



Star Energy


Methane Emission Reduction

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Star Energy (Kakap) Ltd.

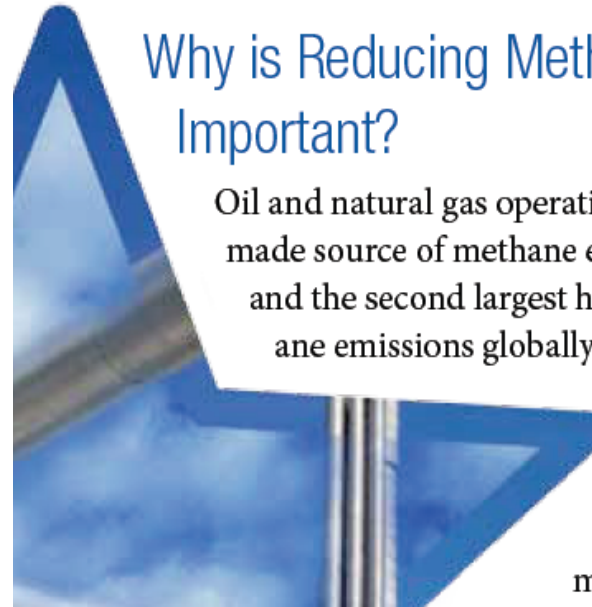
GMI Workshop, April 27-28, 2015



Why Methane ?

Every greenhouse gas has a global warming potential (GWP)—the measure of its ability to trap heat in the atmosphere relative to CO₂. Methane is referred to as a potent greenhouse gas because it has a GWP of 21. This means that methane is 21 times more powerful than CO₂ at trapping heat in the atmosphere over a 100-year period.



Why is Reducing Methane Emissions Important?

Oil and natural gas operations are the largest human-made source of methane emissions in the United States and the second largest human-made source of methane emissions globally. Given methane's role as both a potent greenhouse gas and clean energy source, reducing these emissions can have significant environmental and economic benefits.

President RI' s Executive Order To Reduce Greenhouse Gas Emission at 26% before 2020

Decrees of Minister of ESDM / Director General of Oil & Gas to secure Flaring Reduction by 30% per annum to achieve ZERO in 2025

Overall national commitment

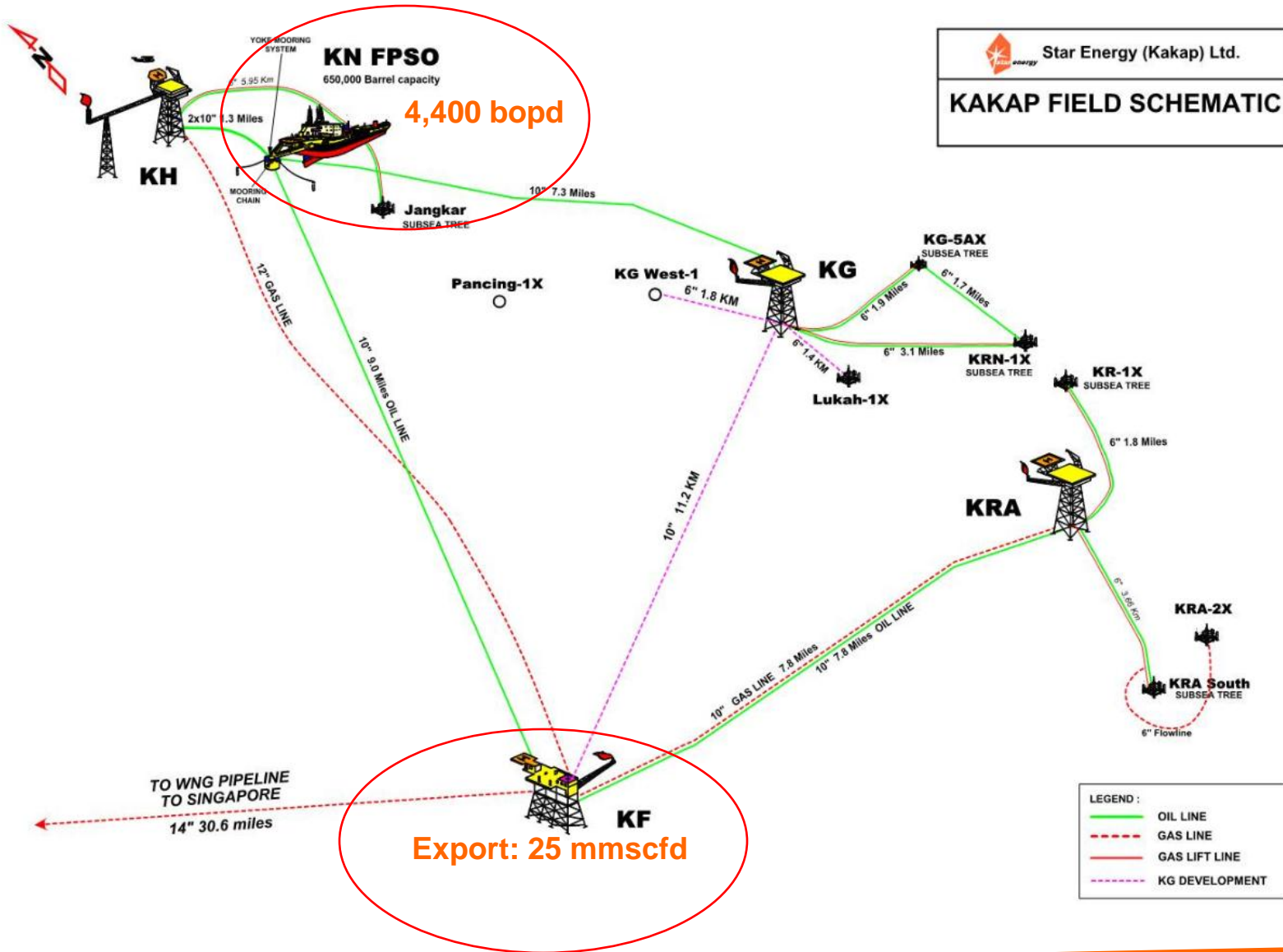
Reduce GHG emissions by 26% through domestic effort and 41% with international support by 2020 (from BAU baseline)

Gas flaring objective

To achieve zero flared gas in 2025



Process Philosophy – Methane Source





Partnership



Term of Reference for the

Global Methane Initiative


Signature: _____

Bambang Dwiyanto

Head of Agency of Research and Development for Energy and Mineral Resources
Ministry of Energy and Mineral Resources of Republic Indonesia


Date: _____

29 April 2011



Under the Methane to Markets Initiative, The Natural Gas STAR Program is a flexible, non-regulatory, and voluntary partnership between the EPA and the international oil and natural gas industry aimed at facilitating and accounting for cost-effective methane emission reductions worldwide.

The Natural Gas STAR Program has identified technologies and operating & maintenance practices in use by industry as cost-effective options for reducing methane emissions. A complete listing of these measures can be found at epa.gov/gasstar.



OMB Control No. 2060-0328
Expires 07/31/2011

NATURAL GAS STAR PROGRAM: MEMORANDUM OF UNDERSTANDING FOR INTERNATIONAL OPERATIONS

This is a voluntary agreement between Star Energy (Kakap) Ltd (company name) and the U.S. Environmental Protection Agency (EPA) for the purpose of reducing methane releases to the atmosphere by implementing cost-effective emission reduction technologies and practices.

Authorized Company Representative: Asrin Haznam, Vice President Oil & Gas Operations (name)

Signature: _____ Date: May 23, 2011

Dina Kruger: Director, Climate Change Division, U.S. Environmental Protection Agency

Signature: _____ Date: _____

Partner's Designated Natural Gas STAR Implementation Manager:

Name: Wahyu Wicaksana 

Title: Sr. Manager Operations

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Strategic Program



NO	PROGRAM	EMISSION REDUCTION (TON CO2 EQ/YEAR)	LATEST STATUS
1	Waste heat recover at KF gas turbine	3,500	Operational
2	KG gas flaring reduction	14,000	Operational
3	Fugitive emission reduction	350	Operational
4	Starting system replacement at KG gas booster compressor	200	Operational
5	KF flare gas recovery	N/A	Feasibility study
6	KN FSO vapor recovery	N/A	Feasibility study



Star Energy's Involvement



- Measurement Study Objectives Formulation (end of 2011)
 - Identified and evaluated opportunities to reduce methane emissions
 - Venting
 - Fugitive
 - Flare efficiency
- Measurement Study was Conducted
 - KRA & KF (February 2012)
 - KN FSO (September 2012)
- Attended GMI workshop & study tour at Denver, Colorado (April 2012)
- Co-Hosted 2nd Asia Pacific GMI workshop with Pertamina EP, SPE, and GGFR (September 2012)



2nd Asia Pacific Global Methane Initiative Oil & Gas Sector Workshop

September 18, 2012
Presented by U.S. Environmental Protection Agency, Pertamina EP, Star Energy, Society of Petroleum Engineers Java Indonesia, Global Gas Flaring Reduction Partnership and BPMIGAS

Pertamina EP Offices Jakarta
Standard Chartered Tower – 3rd Floor
Jl. Prof. Dr. Satrio 164 – Casablanca District
Jakarta, 12950 - Indonesia



Measurement Study Result



KRA Platform Emission Source

General Fugitives	5 %
Centrifugal Comp. Seal	2 %
Flare	93 %

143 ton / year



KF Platform Emission Source

General Fugitives	5 %
Reciprocating Comp. Packing	< 1 %
Centrifugal Comp. Seal	2 %
Flare	93 %

184 ton / year

Proposed Improvement

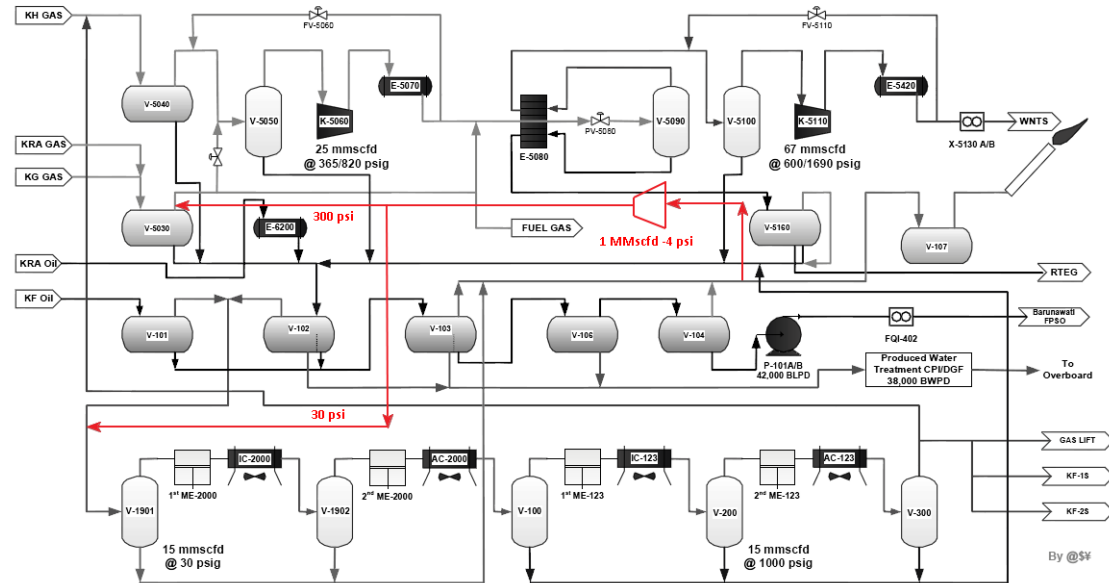
- Average gas to flare KF (2011):
23 MMSCF / month
- Potential Revenue Loss:
USD 530K / month
- Gas to Flare Composition:
Average Methane 58 %

Proposed Improvement: Flare Gas Recovery

Resources Required:

1. Accurate gas to flare measurement
2. Detail engineering complete with economic analysis
3. Compressor with high compression ratio

KF PLATFORM - Hydrocarbon Processing Diagram



Resources Available:

1. Support from US EPA for engineering study



Flare Gas Recovery Update



- Install thermal gas flow meter at end of May 2014.
- Gathering data set for feasibility study.
- Complete gathering data set for June & July 2014 and send to ICF for further study.

DATE	GAS TO FLARE MMSCFD	REMARKS
AVERAGE	1.199	Average all day (normal + shutdown)
AVERAGE	0.609	Average normal only (exclude shutdown)

Engine Starting System Retrofit

- Retrofit from natural gas starting system to air starting system – Successful Trial
- 3-5 cranking before engine running
- Benefits:
 - Reduce emission
 - Reduce interruption on gas export
 - Reduce water coning risk

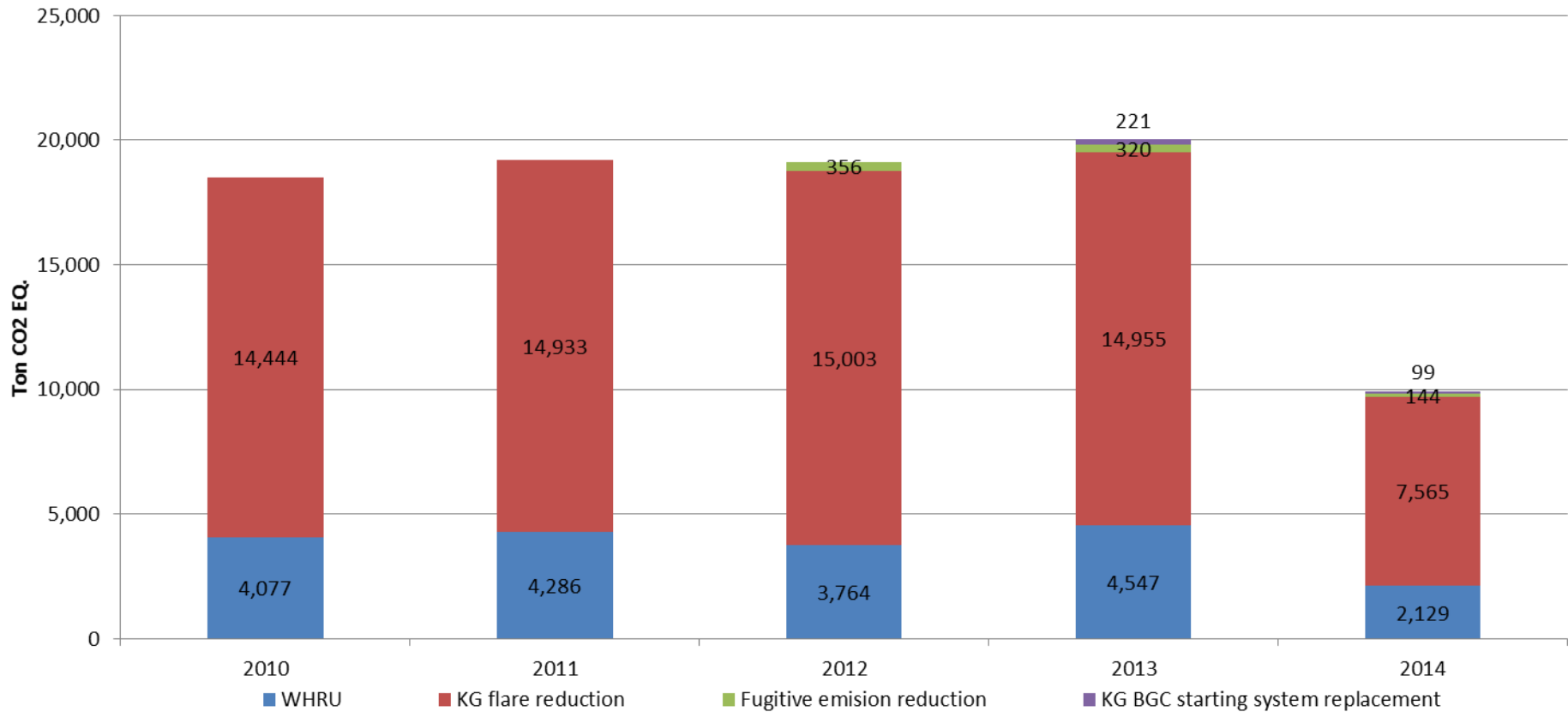




Emission Reduction Practices



Emission Reduction Program





THANK YOU



Existing Air Receiver



MBL-0410 UTILITY AIR RECEIVER	CZZ-0490B/0540A AIR COMPRESSORS	MAJ-
SIZE : 4'-0" O.D.x8'-6" S/S	CAPACITY : 150 SCFM (EACH)	
DESIGN : 200 PSIG @ 170 °F	DISCHARGE PRESS.: 165 PSIG (NOTE 2)	
OPERATING: 120-165 PSIG @ 110 °F	DRIVER : 100 H.P.	

- Existing Air Receiver
 - Volume 106 cuft
 - Operating at 165 psig

