Equatorial Guinea
Associated Gas Utilization Study

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Little legal regulation surrounding Associated Petroleum Gas (APG) use in the country, though a 2006 Hydrocarbons law with stipulations around APG use might be a regulatory incentive - any surplus APG produced that is not used in petroleum operations is the property of the state.

- No explicit fiscal incentive framework around APG use.

- Small domestic market for gas, with very little APG used for LPG, methanol and power production.

- Uptick in interest in APG use for export and specifically LNG export, with the Punta Europa LNG project since 2007.

- The country’s state owned gas company Sonagas has taken steps to increase APG use in the country with the creation of the ‘3G consortium’.
The statistics of APG flaring in Equatorial Guinea: How bad is it?

Overview stats on APG flaring

On the companies involved

Over the last decade

And their flaring trend over time

Equatorial Guinea is the 3rd largest oil producer in SSA after Nigeria and Angola.

Of the 243 bcf of natural gas produced in 2011, most gas was flared or reinjected with some serving as feedstock for primarily the Punta Europa projects (IPP, LPG, Methanol, LNG).
The statistics of APG flaring in Equatorial Guinea: Who is involved?

- **Overview stats on APG flaring**

- **On the companies involved**

- **Over the last decade**

- **And their flaring trend over time**

- 3 IOCs, Exxon Mobil, Marathon Oil and Hess dominate the petroleum sector with Noble Energy and Tullow being smaller investors.

- ExxonMobil-led consortium’s oil field at Zafiro (the country’s largest one but in decline), flared about 75% of its APG amounting to around 120 mmscf/day and Hess’s Ceiba field and Okuma complex flared about 40% in 2008. Flaring is said to have stopped at Marathon’s Alba field while the APG of Hess’s Ceiba field and Exxon Mobil’s Zafira field is re-injected or used for gas lift when it is not flared.
What is the legal and fiscal framework in place to stop flaring and incentivize APG use?

<table>
<thead>
<tr>
<th>Government institutions involved in regulation of oil production/flaring</th>
<th>Description</th>
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<tbody>
<tr>
<td>Ministry of Mines, Industry and Energy</td>
<td>Charged with overall regulation of the oil and gas industry in Equatorial Guinea</td>
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<tr>
<td>Sociedad Nacional de Gas de Guinea Ecuatorial (Sonagas GE)</td>
<td>National gas company, charged with managing the government’s shares and interests in the gas industry</td>
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Sonagas GE has stated as one of its goals, the creation of an integrated sub-regional system for utilization and monetization of surplus associated gas, by building pipelines gathering surplus APG from producing fields in the Gulf of Guinea sub-region, to be processed on Bioko Island. A consortium named 3G is the owner of this pipeline system and its shareholding is: Equatorial Guinean state 15%, Sonagas GE holding 50%, Union Fenosa Gas, 20% and Galp Energia 15%.
What is the legal and fiscal framework in place to stop flaring and incentivize APG use?

<table>
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<th>Regulation/Policies on Gas Flaring/APG use</th>
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<td>2006 Flaring Ban Chapter XVI, article 76 of Hydrocarbons code</td>
<td>Ban on flaring instituted in 2006 through law except as authorized by the Ministry when requested by the Contractor in a written report citing technical, economic, financial and or environmental reasons for the flaring</td>
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<tr>
<td>2006 Flaring Ban Chapter XVI, article 72 of Hydrocarbons code</td>
<td>“All Associated Natural Gas that is produced and not utilized in Petroleum Operations is the property of the State. The Development and Production of all Natural Gas must be carried out in partnership with the National Gas Company”</td>
</tr>
<tr>
<td>2006 Flaring Ban Chapter XVI, article 73 of Hydrocarbons code</td>
<td>Contractor must build any facilities needed for exploitation of natural gas found which they choose not to develop but to only use for petroleum operations. Those facilities include among others, facilities for the separation of APG from liquid hydrocarbons. Those facilities will be used by the National Gas Company to exploit the Natural Gas.</td>
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</table>
What is the legal and fiscal framework in place to stop flaring and incentivize APG use?

- Definition and boundaries not followed
  - Only as of 2006 was any law prohibiting flaring made in the country
  - Last flare out date was set for 2006 and subsequently not met

- Weak monitoring and enforcement of little regulation
  - Lack measurement and reporting of gas flaring figures

- Regulatory Approval
  - There is no explicit framework for flaring approval under the 2006 flaring ban
What is the legal and fiscal framework in place to stop flaring and incentivize APG use?

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<th>Fiscal Framework on Gas Flaring/APG use</th>
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What power needs could the flared gas satisfy?

**Power Generation (IPP)**

- Significant gas reserves, made up of mostly offshore APG near Bioko Island
  - Proven reserves at 1.3 tcf as of 2013
  - Total gas production clocked in at 243 bcf in 2011, with only 56 bcf consumed domestically

- Low electricity access (per capita consumption of just 152kwh as of 2008, as compared to 539kwh in SSA region); population depends on expensive local diesel generators for electricity

- But: with about 80% of electricity sourced from oil and gas-fired plants, there is significant potential for APG use for power generation – but only one power generation project in Bioko Island has been recorded so far. The mainland is supplied by thermal plants whose grid is disconnected from the island.
What are some current APG use projects that could serve as a blueprint for future projects?

- Power Generation (IPP)
- Liquid Petroleum Gas (LPG) and Methanol
- Liquefied Natural Gas (LNG)

The main focus of the Equatorial Guinean government’s strategy of gas utilization has been on Marathon’s Alba condensate field and associated plant. Over 800 mmcmd of Alba Gas is produced and provides the feedgas for various projects based at Punta Europa, located on the north coast of Bioko Island.
APG use company case study: National Power Generation Plant

- **Project Participants**
  - Owned by the Guinean Government, operated through the state owned power company Segesa

- **Project Description and Motivation**
  - Built in 1999, the 10.4 MW Turbo Gas Power Generation provides electricity to Bioko island where the capital city, Malabo, is.
  - By 2004, an extra 17 MW of generation capacity was added, and an extra 120 MW in 2011, which is more than the current demand of Bioko island.

- **Project Location**
  - Punta Europa in the northern end of Bioko island

- **Associated Gas Use**
  - About 14 mmcf/d of primarily associated gas from Marathon’s Alba field
APG use company case study: LPG Processing Plant and Methanol Plant

**Project Participants**
- LPG plant: Marathon Oil (52.2%), Samedn (Noble Energy) (27.8%) and Guinea Ecuatorial Oil and Gas Marketing (20%)
- Methanol Plant: Atlantic Methanol Production Company (AMPCO), a consortium consisting of Marathon Oil (45%), Samedn (Noble Energy) (45%) and Guinea Ecuatorial Oil and Gas Marketing (10%)

**Project Description and Motivation**
- Condensate and natural gas extracted from the Alba platform are sent to the onshore Gas LPG processing Plant at Punta Europa for processing into various LPG for exports. The plant processes up to 20,000 bpd LPG and 65,000 bpd condensate. The plant was set up in 1991 and modernized in 2003-2005.
- Approximately 130 mmcfd of the dry gas remaining after the condensate and LPG are removed is supplied to the AMPCO plant, built in 2001, on Bioko Island, where 3,000 gross tonnes of methanol per day is produced.
- Methanol is produced for export via 2-300,000 ton methanol carriers and the plant reportedly has a storage capacity of 900,000 bbls.

**Associated Gas Use**
- Reportedly, from the Ministry of Mines, the gas consumed by the methanol plant has removed the need to flare gas at the Punta Europa gas processing plant.
- The shareholders of the two projects are working on supplying the domestic economy with LPG which is currently fully exported.
APG use company case study: Punta Europa LNG (LNG)

Project Participants
- Marathon (60%), GE Petrol (25%), Mitsui (8.5%), Marubeni (6.5%)

Project Description and Motivation
- 2nd LNG project after Nigeria in SSA
- Came online in 2007 – Receiving part of the dry gas of the LPG processing plant (600 mmcf/d in 2007 and 700 today)
- Production currently close to 25,000 m³/d with 5 shipments per month
- All LNG produced so far has been sold to BG group - set to purchase 3.4 mpta under a 17 year purchase agreement starting in 2007 (agreement that ought to be reviewed).
- Additionally, negotiations are currently in the works with Societe Nationale des Hydrocarbures of Cameroon (SNH) and Nigeria’s NNPC to purchase gas that would be processed at the LNG plant on Bioko Island.

Project Location
- On Bioko island near the Punta Europa LPG plant

Associated Gas Use
- Train 1 is designed to process 3 tcf of associated gas from the Alba field – using the pipeline infrastructure controlled by the 3G consortium.
- Train 2 and future LNG trains would process gas from both fields in Equatorial Guinea and neighboring countries.
APG use company case study: Punta Europa LNG (LNG) and Methanol Plant

- Power Generation (IPP)
- Liquid Petroleum Gas (LPG) and Methanol
- Liquefied Natural Gas (LNG)

Figure: Map showing location of LNG and Methanol plants and Alba Field in EG

Source: Marathon Oil


References


- Marathon Oil website: http://www.marathonoil.com/global_operations/equatorial_guinea/operations/


