



# Indonesia

## Associated Gas Utilization Study

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Thanks to Tom Mitro for his thoughtful review



**Columbia Center**  
**on Sustainable Investment**

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# Summary of findings

Inadequate gas infrastructure

Bare regulatory environment and no regulatory agency

Declining heavy oil fields

APG projects: LPG and in the longer term LNG

- ◆ Inadequate gas pipeline infrastructure and a nonexistent regulatory environment have been cited as drivers of Indonesia's top 20 status regarding gas flaring.
- ◆ There is no agency with regulatory responsibilities regarding gas flaring. With the dissolution of the upstream oil and gas regulator BP Migas, unofficial monitoring of flaring activities has fallen to its interim successor, SKK Migas.
- ◆ Declining heavy oil fields have made the reinjection option ineffective for those fields. Gas-lift projects are more frequent but use small quantities of Associated Petroleum Gas (APG).
- ◆ APG use for Liquefied Petroleum Gas (LPG) production has played a role in gas flaring reduction but the lack of integrated infrastructure is blocking its expansion.
- ◆ As the 4<sup>th</sup> largest Liquefied Natural Gas (LNG) exporter in the world, there has been some interest in APG use for LNG production (that has been based so far on Non Associated Gas (NAG)).

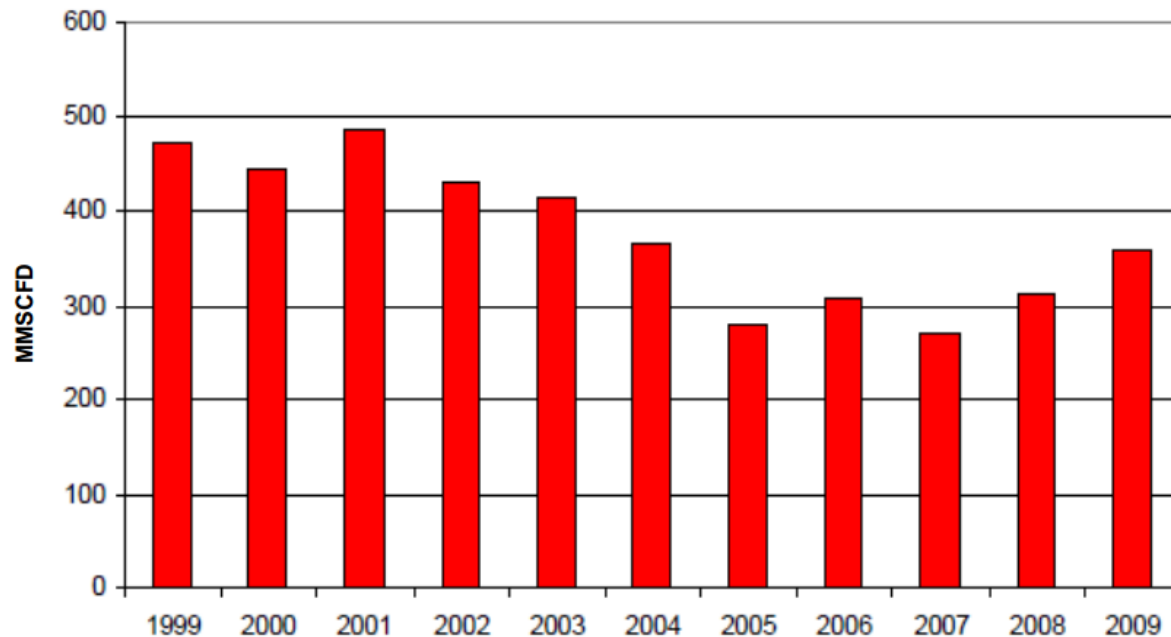


# The statistics of APG flaring and use in Indonesia

Statistics on APG flaring

On the companies involved

Indonesia Gas Flaring 1999-2009



Source: GGFR update to Associated Gas Survey (2010)

- Indonesia is the world's 10<sup>th</sup> largest gas producer as of 2012, 4<sup>th</sup> largest LNG exporter as of 2013, exporting about 818 Bcf in 2013. It is also on the list of the world's top 20 gas flarers with flaring figures showing an overall decrease from 1999 levels. Most of the country's natural gas produced in 2012 was from offshore NAG.

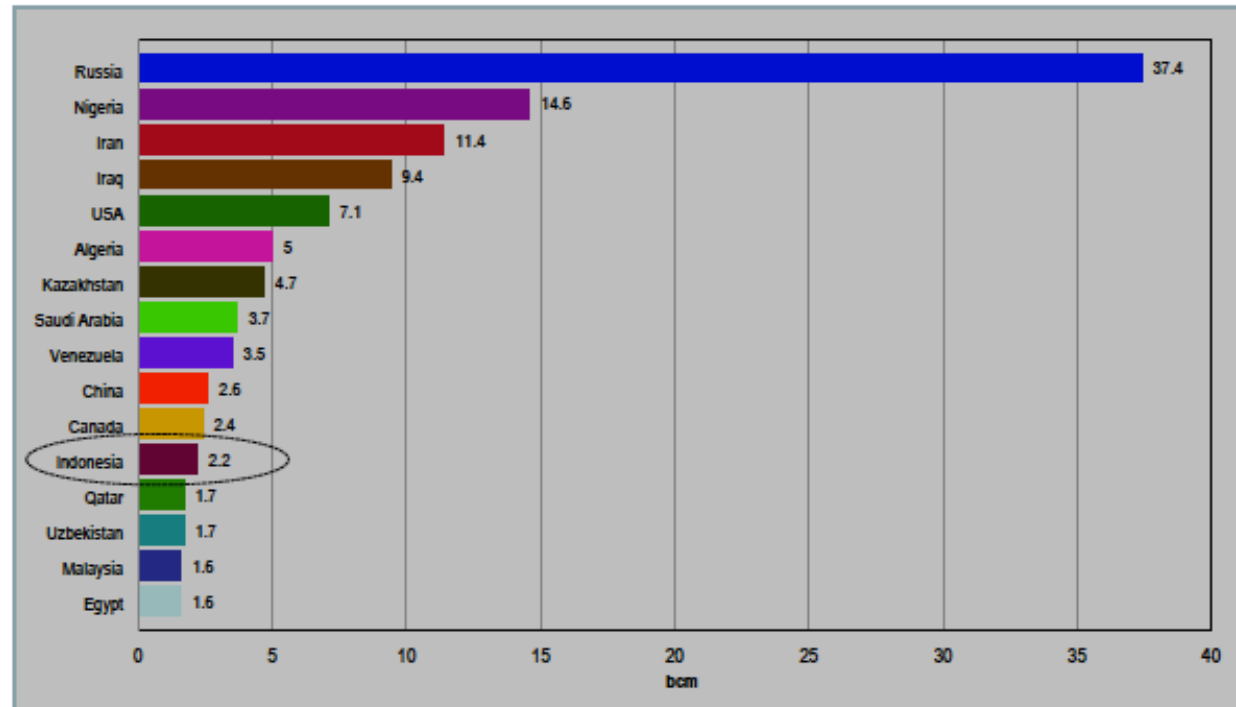


# The statistics of APG flaring and use in Indonesia

Statistics on APG flaring

On the companies involved

Indonesia Gas Flaring 2011



Source : GGFR Update to Associated Gas Survey (<http://web.worldbank.org/ggfr>)

Indonesia is the world's 12<sup>th</sup> foremost gas flarer as of 2011 by US's NOAA estimates (10<sup>th</sup> by GGFR's 2010 estimates).

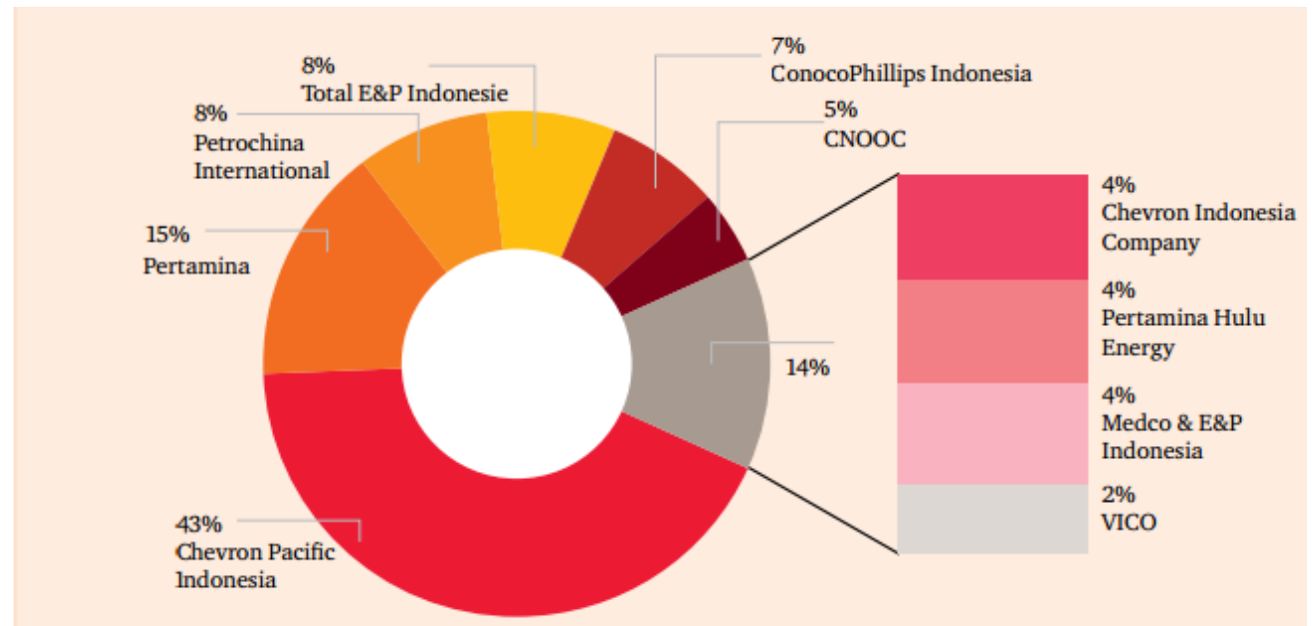


# Gas flaring in Indonesia: Who is involved?

Statistics on APG flaring

On the companies involved

## Indonesia's Major Oil Producers 2010



Source: Petrominer Monthly Magazine No. 01 Vol XXXVII January 15, 2011

- ◆ The majority of oil and gas production is done by foreign contractors and Pertamina is the largest domestic player in the country.
- ◆ The five largest oil blocks by flaring volume account for 46% of all flaring and 22% of oil production in the country as of 2010.

# What is the legal and fiscal framework in place to stop flaring and incentivize APG use?

Agencies

Government institutions involved in regulation of oil production/flaring	Description
<b>Ministry of Environment</b>	Operators are required to report emissions from flaring (and other activities) to the Ministry of Environment.
<b>Ministry of Energy and Mineral Resources (MEMR) – Special Work Unit for Upstream Oil and Gas Activities (SKK Migas)</b>	Has inherited the regulatory duties of the defunct BP Migas since 2013 and will remain active until the enactment of a new oil and gas law. In particular, SKK collects data on flaring by company.

Legal framework

Fiscal framework

- ♦ There are no government entities explicitly tasked with regulating gas flaring but during 10 years BP Migas was the national upstream regulator and executing agency and acted as a monitoring entity of flaring activities. It was disbanded in November, 2012. In the interim, SKK Migas, a newly created government unit, has assumed some of the regulatory responsibilities of BP Migas.
- ♦ Indonesia has implemented some greenhouse gas (GHG) emission reduction programs recently; some focused on flaring reduction through gas utilization for LPG and own-use fuel. Programs also include:
  - ♦ Regular internal monitoring and reporting of flaring activities
  - ♦ And installing a vapor recovery line to reduce flaring

# What is the legal and fiscal framework in place to stop flaring and incentivize APG use?

Agencies

Legal framework

Fiscal framework

Regulation/Policies on Gas Flaring/APG use	Description
<p><b>Product Sharing Contracts (PSC) (Informal)</b></p>	<p>While there is no official, legal regulation regarding gas flaring in Indonesia, PSCs require associated gas to be used and flaring prohibited if it is deemed 'economic'.</p> <p>Additionally, environmental regulations impose minimum opacity for flared gas and prohibit venting with exceptions given for temporary operational circumstances.</p>



# What is the legal and fiscal framework in place to stop flaring and incentivize APG use?

Agencies

Regulation/Policies on Gas Flaring/APG use

Description

No fiscal incentives provided for associated gas utilization projects

Legal framework

Fiscal framework





# What could the technology options be to avoid gas flaring?

Reinjection and Gas-lift

Power Generation (IPP)

Liquefied Natural Gas (LNG)

Liquefied Petroleum Gas (LPG)

Name of Technology	Possibility and current practice	Relevance to Indonesia
Reinjection and Gas-Lift	Practicing	Indonesia has many declining heavy oil fields for which gas reinjection tends to be less effective and economic. This geological fact is compounded by a lack of strong anti-flaring regulation. Gas reinjection is thus seldom practiced, but “gas-lift projects,” more appropriate to old and heavier oil fields are more frequent (e.g.: BP’s NorthWest Java oil field ). They are small APG users however.
GTL	Difficult	Gas –to–Liquids (GTL) technology is nonexistent. A study to develop a GTL plant (in Sulawesi) with Indonesia’s natural gas is underway.
Power Generation	Difficult	Gas –for–power generation is mostly used close to the source rather than close to load centers.  However, with some 22% of power generation capacity sourced from gas (2013) and an electrification rate at 73% lower than its income peers, there might be some opportunity to take advantage of the existing gas for power infrastructure to use APG for power generation
CNG	Possible but expensive	Compressed Natural Gas (CNG) as fuel for vehicles remains very limited; but due to increasing fuel demand, CNG might be a plausible option for the future.
LNG		LNG is the most developed technology in the country, based on NAG, so far.
LPG	Practicing	There is potential to develop more LPG plants. Indonesia is quite experienced in producing LPG and is trying to encourage a shift from kerosene to LPG for domestic use.

Source: Adapted from Indonesia Climate Change Sectoral Roadmap (ICCSR), 2010

- ◆ The lack of an integrated pipeline network, whose construction is rendered difficult and expensive by the fact that Indonesia is a nation of islands, is hampering the use of APG for domestic use. Under these conditions, LPG is the only realistic option.

# What are some current APG-use projects?

Reinjection and  
Gas-lift

Power  
Generation (IPP)

Liquefied  
Natural Gas  
(LNG)

Liquefied  
Petroleum Gas  
(LPG)



- State-owned Pertamina is the major stakeholder of a noteworthy APG to LPG project that earned a CDM.
- Gas demand is expected to grow significantly at an estimated 3.9% per year between 2012 and 2015 and APG-based LPG projects could help meet this demand.
- However, LPG projects tend to be more economic when they can also feed a local natural gas pipeline. When this domestic gas pipeline option does not exist, any LPG project becomes less attractive to foreign investors. This explains why only Pertamina has spearheaded LPG projects so far.



# APG-use case studies: Pondok Tengah LPG

Reinjection and  
Gas-lift

Power  
Generation (IPP)

Liquefied  
Natural Gas  
(LNG)

Liquefied  
Petroleum Gas  
(LPG)

## Project Participants:

- Pertamina (UNFCC CDM project), PT Yudhistira Energy

## Project Description and Motivation:

- Associated gas is recovered from Pertamina fields in Pondok Tengah and Tambun and processed into LPG, condensate and lean gas. The LPG is transported to an LPG plant constructed and operated by PT Yudhistira Energy.
- Processed lean gas is used to satisfy energy needs of Muara Tawar Power Plant owned by PLN, the state owned electricity distributor in Indonesia.
- The LPG produced is used to meet domestic demand and to satisfy Pertamina's mandate to distribute subsidized LPG as part of its Public Service Obligation (PSO) to local communities.

## Project Location:

- The Tambun oil field is located some 40 km west of Jakarta in West Java Province. The Pondok Tengah Oil field is situated some 10 km North of Tambun in the same province.

## Associated Gas Use:

- The LPG plant produces 150 tons/day of LPG and 177 barrels/day of condensate with 15MMSCFD of APG from the aforementioned Pertamina fields.

## Project Technology:

- Primary technology is to include a mini LPG plant and pipeline.





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