enhanced government revenues;

Current Status and Next Steps

- The Concession Agreement between Eranove and Government of Mali was signed on June 18, 2015.
- Reach Financial Closure by June 2016
- COD by 2020

SCALING SOLAR (SENEGAL)



Overview

- Estimated capacity: 50- 100 MW
- Estimated cost: US\$ 100-250 M
- Structuring: PPP project
- WBG – in cooperation with other donors – is supporting the Government of Senegal in the competitive selection of a private developer.
- WBG will provide stapled financing and guarantees for selected developer to ease financial close.
- Standardized and bankable documents along with transparent award process will facilitate faster financial close and provide a level playing field for lowest cost development.

Benefits to Governments and Utilities

- Speed: standardized processes and documents enable rapid tendering and financial close without the delays typically associated with project development and contract negotiations
- Certainty: balanced, bankable documents that can be offered on a non-negotiable basis with the comfort of pre-approved, financing attached to the tender and available to all bidders
- Competitive fixed-rate tariffs: tenders designed to attract competition amongst top tier industry investors, reduced transaction costs, and competitive financing terms to drive down tariff bidding.



Current Status and Next Steps

- Launch request for proposals by the end of December 2015 for financial close in mid-2016.

SUMMARY: AREAS FOR WHICH NAMIBIA MIGHT WISH TO GET WBG SUPPORT

- Natural gas to power (see Ghana and Mauritania examples)
 - Technical assistance including transaction support
 - Financing (public/ private)
 - Guarantees (public/ private)
- Renewable energy development (Senegal, Zambia, Tanzania, Uganda)
 - Technical assistance
 - Financing
 - Guarantees
- Energy sector reforms
 - E.g. via reimbursable advisory services
 - Client contracts WB for services
 - WB leads team comprising WB and external experts

THANK YOU



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