



SPEOLEF 2019

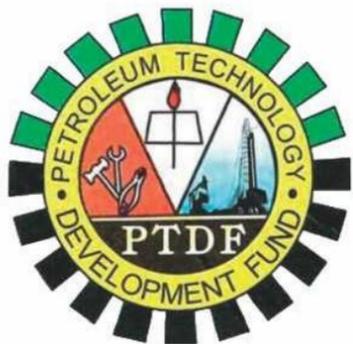
SOCIETY OF PETROLEUM ENGINEERS OLOIBIRI LECTURE SERIES AND ENERGY FORUM

The Oloibiri Lecture Series and Energy Forum (OLEF) is an annual event focused on contributing to oil and gas policy development for Nigeria in commemoration of the first oil well drilled in Nigeria by Shell Darcy at Oloibiri, Bayelsa State in 1956. The annual lecture series attracts participation from the government, regulatory agencies, Captains of industry, practitioners at all levels, as well as other key stakeholders from around Africa. The 2019 lecture series will discuss the Energy Security and Sustainable Development in Nigeria: The Way Forward.

THEME: Energy Security and Sustainable Development in Nigeria: The Way Forward

April 25, 2019 | PTDF Towers (Auditorium) | 9am
2 Memorial Close, Central Business District, Abuja

Sponsors:



The Shell Petroleum Development Company of Nigeria Limited
Operator of the NNPC/Shell/TEPNG/Agip Joint Venture



Esso Exploration and Production Nigeria Limited
In Production Sharing Contract with NNPC



Nigerian Gas Flare Commercialization Programme (NGFCP)

“Climate Change Impact and The Role of Harnessing Nigeria’s Flare Gas in the Energy Mix Transition for Economic Development – Prospects & Opportunities.”

Date: Thursday, 25th April, 2019

Time: 9am Prompt

Venue: PTDF Towers, Abuja, FCT

Justice O. Derefaka
Program Manager, NGFCP,
Ministry of Petroleum Resources (MPR), Abuja, FCT.



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Outline



- 1) Introduction
 - a) World View on Gas Flaring – Why Gas Flaring Should Stop
- 2) The Policy Approach & Strategic Imperative
- 3) Socio – Economic Considerations
- 4) The Legislative Approach
- 5) The Regulatory Framework
- 6) The Commercial & Transactional Framework (“DNA”)
- 7) Implementation Timeline
- 8) A Win – Win For All

1. The Road Map to Energy Sustainability in Nigeria
2. Nigeria's Energy Security: Opportunities, Present Threats and Key Solution Pointers.
3. National Strategic Energy Development Plan: The Objectives and Implementation Policies
4. Sustainable Oil and Gas in Nigeria: Improving People's lives (Education, Job Creation and Poverty Alleviation).
5. Petroleum Economics: Integrating Sustainability Factor into Petroleum Business Performance in Nigeria.
6. Policy Framework and Reforms for Sustainable Energy-mix and Energy Base for the Nation

21st Century Challenge: Providing More and Cleaner Energy



- Providing access to energy, while minimising negative impacts on the planet and the air we breathe, is one of the greatest challenges of the 21st century
- In 2015, the UN adopted 17 Sustainable Development Goals. **Goal 7 aims to “ensure access to affordable, reliable, sustainable and modern energy for all”**
- At a landmark UN climate conference in Paris in 2015, world leaders agreed to work towards limiting the global rise in temperature to well below 2°C above pre-industrial levels
- Meeting these goals implies changes in the way energy is produced, accessed and used **and perhaps wasted in the case of flared gas**

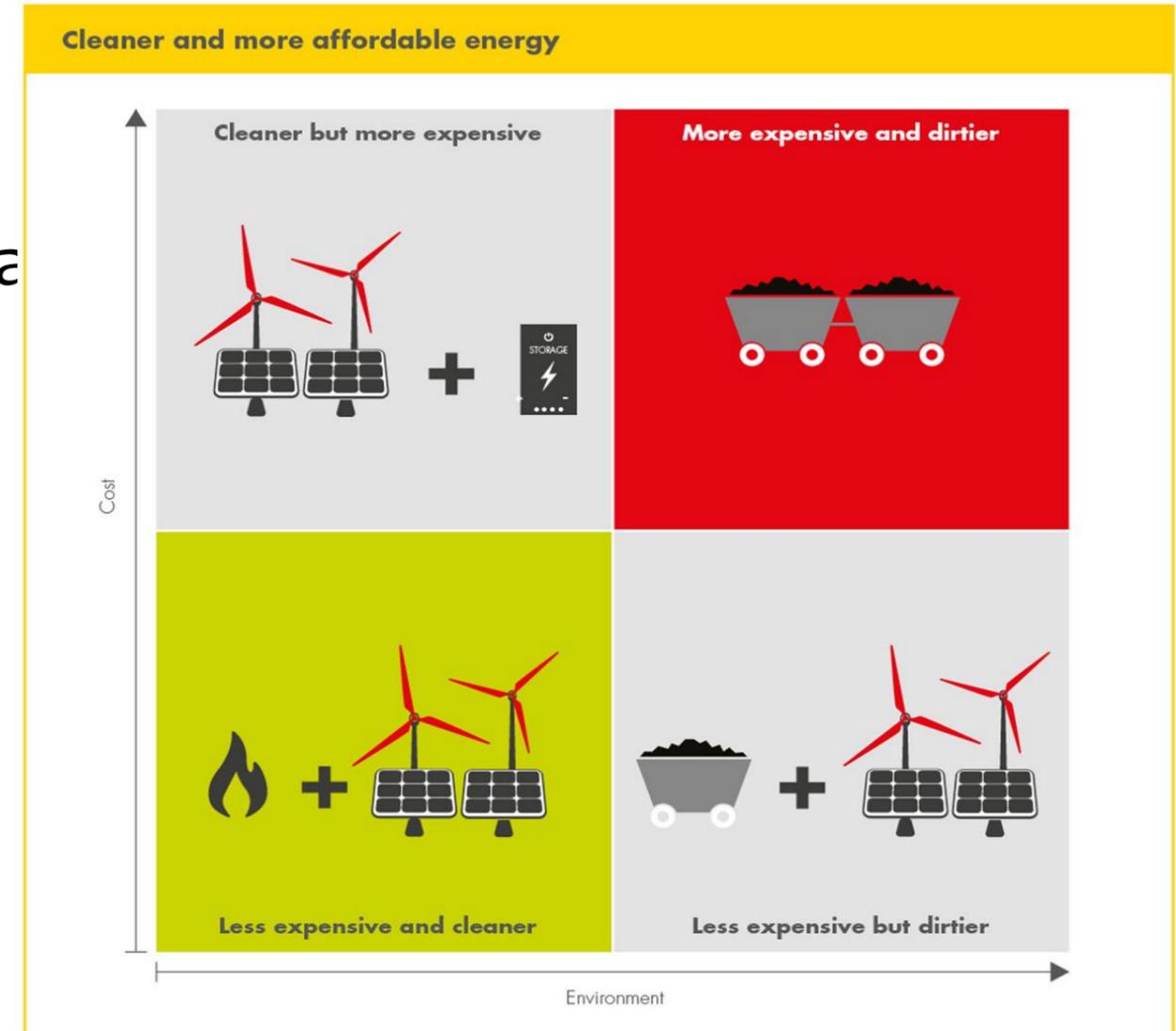


Energy Security In Nigeria - A transformation of Our Energy System is Required



- To assure Energy Security in Nigeria, the **energy transition need to proceed at different paces and of course to produce different outcomes depending on factors such as**

- Availability of natural resources
- National policies to address climate change and air quality
- Energy security
- Affordability
- Pace of economic growth
- Technological innovation
- Choices made by companies and consumers





1. Introduction

NGFCP: “Harnessing Nigeria’s flare gas for sustainable value & wealth creation”

Statement of The National Gas Policy, 2017



The purpose of the National Gas Policy is to:

- Define the policy of the Federal Government of Nigeria in respect of Nigeria's natural gas endowment,
- Establish its medium to long-term targets for gas development and utilisation and
- Record the strategies to be pursued to ensure the successful implementation of the National Gas Policy

Vision:

- *“To be an attractive gas-based industrial nation, with a significant presence in national and international markets” one way of doing this is:*
 - i.e. **End gas flaring and address environmental issues;**

Mission:

- *“To move Nigeria from a crude oil export-based economy to an attractive gas-based industrial economy”*

Global Gas Flaring in Perspective



Size of The Problem

- More than **16,000 flare sites in 90 countries** globally, many of them in Nigeria
- **About 145 - 150 BCM gas is flared** per year globally. **Enough to produce 750 billion kWh power**
 - **More than the entire power consumption on the African continent annually**
- And this is roughly equivalent to ...
 - Gas use in all US residences for a year
 - 5% of global natural gas production
 - 23% of US natural gas use
 - 30% of EU natural gas use
 - **US\$10 Billion lost revenue at \$2.00 per MMBtu**
 - 2.4 Million barrels of oil equivalent per day

Climate Impact

Around 350 - 400 million tonnes per year of CO₂ is roughly equivalent to ...

- Annual emissions from 77 Million cars (34% of US fleet)
- 2% of global CO₂ emissions from energy sources
- **US\$6 Billion carbon credit value erosion at \$15.00 per Metric Tonne**
- 20% of global steel industry CO₂ emissions
- 35% of global cement industry CO₂ emissions
- Output from 125 medium-sized coal plants about 63 gigawatts (GW)
 - 63 GW is ~20% of the current US coal fleet
 - 63 GW is ~67% of India's current coal fleet

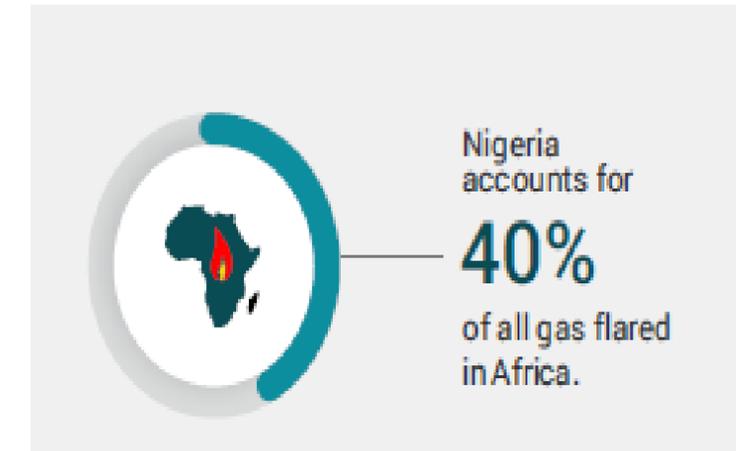
Source: GE Energy

Why Gas Flaring Should Stop



The Environmental & Health Impact

- According to UNEP, approximately 600,000 people die in Africa every year as a result of air pollution; gas flaring is a key driver of air pollution in oil-producing communities, with Nigeria accounting for **40% of all gas flared in Africa** (Source: BUDGIT)
- Contribute to **health problems** such as irregular heartbeat, acute leukaemia, aplastic anaemia, chronic bronchitis, painful breathing, aggravated asthma and premature mortality.
- Emit potent **greenhouse gases** (e.g., CO₂ and methane) that contribute to climate change
- Release particulates that cause **acid rains** that acidifies water bodies, destroys plants and forests, and accelerates the deterioration of buildings and other machinery
 - Example: 17 onshore gas flare points in Bayelsa state are estimated to cause **120,000 asthma attacks, 4,960 respiratory illnesses among children and 49 premature deaths per year** in the region



600,000

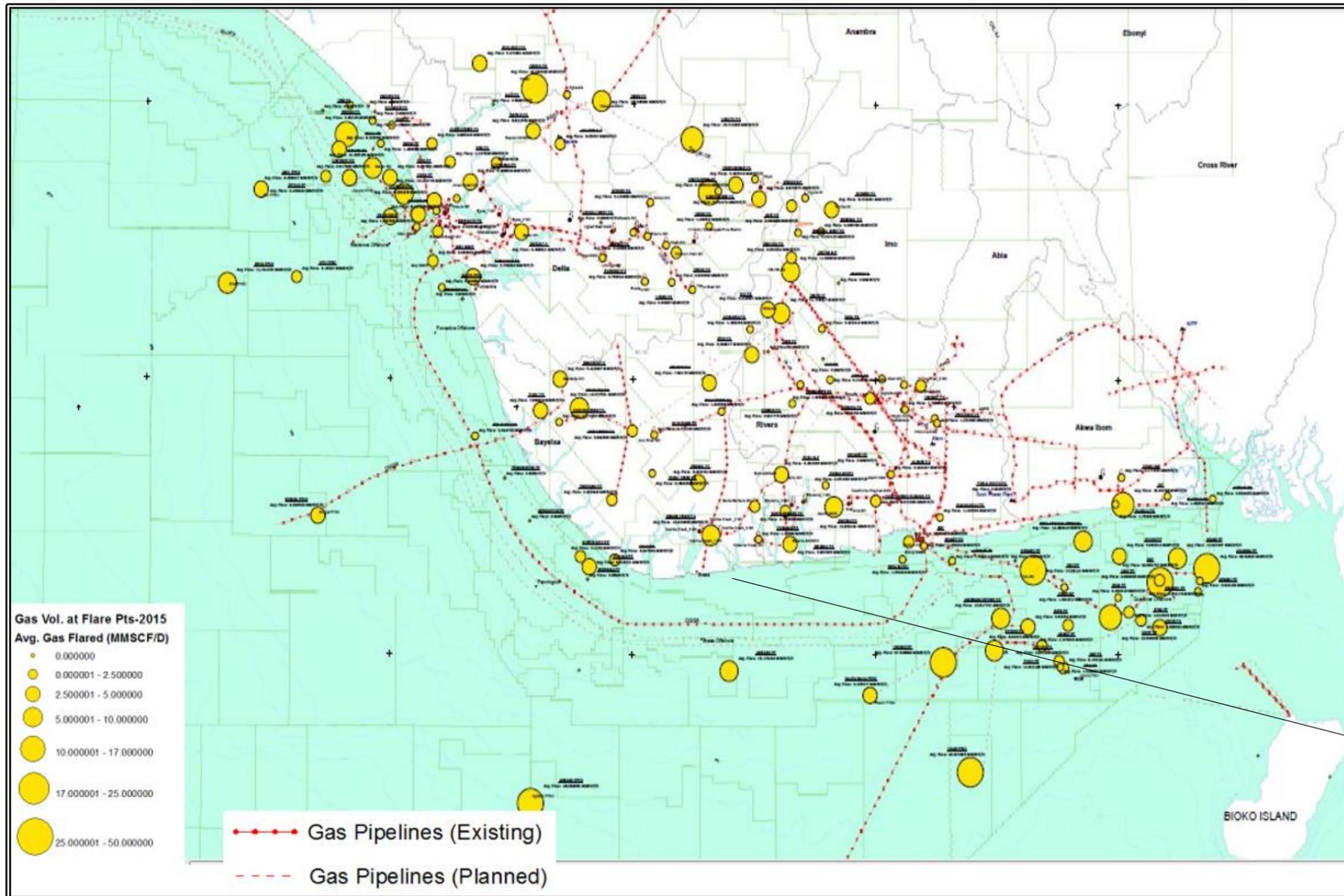
deaths per year is the equivalent of wiping out a small oil-producing community like Polaku in Bayelsa State within a year.

Gas Flaring Is A Waste of A Precious Natural Resource



- Gas flaring is a tremendous waste we cannot simply tolerate ... especially from a climate change perspective.
- Gas flaring account for 2% of all GHG emissions.
- And in a world where we are under increased climate pressure, We cannot get rid of a **precious natural resource** and fuel in that way.
- The gas we flare is **an important part of the global energy transition**, the closet ally to renewables.
- The UN has described energy as “**central to nearly every major challenge and opportunity the world faces today. Be it for jobs, security, climate change, food production or increasing incomes, access to energy for all is essential**”
- Yet, even today, little or no access to energy deprives part of the world’s population (Nigeria inclusive) of the opportunity to improve their quality of life.
- In a world where we still have **about 1.1 billion (i.e. 1 in 6 people on the planet)** people without access to electricity (i.e. more than three times the population of the USA)
- **Another 1 billion people struggle with unreliable supplies of electricity**
 - **95% of these people are from sub-Saharan Africa and Developing Asia**
 - **Of the 1.1 billion globally, Africa has 588 million...West African sub region has the highest with 175million** closely followed by Central Africa with **172 million.**
- In Nigeria with a population of **over 180 million people, only 12.5% of Nigeria’s population** have access to power supply)

Nigeria's Gas Flaring Landscape

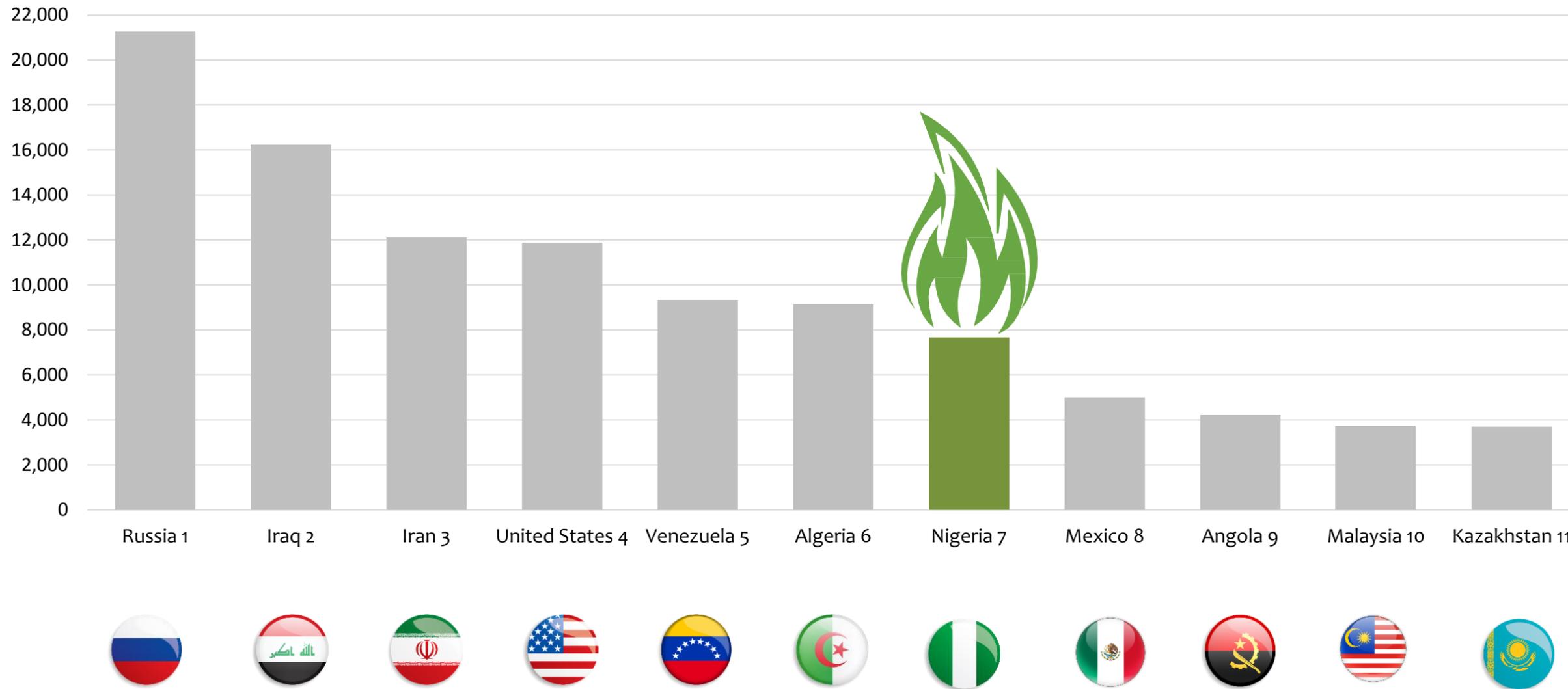


Over 178 flare locations spread across the Niger Delta - onshore and offshore



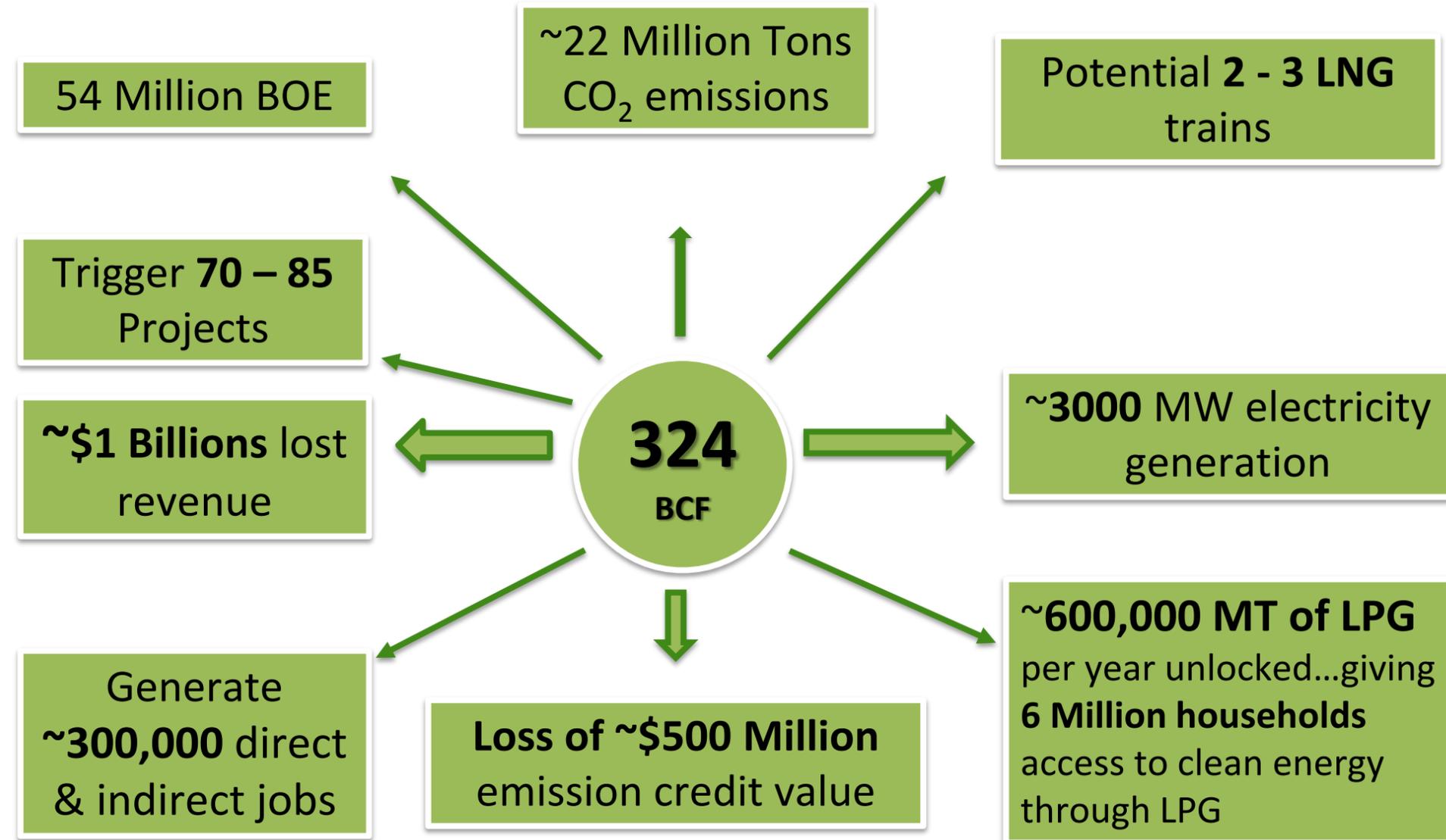
Nigeria's Ranking in the Global Gas Flare League

Volume of flared gas (Million cubic meters, 2015)



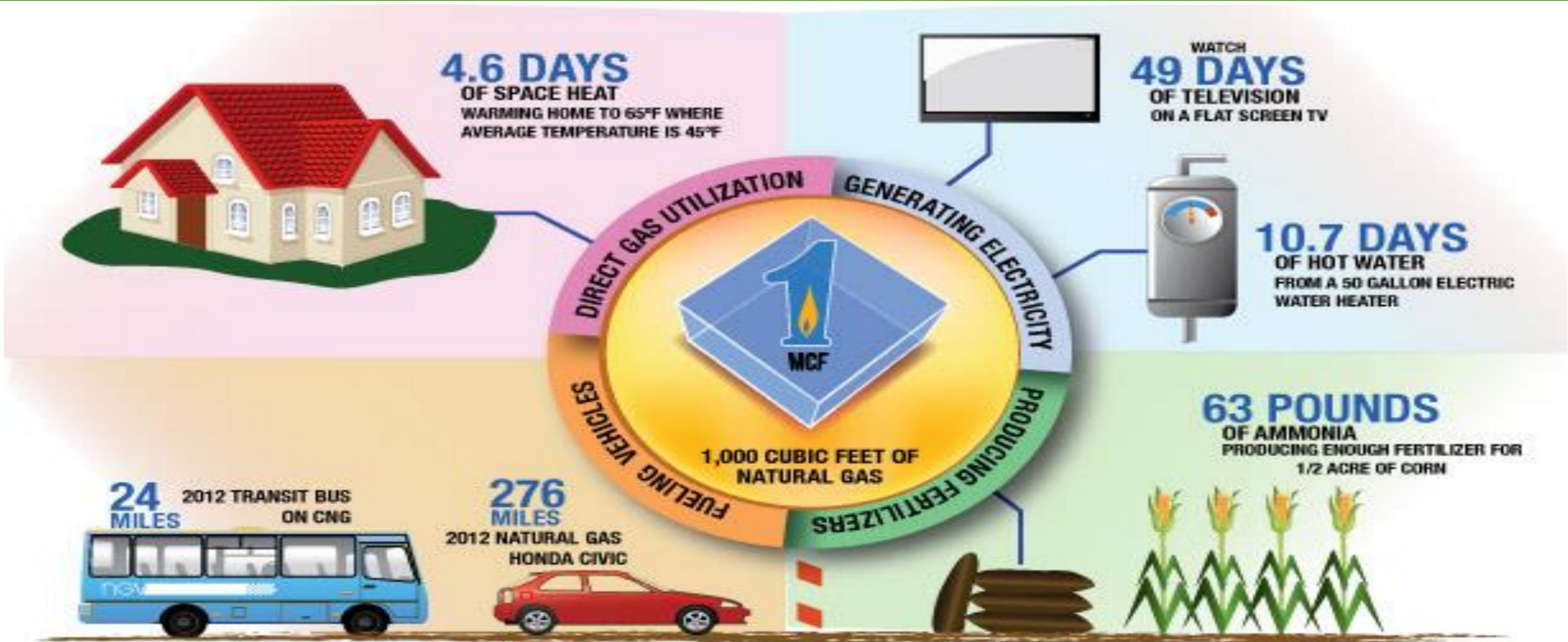
Despite a 70% decline in flaring over the past decade. In 2015, ~1,000 MMSCFD of gas was flared in Nigeria, exceeding the ~800 MMSCFD utilized for power generation and ~450 MMSCFD utilized in domestic industry

Untapped Flare Gas Potential



Although we are recording decline, the Scale of Gas Flaring is still worrisome

What can 1Mcf of Gas Do?



Imagine what 324 BCF of gas flared can do for Nigeria



2. The Policy Approach & Strategic Imperative

Flare Out Policy Positions



- The Federal Government's political will for gas flare out is reflected in the following actions:
 - **Government's declared commitment to gas flare out by 2020**
 - Nigeria's membership of the Global Gas Flare Reduction Partnership (GGFR) and the Zero Routine Flaring (ZRF) Initiative [2016]
 - FEC approval of the Nigerian Gas Flare Commercialization Programme [NGFCP] [October, 2016]
 - **Signatory country to the United Nations Framework Agreement for Climate Change (UNFCCC) ["Paris Agreement"] with a commitment to make "Intended Nationally Determined Contributions" for the reduction of greenhouse gas emissions (GHGs) [2016]**
 - **Ratification of the UNFCC by the President [May, 2017]**
 - **FEC approval of the National Gas Policy [June, 2017]**
 - **Gas Flare Out as a component of the ERGP [2017]**
 - The development of a Niger Delta Strategic Implementation Workplan [September, 2017]



President Buhari Speaking at the UN Climate Change Conference, COP 21, in Paris



President Muhammadu Buhari signs Instrument of Ratification of the Paris Agreement on Climate Change in State House on 28th March 2017

The Nigerian Oil & Gas Industry “7 Big Wins”



3 Gas Revolution

- Gas Infrastructure Development
- Gas Revolution Projects
- Promotion of Domestic Utilization of LPG and CNG
- Reduction of Gas Flaring
- Gas Commercial Framework Implementation
- Gas to Power

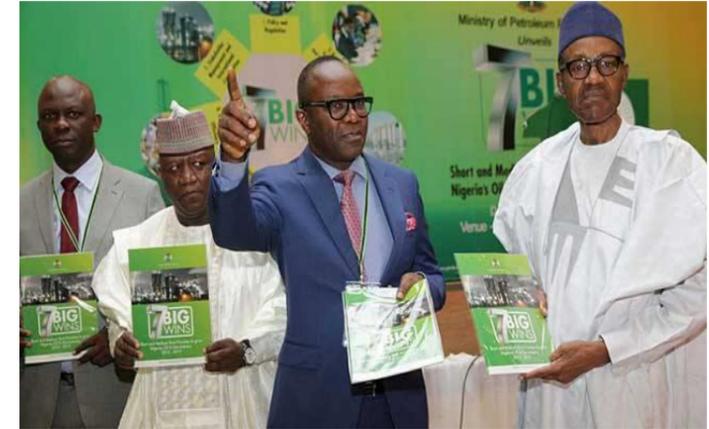
- Communication Strategy
- Stakeholder Relationship Building and Management
- International Energy Relations
- Bilateral Cooperation

- Transparency
- Capacity Building
- Institutional Strengthening and Governance Model
- ICT and Automation
- Performance Management

- Environment and Security
- Infrastructure
- Capacity Building and Economic Empowerment

- National Oil Policy
- National Gas policy
- Downstream Policy
- Fiscal Reform Policy
- Petroleum Industry Reform Bill

- Upstream
- Midstream
- Downstream



National Gas Policy – Approved by FEC, June, 2017



- **The commercialization of flared gas for supply into the domestic market is a high priority strategy for the Government in achieving the national mandate for flare-out by 2020. Plus;**
- **Government will take measures to ensure that flare capture and utilization projects are developed, and will work collaboratively with industry, development partners, providers of flare-capture technologies and third party investors.**
- **Open an industry consultation mechanism, as an important measure in ensuring flaring targets are feasible and regulations are realistic.**
- **Maximise utilization of associated gas to be treated for supply to power generation or industry.**
- **Increase the gas flaring penalty to an appropriate level sufficient to de-incentivize the practice of gas flaring whilst introducing other measures to encourage efficient gas utilization.**



FEDERAL REPUBLIC OF NIGERIA
Ministry of Petroleum Resources



National Gas Policy
Nigerian Government Policy and Actions

2017

www.petroleumresources.gov.ng

Chapter 6, Section 6.4, pg 60 - 64



Diagnostics of the Gas Flare Situation



...preliminary groundwork, case studies and economic analysis of various flare gas utilization options for the country. Major highlights from the economic analysis include:

- Harnessing gas **from the top 50 flare points** would **reduce volume of flared gas by 80%, given 2015** gas flare locations and volumes as the baseline;
- **Over 178 flare points** collectively flare about 1 billion scf of gas;
- Majority of the gas flaring locations (about 65% of them) are onshore (i.e. on land);
- **At least 80% of gas from the flaring locations can be viably utilized;**
- Although pipelines present the most viable option for transporting gas, scalable, containerized, skid mounted/barge type 'plug & play' technologies, virtual pipeline & compressed natural gas trucks would be preferred for security and other reasons;
- **About 3.5 billion US Dollars' worth of inward investments** is required to achieve the gas flare commercialization targets by 2020.
- NNPC/JV Success story of well over **70% decline in flaring over the past decade**. We still flare 1 BCF of gas in Nigeria in 2017, **exceeding the ~800 MMSCFD utilized for power generation and ~450 MMSCFD utilized in domestic industry**

NGFCP - The Strategic Imperative (1 of 2)



- Designed as the strategy to implement the policy objectives of the FG for the elimination of gas flares from Nigeria's oil & gas fields in the near term (2-3 years), with potentially enormous multiplier and development outcomes for Nigeria.
- The policy on gas flaring is also encapsulated in the National Gas Policy approved by the Federal Executive Council in June 2017.
- Designed as the contribution of the petroleum sector to Nigeria's **Intended Nationally Determined Contributions (INDC)** under the Paris Agreement (COP21);
- To eliminate gas flaring through technically and commercially sustainable gas utilization projects developed by **competent third party investors** who will be invited to participate in a competitive and transparent bid process.
- The commercialisation approach has been considered from legal, technical, economic, commercial and developmental standpoints.
- It is a **unique and historic opportunity to attract major investment** in economically viable gas flare capture projects **whilst permanently addressing a 60 year environmental problem in Nigeria.**

NGFCP - The Strategic Imperative (2 of 2)



- Third party investors are to access and utilize flared gas that is currently being sent to flare and convert into Flare-Gas-to-Market-Products (FG-2-MP) & **demonstrate project development experience and proven technology in commercial application.**
- A structure has been devised to provide **project bankability** for the Flare Gas Buyers, which is essential to the success of the Programme.
- Consistent with Nigeria's commitments for reduction of **GHG** under the Paris Climate Change Agreement, the **Program would reduce Nigeria's CO2 emissions by approximately 13 million tons/year**, which could be monetized under an **emission credits/carbon sale programme.**
- NGFCP is designed as an important “*climate change action plan*” for the Nation.
- NGFCP is **the first market driven program undertaken on this scale globally - Bidders will have flexibility of choosing which flare site(s) to bid for, the flare gas price to offer to the FGN (taking into cognisance the NGFCP floor price of US\$0.25cents per thousand standard cubic square feet of gas) and the end market gas products (FG-2-MP), as well as the technology (FG-2-MT) to be deployed/Used.**
- **A High - Impact Program**

Driving Principles



The NGFCP must:

- 1) **Reduce** gas flaring
- 2) **Benefit Niger Delta** communities
- 3) **Positively impact** the Nigerian economy
- 4) Present a **market-driven solution** for the flares.
- 5) Be **bankable** for investors and lenders
- 6) Avoid any **adverse impact** on the level or safety of Producers' E&P operations.



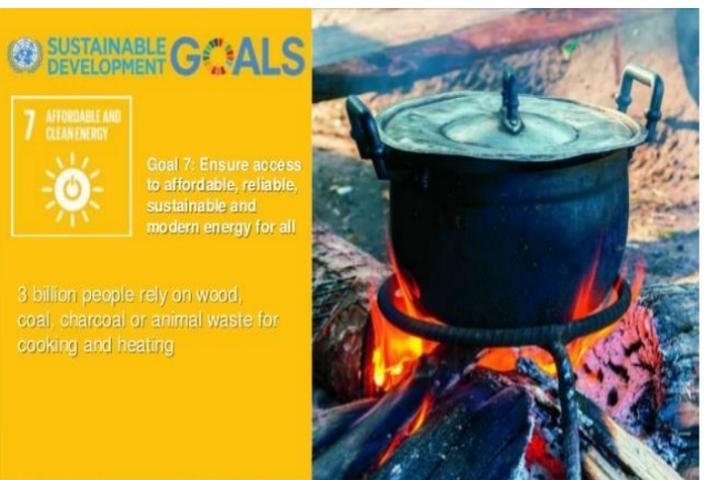
NGFCP Impact: UN Sustainable Development Goals (SDGs):



- ✓ NGFCP ticks 11 of the 17 following boxes. And will stimulate action over the next 2 - 3 years in 5 areas of critical importance to the SDGs' i.e. **People, Planet, Prosperity, Peace & Partnership.**



Amongst Others, We want to Move from Left to the Right





3. Socio – Economic Considerations

An effective Commercialisation Strategy will Yield The 4 Desired Results



Trends

Description

① Growing demand for Gas based solutions

- Nigeria Gas demand is projected to grow due to:
 - **Industrial growth**, e.g plastics, fertilizer, power
 - **Domestic LPG use**, e.g clean cooking



② Enabling technology

- **Introduction/refinement of new end-use technologies** e.g. GTL, small scale LNG etc.
- **Reducing costs/ decreasing barriers**, e.g. decline in the cost of CNG compressors etc.



③ Growing midstream players

- **Inflow of new** infrastructure players to enable gas uptake and usage in previously unreachable regions
- **Business development from gas companies** to unlock new domestic markets for gas



④ Environmental awareness

- Nigeria is a **signatory to GGFR** which works to increase use of natural gas associated with oil production
- Nigeria is a part of **the COP agreement**, committed to emission reduction and cleaner energy





4. The Legislative Approach

Legislative Framework



- The **Flare Gas (Prevention of Waste and Pollution) Regulations 2018** has been approved by Mr. President and gazzetted to underpin the implementation of the NGFCP (Approved 5th July, and gazette 9th July, 2018)
- The regulations is made pursuant to:
 - **Sections 9 & 11 of the Petroleum Act**
 - **Paragraph 35 (b) (1) First Schedule, Petroleum Act** (*The right of Government to take all Flare Gas free of cost at the Flare and without payment of royalty*)
 - **Section 9 (1) (b) (ii) and (iii) of the Petroleum Act**
 - **S.3 of the Associated Gas Re-injection Act**
- **Key provisions in the New Regulations:**
 - Mandatory Reporting and Access to Gas Flare Data
 - Mandatory access to Gas At Flare
 - Increased Flaring Fines [The new regime of fines)
 - Flaring Standards
 - Metering requirements
 - Reporting Obligations [Monthly Gas flare logs & Annual reporting]
 - Prohibits flaring and venting of gas except further to a certificate issued by Minister in **limited circumstances**



The Flare Gas Regulations and the Implications therefrom



- It provide a legal framework to support the policy objectives of the Federal Government for the reduction of Green House Gas (GHG) emissions through the flaring and venting of natural gas.
- The Regulations provide the legal basis for the implementation of the NGFCP,
- It introduces a new payment regime (penalties) for gas flaring which adopts the “polluter pays” principle and mimics a carbon tax.
- Significant obligations are imposed on producers and gas flare out projects for the reporting of data in respect of activities related to gas flaring.
- As a minimum, the objectives of these Regulations are:
 - **The reduction of the environmental and social impact caused by the flaring of natural gas;**
 - **Protection of the environment;**
 - **Prevention of waste of natural resources; and**
 - **Creation of social and economic benefits from gas flare capture.**

- The **Regulations** provide a strong incentive for compliance
- There are mandatory **payments** by the Producer for:
 - ✓ flaring gas
 - ✓ failure to produce **accurate** flare data (Regulations 5)
 - ✓ failure to provide **unfettered access** to flares or flare sites (Reg. 6)
 - ✓ failure to sign a **Connection Agreement**
- **Part III: Regulations 13 - Flare Payments**
 - **U\$0.50 <10,000bopd & U\$2.00 >10,000bopd (irrespective of whether the flaring is Routine or Non-Routine Flaring; ...unless in cases of war, community disturbance, insurrection, storm, etc beyond the reasonable control of the Producer)**
 - An additional payment of **\$2:50/1000scf/d** within the Oil Mining Lease or Marginal Field for each day the Producer breaches and/or fails to meet the the regulations
 - **In the event of continued or egregious breaches**, the possibility of:
 - suspension of operations (which could mean curtailment of production), or
 - termination of producer's licence



„If you think compliance is expensive – try non-compliance“

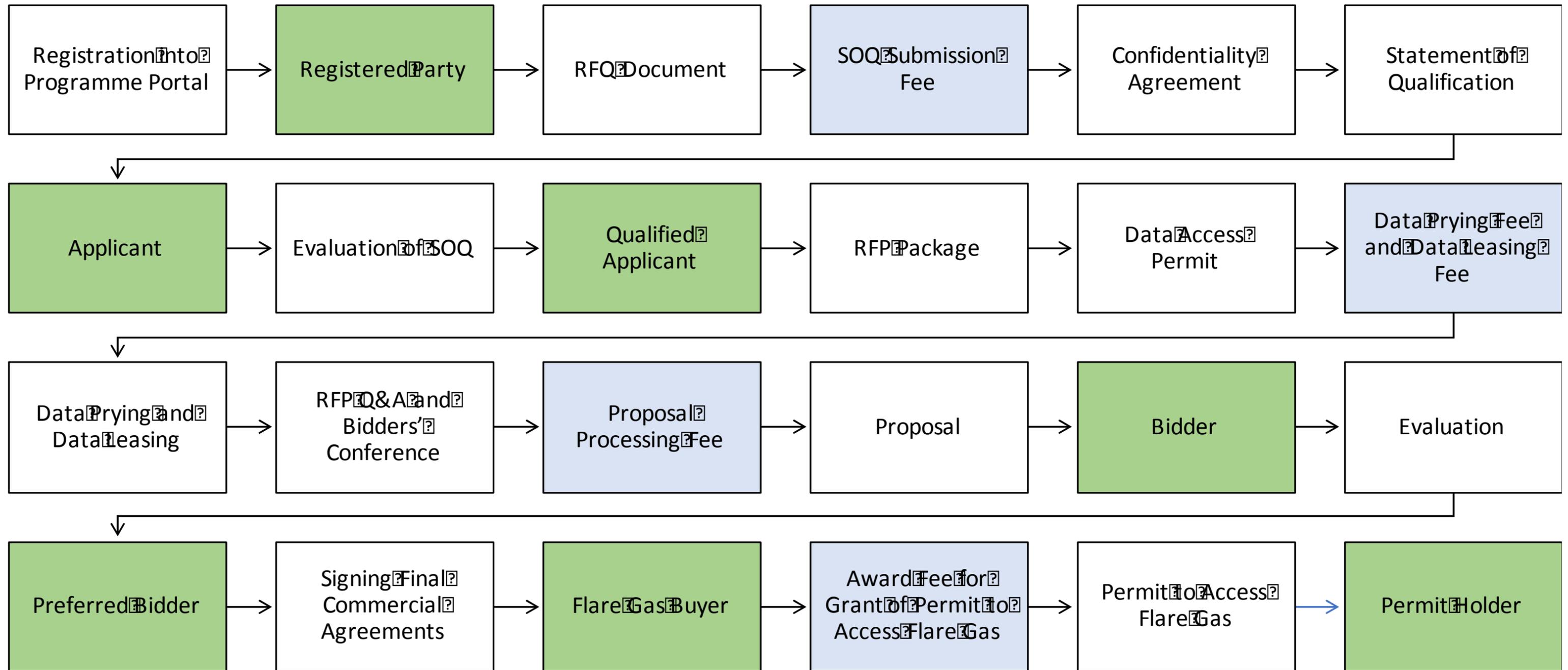
(former U.S. deputy attorney general Paul McNulty)



6. The Commercial & Transactional Structure



NGFCP – Auction Process

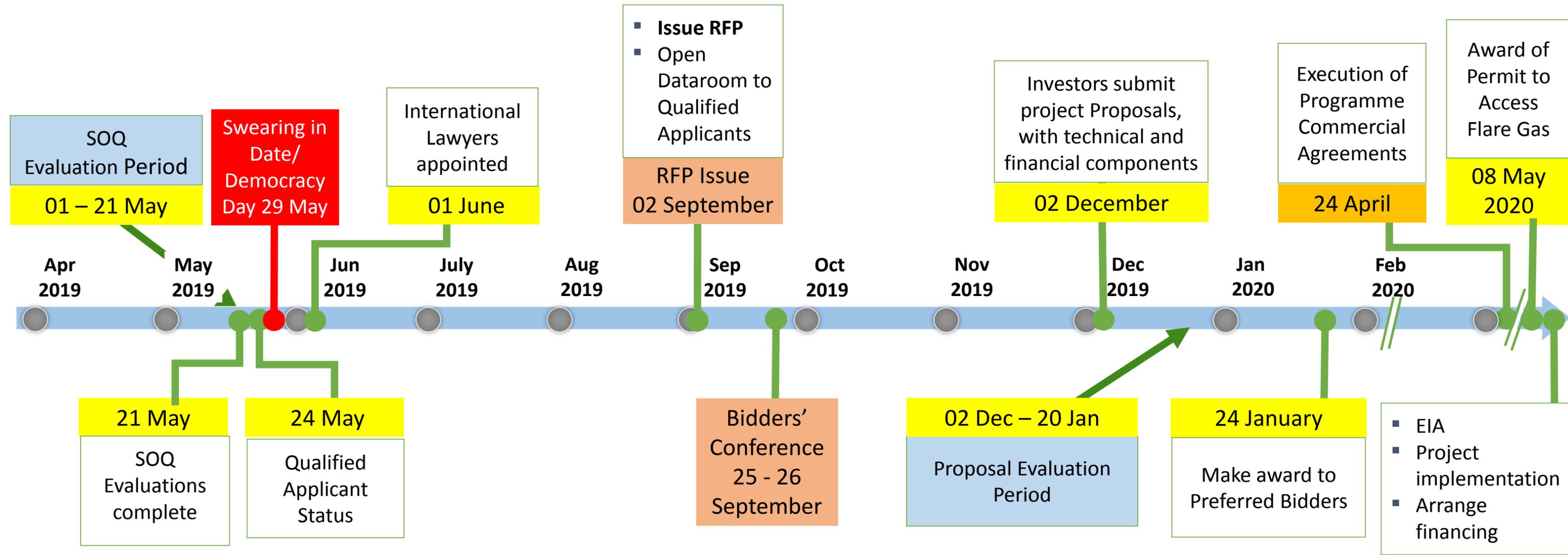


Key: Party Status Fee payable



7. Implementation Timeline

NGFCP Implementation Timeline – to award of Permit to Access Flare Gas





8. A Win – Win for All

NGFCP Value Proposition



Assuming around 65% of the flared gas volume meets a minimum monetization investment threshold, the NGFCP has the following potential:

- Overall investment: ~ **US \$ 3 - 3.5 billion**
- Potential annual revenues/GDP Impact around ~ **US \$ 1 billion/annum**
- Assuming an average project size of US\$ 40 MM, the NGFCP has a potential of triggering **89 projects**
- Over a 1.5 – 2 year period, the NGFCP could generate approximately 26,000 direct jobs (assuming an average direct labor force of 300 people per project) and **approx 300,000 direct and indirect jobs**
- Once operational, projects launched under the NCFCP would reduce Nigeria's emissions by **~13 mln tons of CO2 per year**
- NGFCP can become an important source of additional gas for Power Sector Recovery
- **Clearly a High - Impact Program**



Take-away from the NGFCP Presentation



- Energy is an **important engine of economic growth**, on which **poverty reduction and shared prosperity depend**
- Inclusive economic growth is the single most effective means of reducing poverty and boosting prosperity
- Most business and economic activities would be **impossible without energy (preferably Clean energy)**
- Adequate, reliable and competitively priced **‘modern’** energy is essential for business development, job creation, income generation and international competitiveness.
- **Clean, affordable and sustainable Energy access is increasingly** seen as a vital catalyst for wider social development including better health and education
- Energy is a critical input for the achievement of the SDGs hence - **Harnessing Nigeria’s Flare Gas Towards Affordable, Clean & Sustainable Energy for Economic Development & Climate Change Impact**

A Basket of Benefits to All



- Significant reduction in gas flaring and its adverse impacts on our people and the environment
- **Social, economic and health benefits to the Niger Delta communities**
- Multiplier effects to the Nigerian economy
- Producers will **avoid significant flaring fines** by participating in the program
- An **improved operating environment** for Producers
- Potentially huge local and international public relations benefits for Producers
- Improved relations with **host communities / social licence to operate in the Niger Delta**
- Trigger and develop a **new cadre of competent midstream players**
- Potential long term partnerships with the new players for the marketing and monetization of Non Associated Gas (NAG) resources in the future

Summary: An Analysis on the Energy Outlook



- **By 2050, global energy demand will double and could even triple from the level of back in 2000.** Which means the world and indeed Nigeria is going to require all forms of energy i.e. natural gas, crude oil, coal, renewables and nuclear to meet global energy demand.
- At the same time, the **world must reduce CO₂ emissions in half by transitioning to a more sustainable energy system,**
- The world will need to invest heavily in energy production, both in traditional sources and in renewables. The broader perspective, of course is, a world looking for affordable and reliable energy to drive both economic growth and improved living standards.
- The **global middle class is expected to double to nearly 5 billion,** which means twice as many people will need commercial fuels for heating, cooling, mobility and manufacturing.
- **Natural gas is an abundant, cleaner-burning fossil fuel, economic to produce, scalable, and complementary to intermittent renewables.**
- **Natural gas is one of the few energy sources that can meet many energy needs: to generate electricity, heat homes, power industry, and fuel ships and trucks.**
- According to the International Energy Agency, there are **enough recoverable natural gas resources to last more than 200 years at current levels of consumption.**
- **Despite the critical role of renewables, they cannot provide all the world's energy needs.**
- **Renewables chiefly power electricity, which only meets around 20% of global energy demand**

Thank
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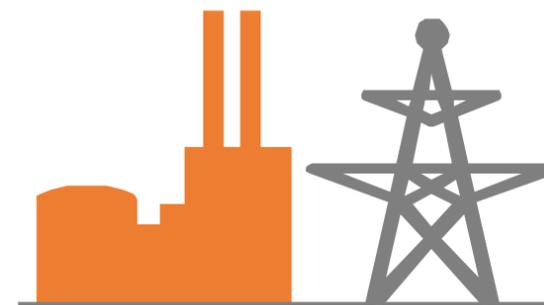
NGFCP: “Harnessing Nigeria’s flare gas for sustainable value & wealth creation”



BACK UP SLIDES

The Global Energy Challenge

There is more demand for energy in Nigeria, Africa and globally as the world's population and living standards increase



Growing population

Global population is expected to increase from around 7.4 billion today to nearly 10 billion by 2050, with 67% living in cities.

Rising Energy demand

Global energy demand will likely be almost 60% higher in 2060 than today, with 2 billion vehicles on the road (800 million today).

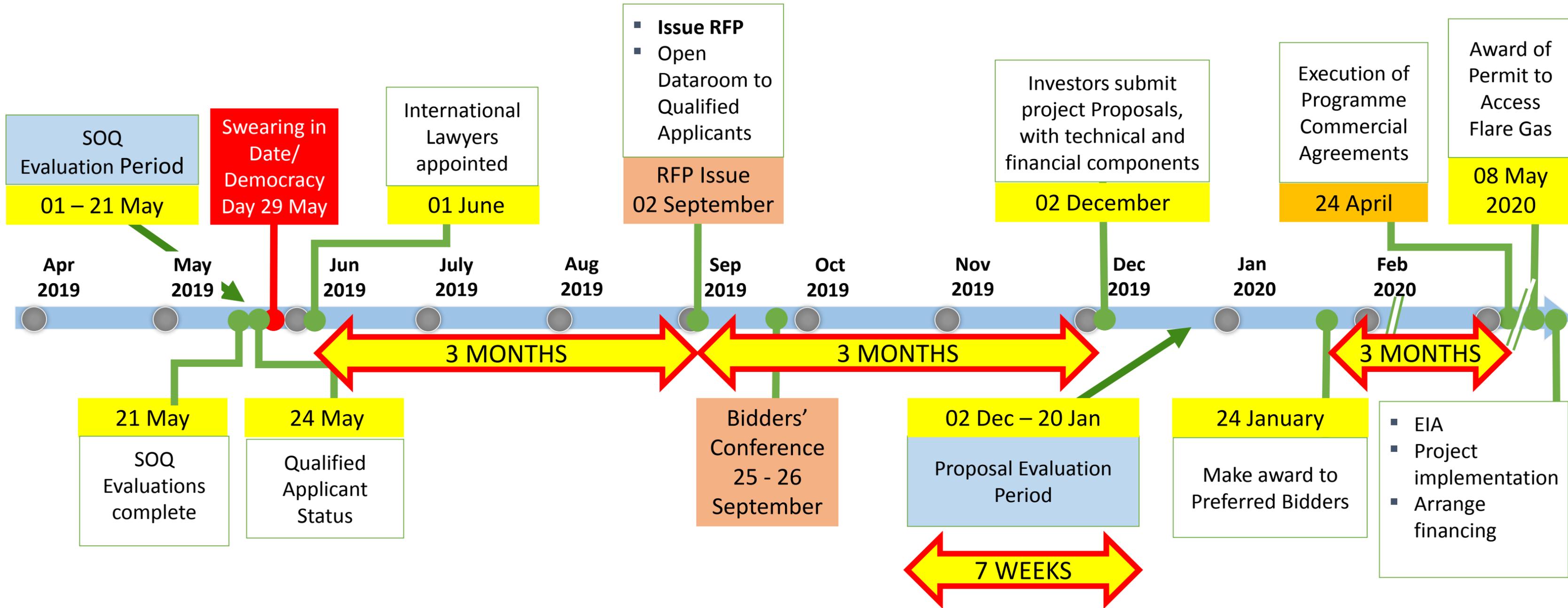
Ongoing supply

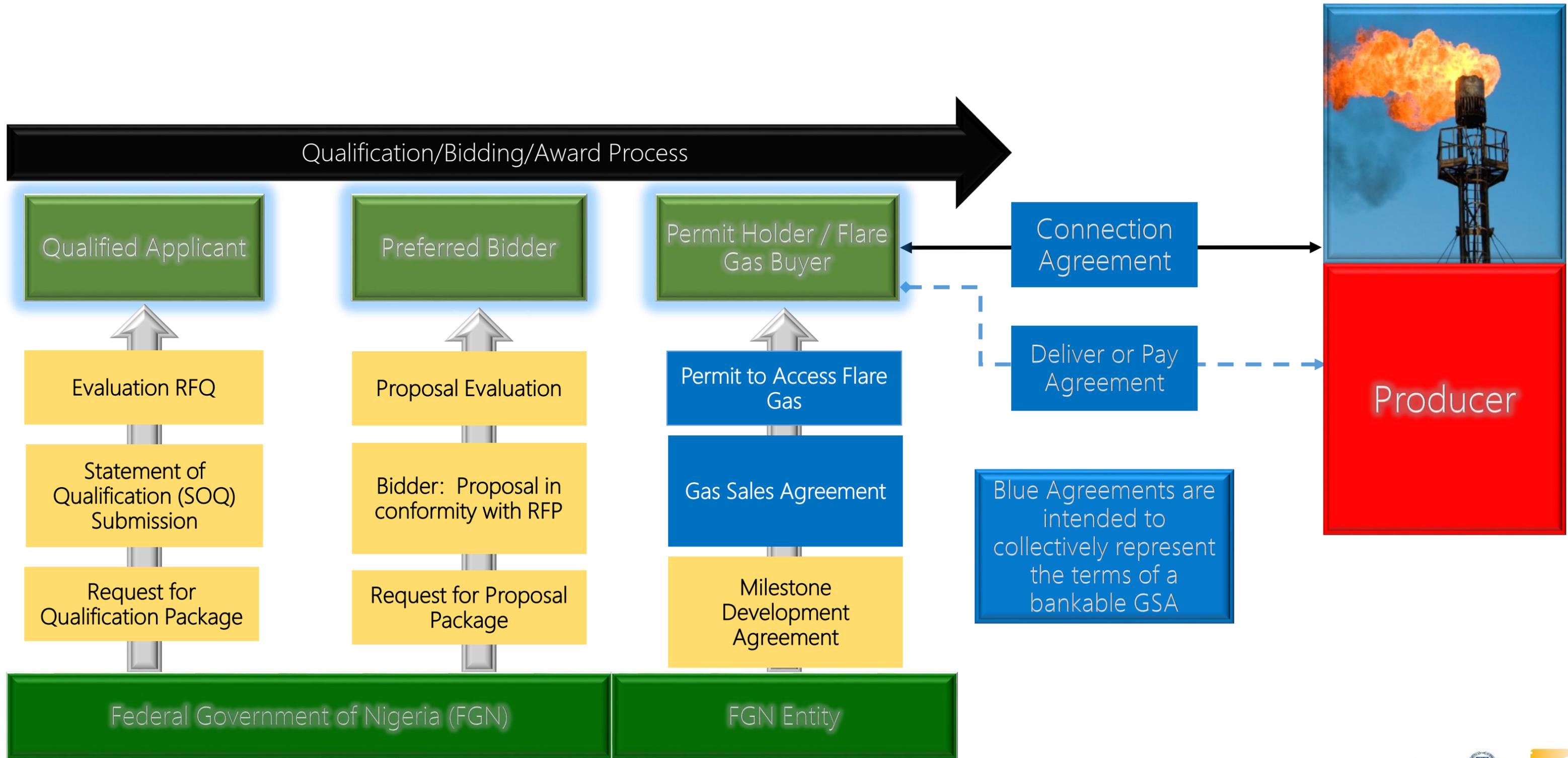
Renewable energy could triple by 2050, but we will still need large amounts of oil and gas (in the case of NGFCP, it is flare gas monetization) to complement & provide the full range of energy products that the world needs.

Mitigating climate change

Net-zero emissions is a potentially achievable societal ambition.

- to award of Permit to Access Flare Gas





NGFCP: “Harnessing Nigeria’s flare gas for sustainable value & wealth creation”



5. The Regulatory Approach



Sustainability



- To ensure sustainable implementation of the programme, “**Ownership**” by the Regulator is **essential**
- To date, the **NNPC** and **Department of Petroleum Resources (DPR)** have played the following roles:
 - participation in programme design
 - Administer the GSA on behalf of the FGN
 - Collectivization of the emission/carbon credit on behalf of the FGN by NNPC’s RED.
 - Data gathering and management process
 - design of Guidelines
- Workshops
 - top management [COO, Senior Directors and operational heads]
 - staff of key departments within NNPC and DPR
- **Ongoing capacity building**
 - Training on all aspects of the programme [auction, economics, regulatory framework, monitoring and enforcement]
 - With support from the United States Agency for International Development (USAID), we trained a total of **eighty-seven (87)** personnel drawn from the **Ministry, NNPC, DPR, NEITI** and **PTDF** in the capabilities required for the implementation of the NGFCP.
- Achieved the establishment of a dedicated NGFCP implementation unit within DPR

- In developing countries, traditional biomass such as wood, dung and peat still meets 43% of energy demand in homes
- Replacing these fuel sources with cleaner-burning natural gas eliminates the impact of high levels of indoor air pollution
- In India alone, where around 700 million people still rely on solid fuels for domestic cooking, exposure to household solid fuels is estimated to cause 500,000 premature deaths and 5 million illnesses each year



Vision – National Gas Policy, 2017

“To be an attractive gas-based industrial nation, with a significant presence in national and international markets”

- This Vision for Nigerian gas contains key Aspirations:
 - **Moving the economy from oil to gas;**
 - **Diversifying the gas resource base within Nigeria, to ensure security of supply;**
 - Extend gas penetration in the domestic market in order to facilitate the growth of the agricultural, electric power and industrial sectors;
 - Gaining a presence for Nigerian gas in international markets;
 - Operate a gas industry with a clear division of roles between private and public sectors:
 - ✓ Public sector policy making and regulation;
 - ✓ Private sector implementation, investment and operations;
 - **End gas flaring and address environmental issues;**
 - Provide an enabling environment for increased private sector participation in the gas sector;
 - Clarify the rules guiding investment in the gas sector.

Mission – National Gas Policy, 2017

“To move Nigeria from a crude oil export-based economy to an attractive gas-based industrial economy”

- This Mission contains some important elements:
 - **Set a clear gas policy;**
 - **Establish a clear legal and regulatory framework;**
 - **Moving the economy from oil to gas;**
 - Communication of the vision to national, government and international stakeholders;
 - Ensure security of gas supply through:
 - ✓ Developing new gas supply resources;
 - ✓ Installing an optimal infrastructure network;
 - **Provide an attractive climate for investment;**
 - Seek rents from international and national downstream markets;
 - Enable low cost gas for domestic markets;
 - Realign the public sector to provide policy, legal and regulatory support to the industry;
 - **Introduce international best practice in operations and in governance;**
 - Operating in an environmentally clean manner.



12. Markey Study

Flare Payments – The Onshore / Offshore Dichotomy



- Both **GOR** and the **AGUF** are the key drivers to the **impact** the Flare Payments will have on producers' OPEX and revenues
- The weighted average impact of the Flare Payments on **OPEX** (assuming 30 US\$/bbl) is an **increase of 2.64%**
- The weighted average impact of the Flare Payments on **oil revenues** is a **reduction by 1.76%**
- Generally, a higher GOR = higher Flare Payments unless AG is utilised or sold
- The impact of the Flare Payment goes up significantly with a lower Associated Gas Utilisation Factor (AGUF)
- The weighted average **GOR** in the offshore is significantly higher than for example the swamp terrain
- The AGUF of off-shore and deep off-shore operations is significantly higher than that for land and swamp operations mainly because a larger percentage of the AG volumes are **re-injected**
- Given the relatively high AGUF, the impact of the Flare Payments on offshore operations, even when assuming a higher GOR, is significantly lower than for land or swamp operations
- Through the NGFCP, Producers can increase their AGUF; therefore significantly reducing the impact of the Gas Flare Payment.

The NGFCP Market Study – Funded by World Bank/IFC



- The primary focus of the Market Study is on the Off-Takers (Market) inputs and the total value chain economics and each of its corresponding links.
- To determine whether and under what conditions Flare Gas can be taken to Market based on sound economic/market criteria
- Focus on current Market conditions and potential (adverse) change in Market conditions within the next 5 – 10 year period
- This is premised on the fact that the Flare Gas-to-Market Projects will mainly:
 - 1) Provide services/products to unaddressed markets (e.g. supply electric power where today communities have no electricity, fertilizers where there are none, etc.)
 - 2) Generate savings by substituting a higher-cost with a lower-cost energy source (e.g. providing lower-cost power, substituting diesel or HFO with CNG, LNG or pipeline gas, etc.)



The NGFCP Market Study – Objectives (1 of 2)



The main objectives of this Market Study are to:

- **Determine the feasibility, attractiveness and sustainability of Flare Gas to Market projects** which includes the transformation of Flare Gas to “end products” and the delivery and sale of these “end products” to the Off-Taker.
- **Market Intelligence** related to the various Flare Gas to Market Products (FG2M-P) e.g.: LPG, CNG/LNG, Power, Methanol, Pipeline gas, GTL;
- **Cost / Benefit Analysis and Net Back Pricing:**
 - Based on the Market Study determine a **realistic Market Pricing range for the various FG2M-Ps** (what will incentivize Off-Takers to switch to the available Flare Gas to Market Products)
 - Based on the Market Pricing of the various FG2M-P, and the corresponding cost inputs for “hardware” (“front end”, FG2M-T and “back end”), estimated soft costs, estimated cost of capital, capacity factors, taxes, contingencies, etc. do a netback analysis to establish Flare Gas prices dictated by the market at the Delivery Point



The NGFCP Market Study – Objectives (2 of 2)



- **Risk and Sensitivity Analysis - Identify, quantify and qualify risks and impacts related to:**
 - Flare Gas supply interruption
 - Interruptions in any link of the Flare Gas to Market value chain
 - Risks related to inflation, devaluation (currency mismatch between capital investment currency and revenue currency), etc.
 - Future Flare Gas to Market dynamics;
 - Competitive analysis of Flare Gas versus Non-Associated Gas and how certain weaknesses in the Flare Gas supply chain need to be mitigated to enhance Flare Gas to market solutions
- **Market Sounding:**
 - General perception within the oil industry regarding the NGFCP; amongst others, ability and willingness under which Producers will provide Guaranteed Flare Gas.
 - Feedback from the finance community regarding appetite to fund NGFCP projects and identify / quantify the main gaps that need to be mitigated
 - Through sounding of the Producers, midstream players, original equipment manufacturers, potential investors and lenders, etc. develop a SWOT
- **Identify where the main challenges are and how these can be mitigated**

Commercial Agreements



- **Milestone Development Agreement (MDA)** – between Flare Gas Buyer and FGN. FGB undertakes to implement its Project according to a set of milestones. FGB performance is ‘encouraged’ by a Milestone Bond
- **Gas Supply Agreement (GSA)** – between FGB and FGN. Confers FGN title of Flare Gas to FGB. Contains the quantities of gas contracted for, the price and the Take or Pay terms
- **Connection Agreement (ConnAg)** – between FGB and Producer. Contains the Flare Gas delivery terms and conditions, rules for the physical connection of facilities, and nomination procedures
- **Deliver or Pay Agreement (DoPA)** – an undertaking of Producer with respect to ‘Guaranteed’ Flare Gas whereby, for a DoP Fee (paid by FGB to Producer), FGB receives a DoP Payment should Producer fail to deliver such guaranteed Flare Gas
- **Permit to Access Flare Gas (PAFG)** – a permit granted to FGB (becoming Permit Holder (PH)) pursuant to the Regulations (see next slide)

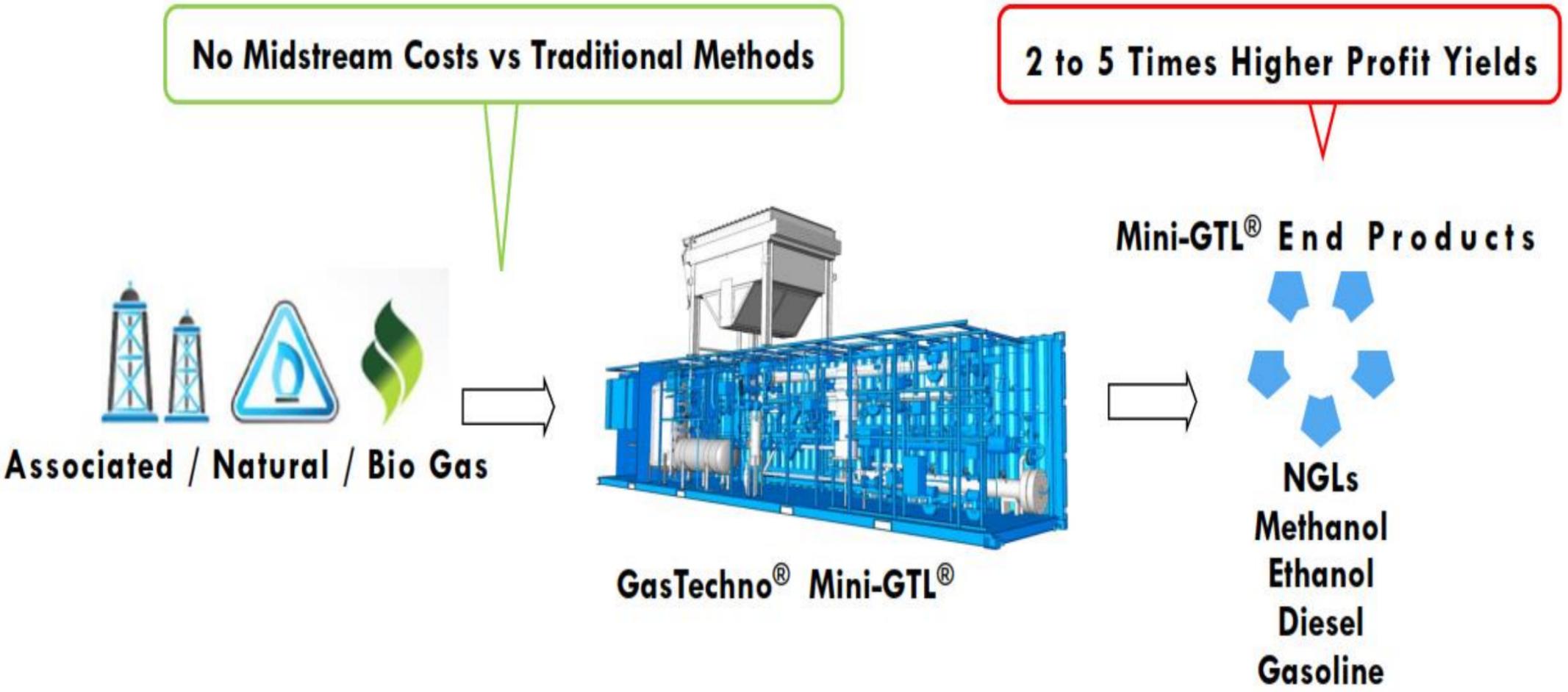


Mini-GTL® plants:

- Convert flare gas into high-value fuels and chemicals including methanol, ethanol and gasoline/diesel oxygenated fuel blends;
- It also reduces greenhouse gas emissions.
- The unit capital cost of the plants is approximately 70% lower than traditional methanol production facilities and they require relatively limited operation & maintenance costs.

MINI-GTL SINGLE STEP GAS CONVERSION

End Products - Higher Profit Yields Than Natural Gas.



COMMERCIAL READINESS



RAPID SITE DEPLOYMENT

- Low Footprint
- Compact 40' container
- Tie-in to existing flare line
- Simple gas purchase model
- No operator CAPEX spent



SIMPLE OPERATION

- Simple hardware / Sophisticated software
- No mechanical refrigeration
- Hot rich gas cooled
- Warm lean gas to Mini-GTL
- Minimal moving parts



MINIMAL SITE PREP DIRECT CONNECTION TO/FROM FLARE

- High Recovery
- Indirect J-T cooling effect
- Turn down up to 80%
- ~70% C3+ recovered
- Perfectly integrates with GTL

Opportunities exist for host community involvement in the NGFCP



Key opportunities

Key opportunities	Image	Description	Potential Impact
<p>a Creating or serving local market</p>		<ul style="list-style-type: none"> A portion of investment end-product is directed to the host community at concessional prices 	<ul style="list-style-type: none"> Reduces risk of community-related disruptions Provides an affordable good to the community
<p>b Local Content</p>		<ul style="list-style-type: none"> Investor procures goods and services from local communities, e.g., workers for construction and on-going operations of site facilities 	<ul style="list-style-type: none"> Creates employment Enhances security of facility
<p>c Local equity participation</p>		<ul style="list-style-type: none"> Investments are co-owned and potentially co-managed by the community Community is allocated a carried interest in the venture 	<ul style="list-style-type: none"> Ensures sustainability of community initiative Creates a sense of ownership thus de-risking the project
<p>d Provision of social amenities</p>		<ul style="list-style-type: none"> Investor builds social infrastructure for the local community, e.g., hospitals, schools, etc. 	<ul style="list-style-type: none"> Improves quality of life for host community members Builds skills in locals Creates stable jobs

Flare Payments – Key Principles

- Gas Flare Payments should have a **material impact** on producers' opex but should not force them to shut in oil production [it should “bite”, but not “kill” - #BBNK]
- The new/present value of Gas Flare Payments should provide **sufficient incentive for commercialisation** of the flare gas
- A Flare Payment to be structured as the equivalent of a **“carbon tax”** i.e. compensation for the impact flaring on the environment and society as a whole (*The Polluter Pays Principle*).
- Consistent with the vision of the NDC Partnership, the Flare Payment should help “*achieve an alignment between **development and climate** to unlock sustainable and shared prosperity*”.





7. Gas Flare Data Management



Discrepancies with Gas Flare Volume Estimate



There are major discrepancies between satellite estimates and national statistics with national statistics typically showing lower flare volumes. Causes for this include:

- ***Underreporting in national statistics.***
 - Based on reports from IOCs' which do not always measure gas that goes to flares,
 - IOCs' make estimates of associated gas production and flaring, based on gas-to-oil ratios and other (indirect) parameters.
 - Given that flaring is subject to regulations and penalties,
 - The tendency that flaring is systematically underreported.
- ***Uncertainties in converting data from satellites to flare volumes.***
 - Conversion factors used by GGFR/NOAA may for some countries overstate flare volumes.
 - The fact that satellite images are not continuous measurements but “snapshots” represents a possible source of error.
- ***Estimates from satellite images include more than flaring of associated gas.***
 - Data published by NOAA/GGFR may include flaring of both associated and non-associated gas from gas processing plants and
 - There may also be problems excluding refinery flares in the estimates.
 - In Nigeria, satellite could capture the illegal oil refineries in the Niger Delta as gas flare sites and increase the number

“Investment Grade” Data



A

ATTAINABLE

Information / Data that can be obtained and validated with a high degree of accuracy

R

RELEVANT

Information / Data that relates to the variables that are determining factors towards defining; i) the baseline, ii) potential untapped energy sources and iii) project scope and objectives.

A

ACCURATE

Historic Information / Data has to represent actual values (true representation).
Forecast/Projections should be made using sound engineering principles (as these can't be 'actual values')

R

REPRESENTATIVE

The nature of the Information / Data has to provide input in making the correct decisions.

A

ACCREDITED

Information / Data that will be accredited by authorities and third parties.

Its all about guaranteeing the integrity of the data collection / registration, data processing and interpretation and reporting process.



9. Stakeholder Consultation

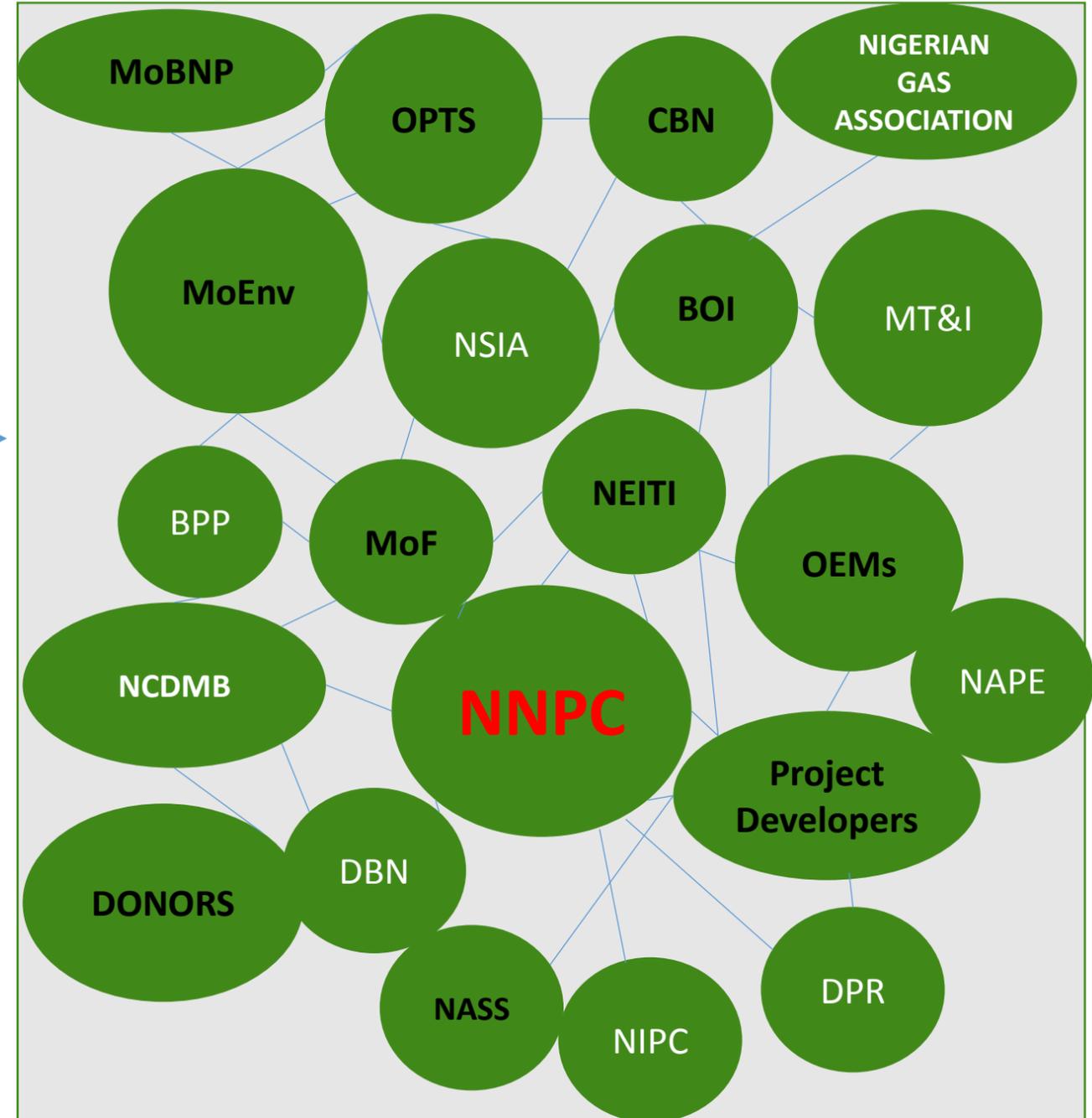
NGFCP “Family Picture”



- EMT**
- Key EMT Members

- NNPC**
- Senior Management
 - NAPIMS
 - NPDC
 - NGMC
 - NGPTC
 - VENTURES/RED

- State Governments
- Communities
- Financial Institutions
- Donor/ Development Agencies



Measurement and Reporting Obligations



- **Reporting of Flare Data** is a critical part of the regulatory regime.
- Reporting requirements allow DPR to:
 - Monitor compliance by producers and permit holders
 - Monitor progress of flare / Green House Gas (GHG) reduction
- **Metering** required to be installed by producer and project
- Meters must be capable of providing reliable and accurate **measurement**
- Producers and projects are required to maintain **daily logs** of Flare Data, and to send **monthly reports** to DPR
- A statutory duty is imposed on DPR to issue an **annual publication** of Flare Data gathered from industry
 - for transparency
 - this puts 'peer pressure' on poor performers





The Flare Gas (Prevention of Waste and Pollution) Regulations, 2018



An Overview: The Regulations on a page

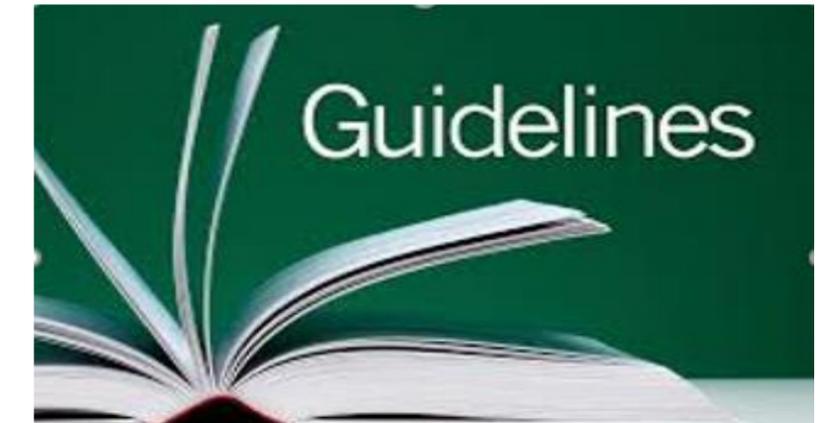


GENERAL	PERMITS	PAYMENT FOR FLARING GAS	REPORTING OF GAS FLARE DATA	MISCELLANEOUS
Objective, Ownership and Application (Regulations 1 – 5)	Grant, revocation, assignment and) fees of 1. Data Access Permit 2. Permit to Flare Gas (Regulations 6 – 12)	Payment for Gas Flaring (Regulations 13)	Associated Gas Production Logs (Regulation 16)	Conflicts (Regulation 23)
		Certificate for continued Flaring (Regulations 14)	Annual Report (Regulation 18 and 19)	Interpretation (Regulation 24)
		Flare Gas Logs (Regulations 15)	Metering and Safety standards (Regulation 20 - 22)	

STRUCTURE



FLARE GAS (PREVENTION OF WASTE AND POLLUTION)
REGULATIONS, 2018



**Guideline for Grant of
Permit to Access Flare Gas**

**Guideline for Flare Gas
Measurement, Data
Management and
Reporting Obligations**

**Guideline for Flare
Payments**

**Guideline for Producer's
Approved Flare Out
Projects**





SPEOLEF 2019
SOCIETY OF PETROLEUM ENGINEERS OLOIBIRI LECTURE SERIES AND ENERGY FORUM

The Oloibiri Lecture Series and Energy Forum (OLEF) is an annual event focused on contributing to oil and gas policy development for Nigeria in commemoration of the first oil well drilled in Nigeria by Shell Darcy at Oloibiri, Bayelsa State in 1956. The annual lecture series attracts participation from the government, regulatory agencies, Captains of industry, practitioners at all levels, as well as other key stakeholders from around Africa. The 2019 lecture series will discuss the Energy Security and Sustainable Development in Nigeria: The Way Forward.

THEME:
Energy Security and Sustainable Development in Nigeria: The Way Forward

April 25, 2019 | PTDF Towers (Auditorium) | 9am
2 Memorial Close, Central Business District, Abuja

Confirmed Speakers/Panelists:



Dr. Maikanti Baru
GMD, NNPC



Mr. Bayo Ojulari
MD, SNEPCO



Prof. Chidi Ibe
(Retired UN Technocrat/Diplomat)



Prof. (Engr.) Eli Jidere Bala
DG, Energy Commission



Dr. Bello Aliyu Gusau
Executive Secretary, PTDF



Prof. Nelson Brambaifa
Ag. MD/CEO, NDDC



Dr. Yemi Kale
DG, National Bureau of Statistics



Dr. Rabiu Bello
COO Upstream, NNPC



Prof. Wumi Iledare
SPE African Regional Director



Senator Albert Bessey
Chairman, Senate Committee on Gas



Mrs. Yemi Famori
GM Upstream, Gas SPDC



Mr. Olumide Adeosun
Director, Strategy PWC



Mr. Justice O. Derefaka
Program Manager, Ministry of Petroleum Resources



Debo Fagbami
Chairman, SPE Nigeria Council | **Host**

Who Should Attend:
Operators of Joint Ventures (JV), Production Sharing Contracts (PSC), Service Contracts (SC), MD/CEO of Independent, Indigenous and Marginal Field Operators in the Oil and Gas Industry, MD/CEOs of Banks, Investment Groups, Industry Professionals and Researchers, Media, Insurance, related industries, and other government and corporate establishments connected to policy formulation and implementation in the Nigerian and global Oil and Gas Industry.

spenc-secretariat@spenigeriacouncil.org
Tel: 0809 244 8828, 0809 655 5168

Sponsors:



The Shell Petroleum Development Company of Nigeria Limited
Operator of the NNPC/Shell/TEPNG/Agip Joint Venture



Esso Exploration and Production Nigeria Limited
In Production Sharing Contract with NNPC

