



The Ministry of Energy and Mineral Resources

Global Methane Initiative- Indonesia R & D for Oil and Gas Industry Concern and Collaboration

Sugeng Riyono

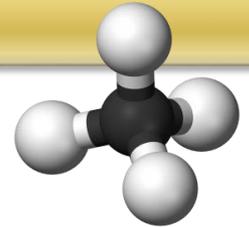
(sugengriyono@lemigas.esdm.go.id)

**Research & Development Center for Oil and Gas Technology “LEMIGAS”
Agency of Research & Development for Energy and Mineral Resources**

Global Methane Forum (GMF)
Washington D.C. USA 28th - 30th March 2016



The Ministry of Energy and Mineral Resources



Introduction

Properties of Methane	
Chemical Formula	CH ₄
Lifetime in Atmosphere	12 years
Global Warming Potential (100-year)	21



TARGET OF NATIONAL GHG REDUCTION PLAN

Scenario of 26% GHG Emission Reduction

President Commitment
G-20 Pittsburgh and COP15
To reduce te GHG Emission in 2020

26%

Unilateral

26%

15%

41%

Unilateral and International Support

FORESTRY & PEATLANDS

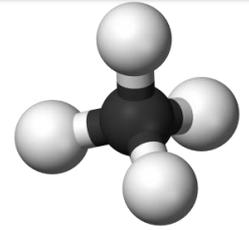
AGRICULTURE

ENERGY AND TRANSPORTATION

INDUSTRY

WASTES

National Action Plan



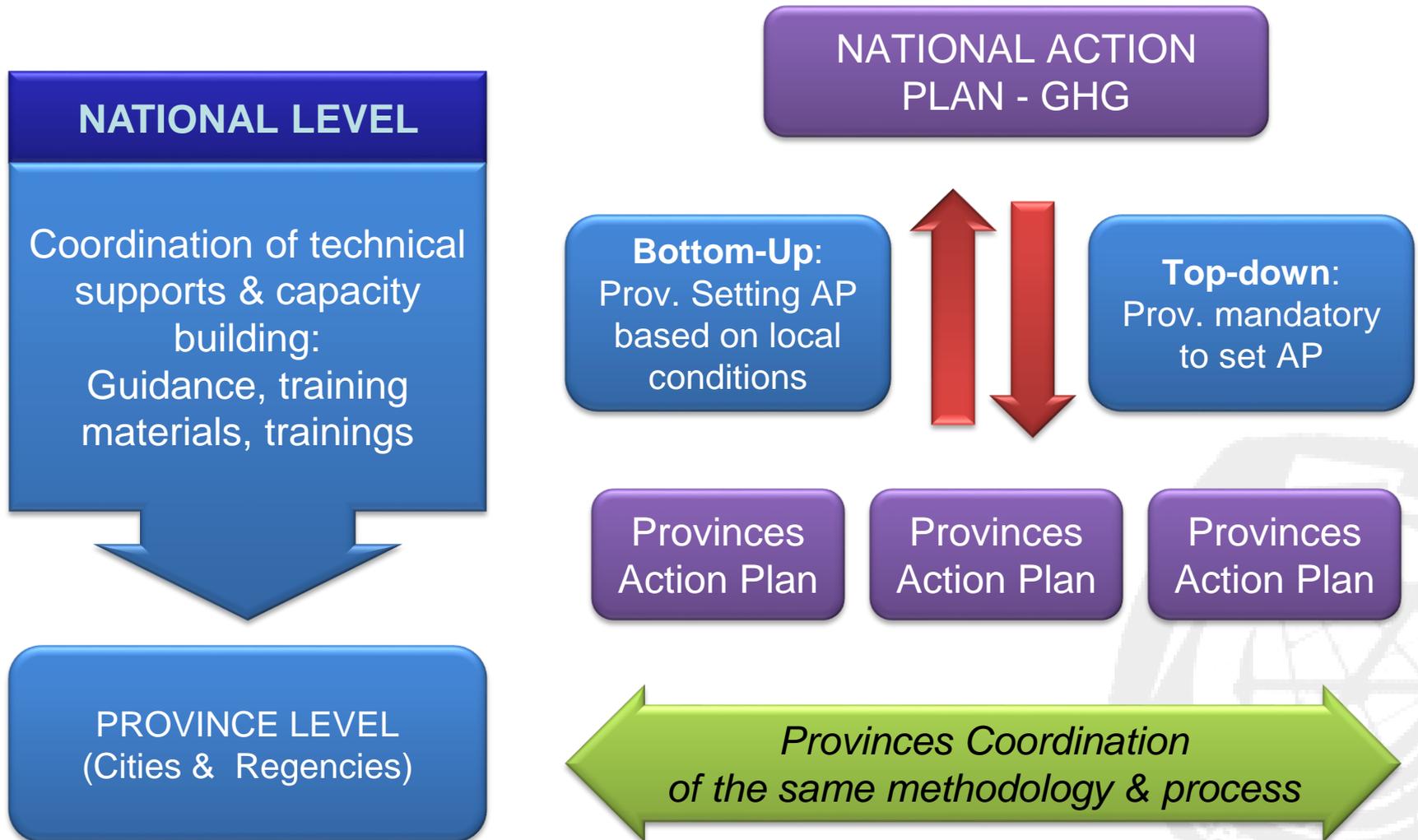
Presidential Decree No. 61, 2011 on National Action Plan of GHG Reduction

RAN-GRK (GHG ACTION PLAN)





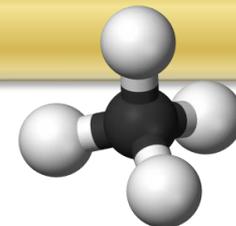
NATIONAL-PROVINCE GHG ACTION PLAN RELATIONSHIP



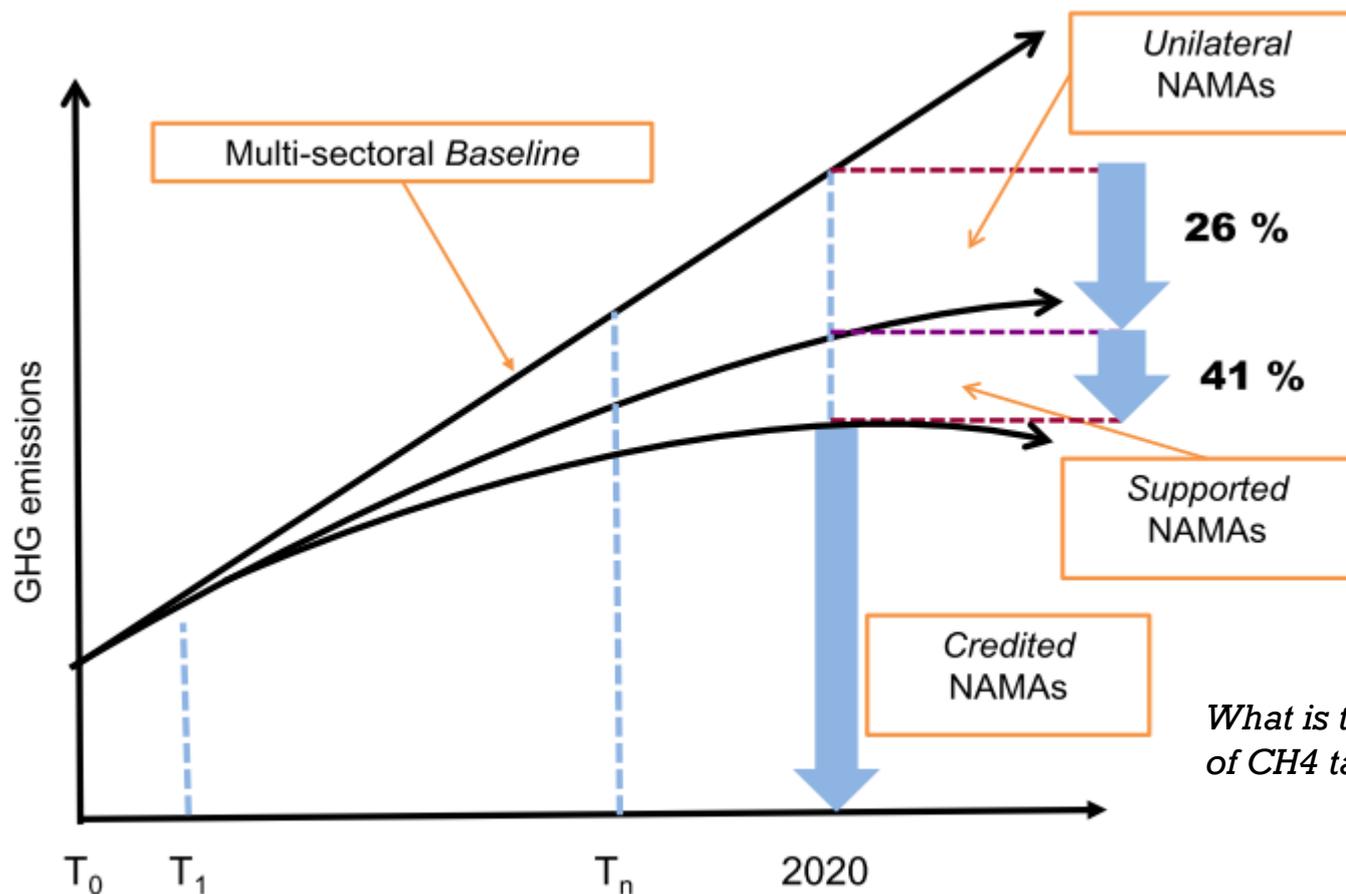


TARGET OF GHG EMISSION REDUCTION

Sector	Emission Reduction (Giga ton CO ₂ e)		Action Plan	Institutions
	26%	+15%		
Forestry and Peatland	0,672	0.367	Forest and land fire control, water and hydrology management on peatland, forest and land rehabilitation, illegal logging control, avoiding deforestation, community development	MoFr, MoPW, MoA, MoE
Waste	0,048	0,030	Sanitary landfill development, 3 R and sewerage system in urban areas	MoPW, MoE
Agriculture	0,008	0,003	Introduction of low carbon rice variety, irrigation efficiency, organic fertilizer utilization	MoA, MoPW, MoE
Industry	0,001	0,004	Energy efficiency, renewable energy development	MoI
Energy and Transportation	0,038	0,018	Biofuel development and utilization, fuel efficiency improvement, mass transportation, demand side management, renewable energy, energy efficiency <i>Methane emissions reduction</i>	MoT, MoEnergy, MoPW, MoF
	0.767	0.422		



Multi sectoral baseline

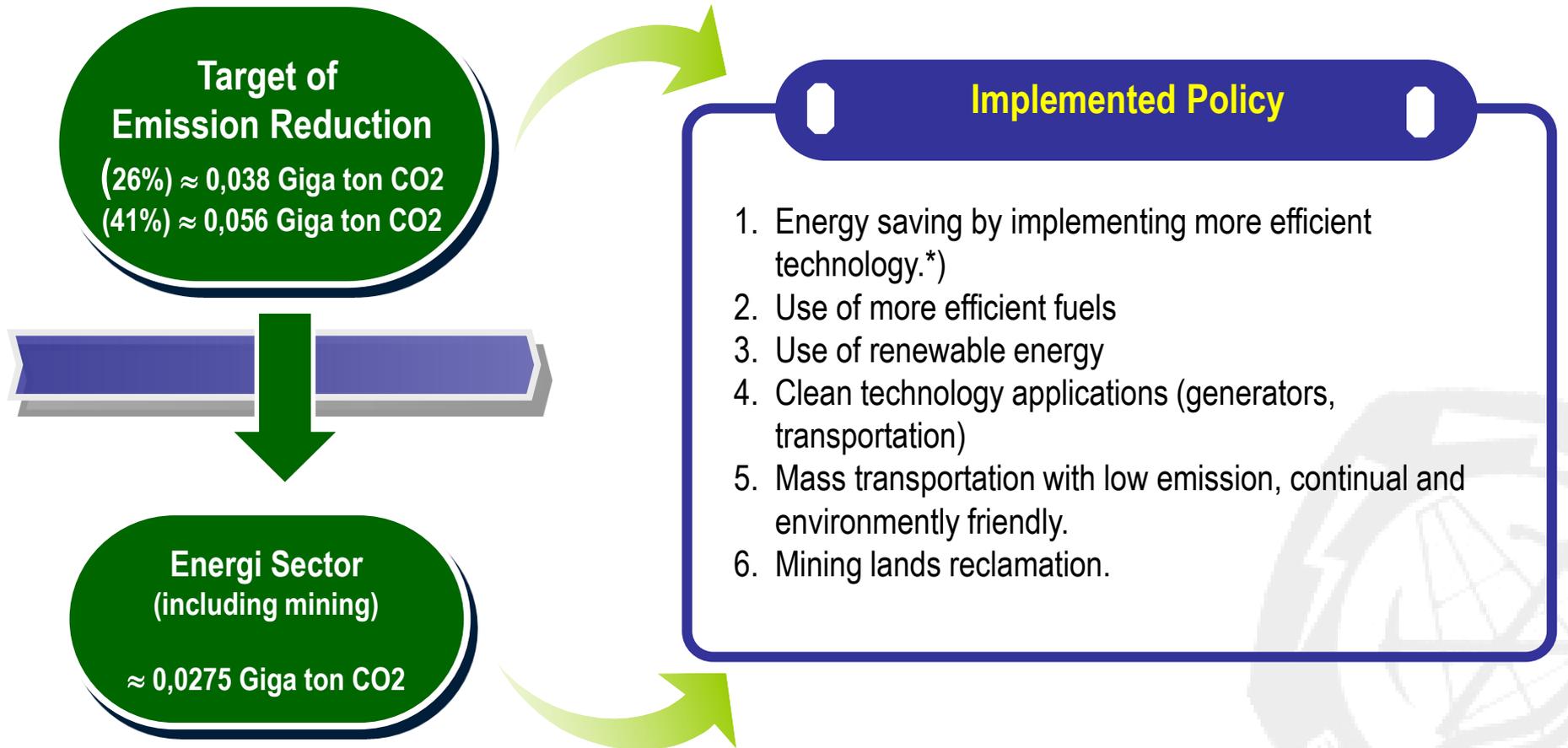


What is the number of CH₄ target ?

Paragraph 1 (b) (ii) of the Bali Action Plan of 2007: “[...] **Nationally appropriate mitigation actions** [developed] by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity building, in a **measurable, reportable and verifiable manner.**”



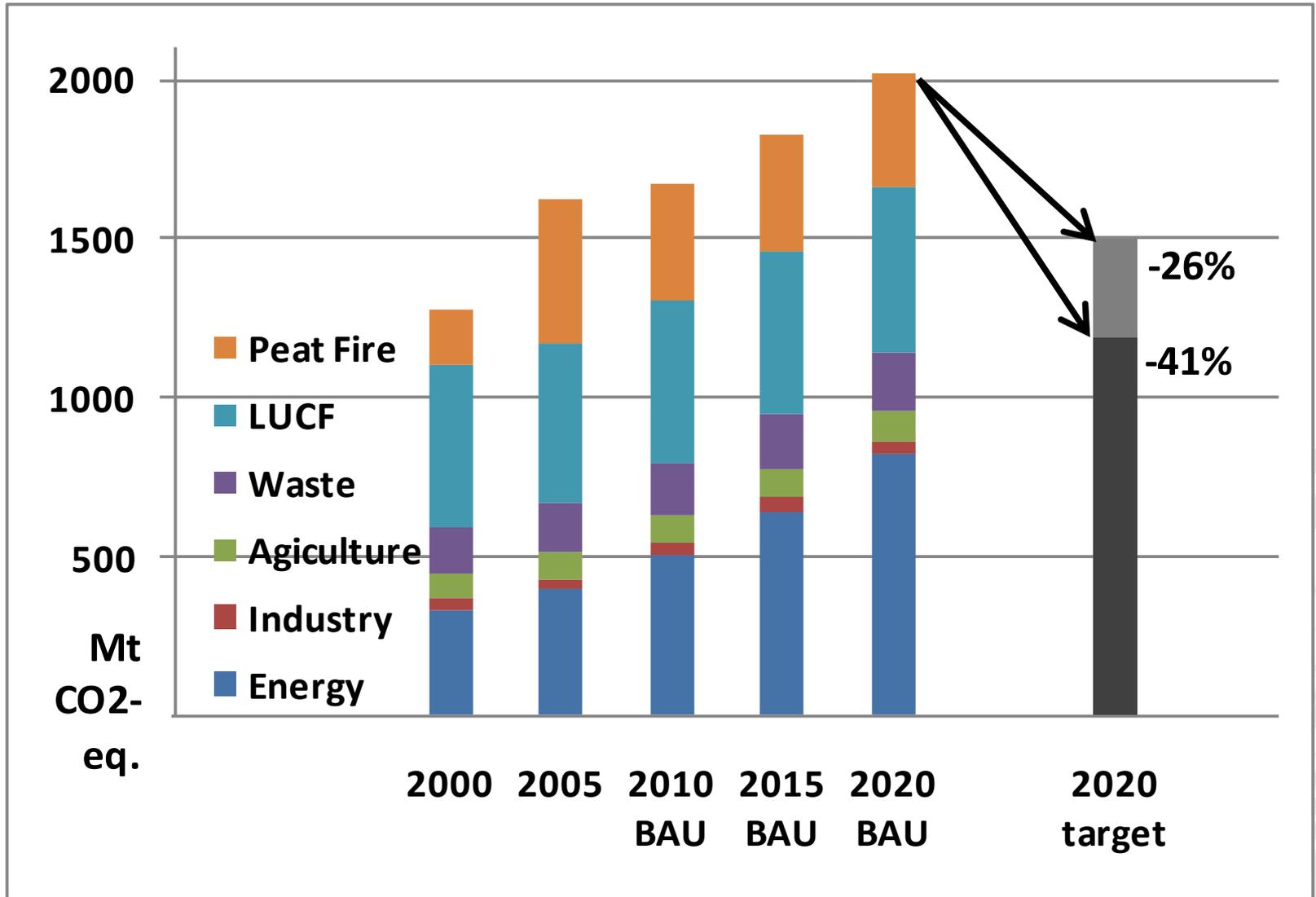
ENERGY AND TRANSPORTATION SECTORS



*) *Implemented No. 1: Vented & combustion methane emissions Reduction*



Indonesia's emissions profile, projections and reduction challenge





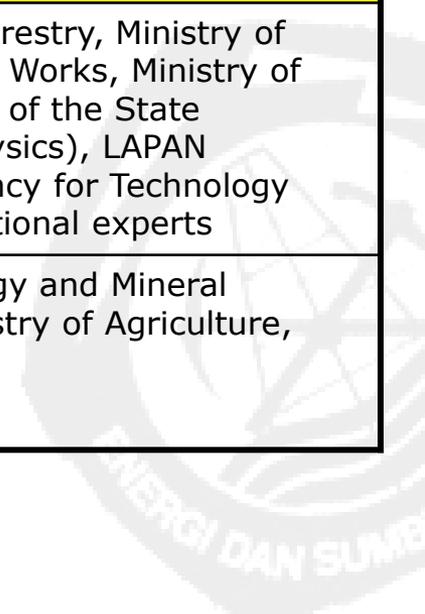
- Indonesia's Intended Nationally Determined Contribution (INDC), released on 24 September 2015, includes an unconditional 2030 GHG emissions reduction target (including land-use, land-use change and forestry (LULUCF)-emissions) of 29% below business-as-usual (BAU) and a conditional 41% reduction below BAU by 2030 (with sufficient international support).





Working Groups

WORKING GROUP	INSTITUTIONS
WORKING GROUP A (Others)	Ministry of Environment, National Planning and Development Agencies (BAPPENAS), Ministry of Foreign Affairs, Ministry of Finance, Ministry of Home Affairs, APKASI (<i>Asosiasi Pemerintahan Kabupaten Seluruh Indonesia</i>), APKESI (<i>Asosiasi Pemerintahan Kota Seluruh Indonesia</i>), APPSI (<i>Asosiasi Pemerintah Propinsi Seluruh Indonesia</i>), and BPS (Badan Pusat Statistik).
WORKING GROUP B (Inventory)	Ministry of Environment, Ministry of Energy and Mineral Resources, Ministry of Forestry, Ministry of Agriculture, Ministry of Transportation, Ministry of Industry, and national experts
WORKING GROUP C (V&A)	Ministry of Environment, Research Agencies within the Ministry of Forestry, Ministry of Agriculture, Ministry of Marine Affairs and Fisheries, Ministry of Public Works, Ministry of Health, Ministry of Research and Technology, Environmental Division of the State Electricity Company (PLN), BMG (Bureau of Meteorology and Geophysics), LAPAN (Indonesian National Institute of Aeronautics and Space), BPPT (Agency for Technology Assessment and Application) and scientists from universities and national experts
WORKING GROUP D (Mitigation)	Ministry of Environment, Ministry of Transportation, Ministry of Energy and Mineral Resources, <i>Ministry of Trade and Industry</i> , Ministry of Forestry, Ministry of Agriculture, Ministry of Research and Technology, and national experts





INDONESIA MRV ACTIVITIES -GHG

Activities

Institutions

Data of GHG emission for last 2-years and projection of GHG emission for next 10-years

Conducted by SIGN-Center under the supervision of KLH
Output: a document of national GHG emission bi-annually

National Planning on Climate Change Mitigation

- Sector submit climate change mitigation plan
- Bappenas compiles mitigation plan for formulating of RPJMN and RPJP
- *Expert Panel* validates mitigation plan (under the coordination of KLH, compare to the result of inventory)

National Report on the implementation of mitigation actions and reduction target
Prepared by KNLH

Verification on specific aspects (emission reduction, financial)
Verified by related institutions (e.g.: BPK/independent auditor)

Bi-annual report (as a part of NATCOM)

Report of target achievement on 26% emission reduction in 2020

Indonesia's perspective
Measurable, Reportable, and Verifiable



Program Activity of each Sector for the additional 15% emission reduction target

SECTOR/ACTIVITY	Additional ER Target (Gt CO2e)	REMARK
ENERGY SECTOR	0.010	Equivalent to 13 TWh or 1550 MW capacity
1. Energy Conservation Program in demand side <ul style="list-style-type: none"> - Energy conservation for minor investment - Overhaul for maintenance and repair 		EE will be achieved through minor investment in industry, building/ commercial sector, etc
2. Deployment of clean coal technology		Supercritical or Fluidized Bed coal Power plant (350 MW)
3. Accelerated Geothermal (1000 MW)		Additional 1000 MW to the existing government plan
4. Biofuel		Additional to achieve the government target (mandatory)
TRANSPORT SECTOR	0.008	Equivalent to 24 MMBOE
Further Improvement in Transportation Sector <ul style="list-style-type: none"> - Enhance public transport infrastructure such as Bus Rapid Transit or city train system, pedestrian and bicycle road - Integration of transport and land use plan 		The program will further improve more efficient public transport infrastructure (road, pedestrian, public transport vehicle, information system for public transport management <ul style="list-style-type: none"> - City planning by local government - Public work

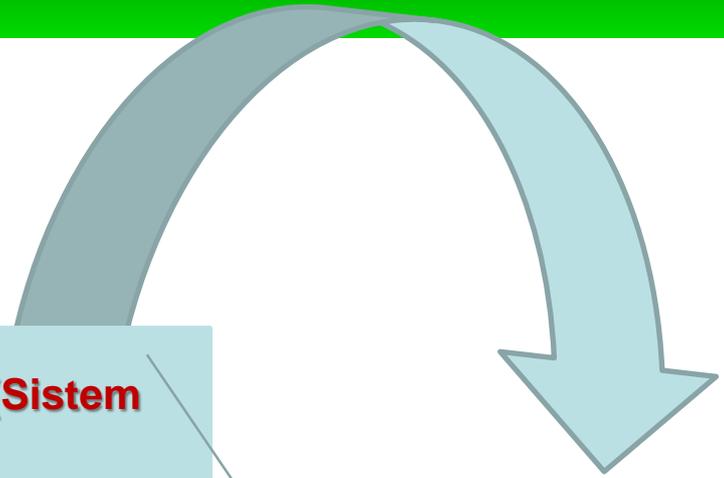


National Mitigation Actions



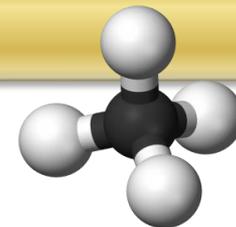
National GHG-Inventory System or SIGN (Sistem Inventarisasi GRK Nasional)

- Sustainable GHG-inventory process (national, regional and local level);
- Monitor level- and status of GHG emission;
- Evaluate implementation of emission reduction actions;
- Report GHG emission status.



**Measureable
Reportable
Verifiable**

- *As one of the important instruments for MRV-implementation related to national mitigation actions.*
- *SIGN → level of achievement on emission reduction (measurable) through current emission status (reportable) and re-checking process/“back-tracking” to the emission sources/sectors (verifiable), considering:*
 - *Sector/location*
 - *Source of fund;*
 - *Technology;*
 - *Energy sources/emission sources;*
 - *level of removal.*



GMI OIL & GAS INDUSTRY - INDONESIA

Relevance – Completeness – Consistency – Transparency - Accuracy



[How to Participate](#)

[Partner Countries](#)

[Project Network](#)

[Activities](#)

[Tools & Resources](#)

[News & Events](#)

[HOME](#) » [PARTNER COUNTRIES](#) » [OIL AND GAS COMMITTEE MEMBERS](#)

Oil & Gas Subcommittee

Indonesia

Dr. Bambang Widarsono

Director of Oil and Gas R&D

Centre for Oil and Gas Technology "LEMIGAS"

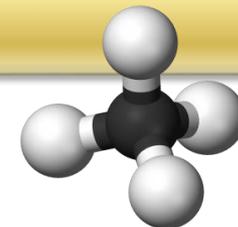
Jl. Ciledug Raya Kav. 109, Kebayoran Lama, Jakarta Selatan, Indonesia, 12230

Tel: +(62) 21 7394422

Fax: +(62) 21 7246150

Email: bwidar@lemigas.esdm.go.id





Indonesia Joins GMI

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:  _____

- Officially signed **28 April 2011**
- Previously initiated by Evita H Legowo (M2M) since 2009





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: _____



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

Address: Wisma Barito Pacific, Star Energy Tower 8th-11th floor, Letjend S. Parman Street, Kav. 62-63

City/State: West Jakarta / DKI Jakarta

Zip Code/Postal Code: 11410

Country: Indonesia

Telephone: (62-21) 532 58 28

Fax: (62-21) 530 79 28

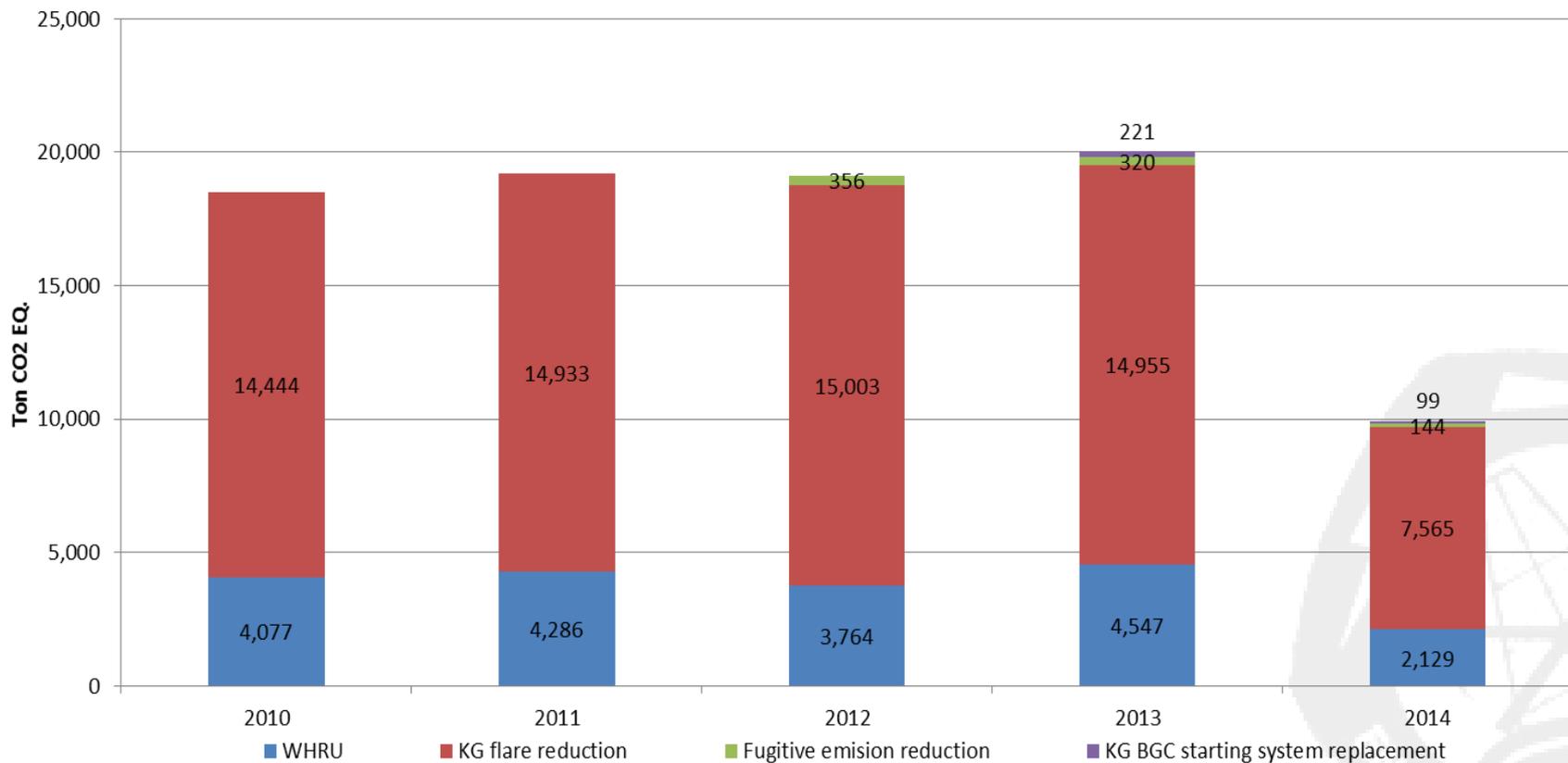
E-mail: wahyu.wicaksana@starenergy.co.id





Emission Reduction Practices

Emission Reduction Program

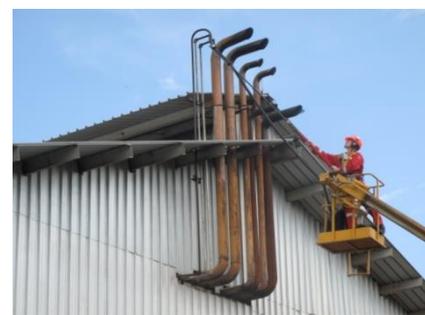




Green House Gas Reduction

Natural Gas Star Program w/ USEPA

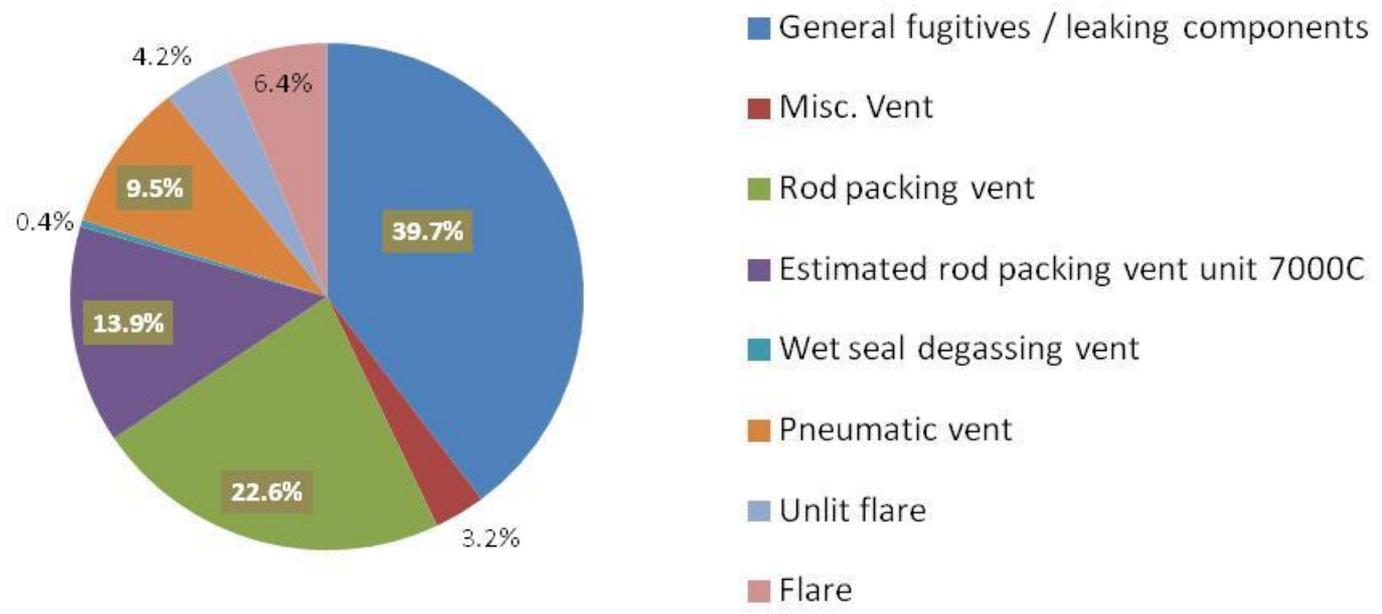
- **MoU Signed** on April 2nd, 2013, as the second Indonesian partner
- **Objective:** to receive professional guidance on the technology, cost-effective program and best practices to reduce the methane emission from its operational activities
- Field Visit conducted on Sept 4th – 10th, 2013 to Badak Plant including its satellites (South and North Satellite).
- Received study report draft from USEPA on April 1st, 2014. Now is still under VICO review.





Green House Gas Reduction

Methane Leaks Source (based on USEPA assessment)



GHG reduction strategy prioritized on effort to reduce the emission from **MAIN SOURCES**

Less emissions translates to more production & \$ value, more safe environment, and finally more green operation





PERTAMINA EP SUBANG METHANE IDENTIFICATION PROGRAM



MONITORING PROGRAM :

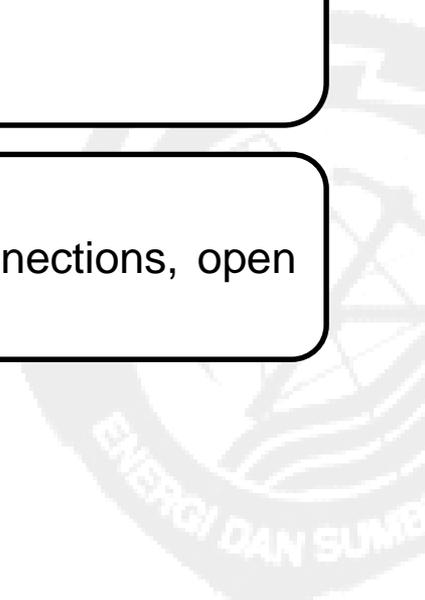
1. Pre Inspection record review based on P&ID
2. On site Inspection of Source records and a facility walk through and observation
3. On site inspection with the inspector conducting the monitoring

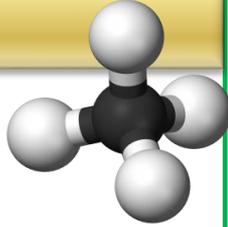
MEASURING METHOD :

1. Monitoring fugitive methane using calculation tier 2 EPA
2. Monitoring fugitive VOC using direct measurement method

Equipment measured under fugitive emission:

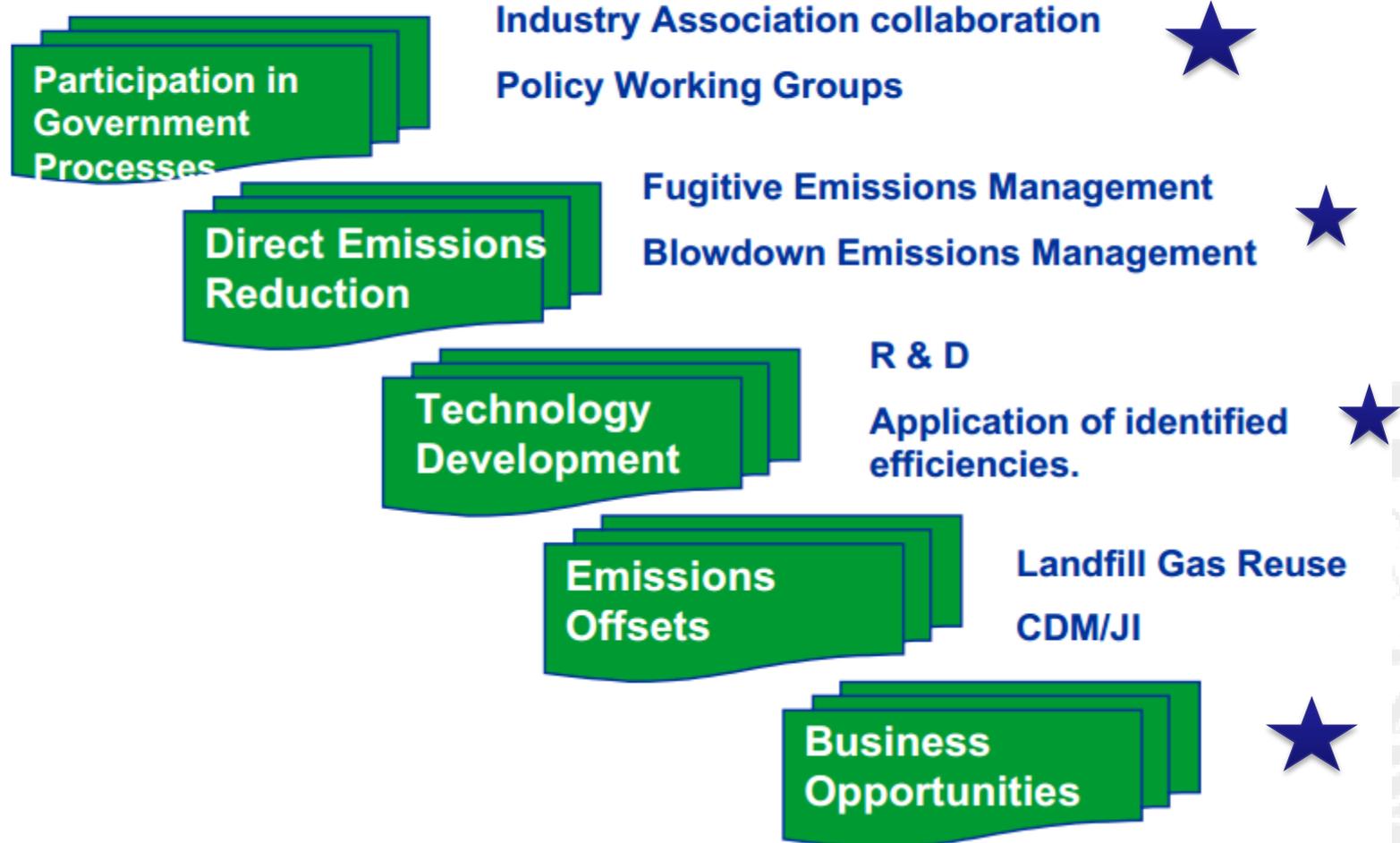
Pumps, valves, compressors, pressure relief devices, sampling connections, open ended valves, flanges, tank



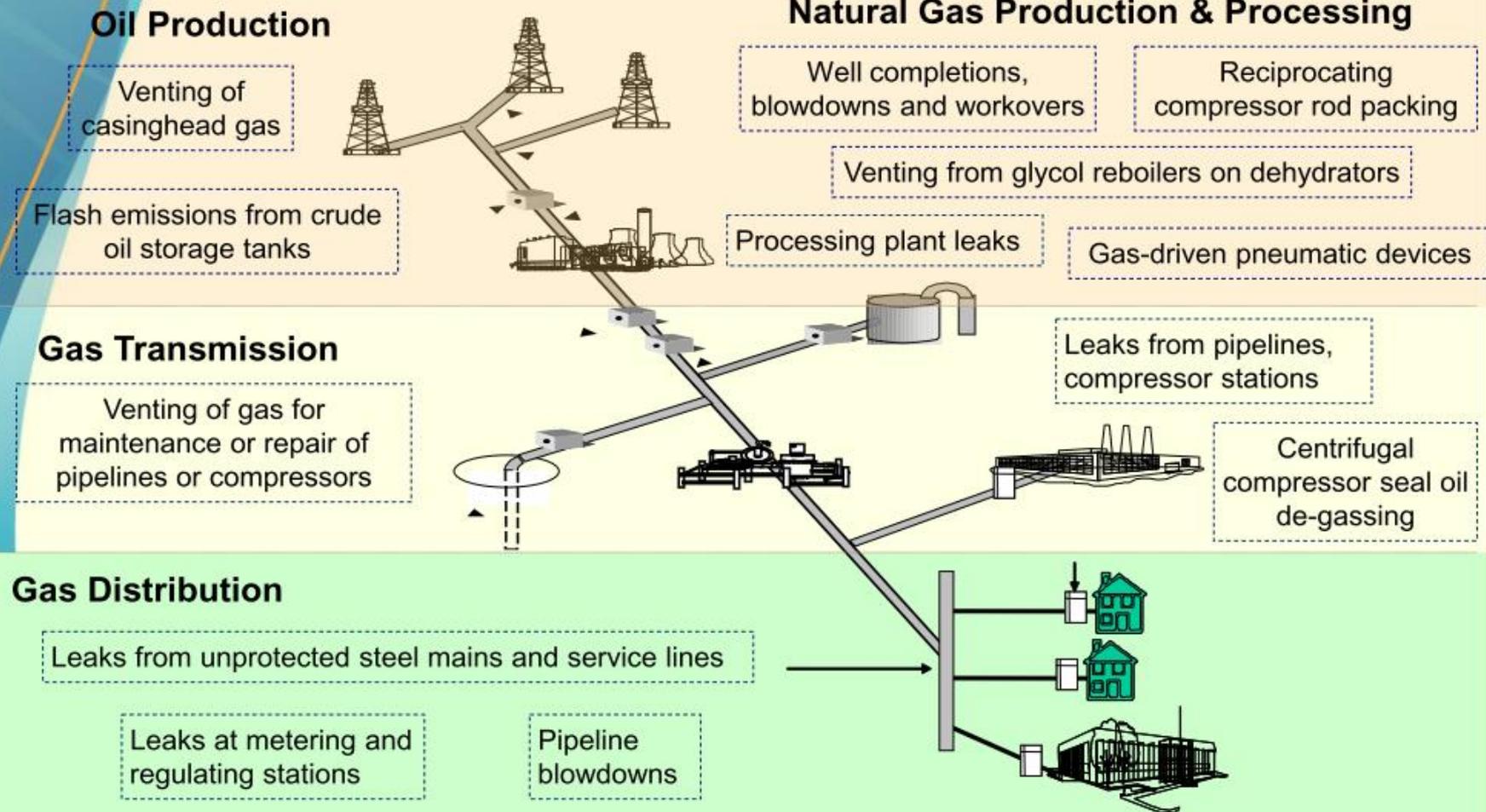


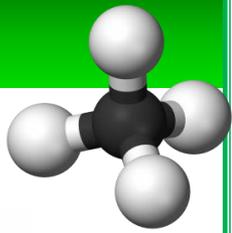
Climate Change Strategy

Methane Initiative Program Coordination

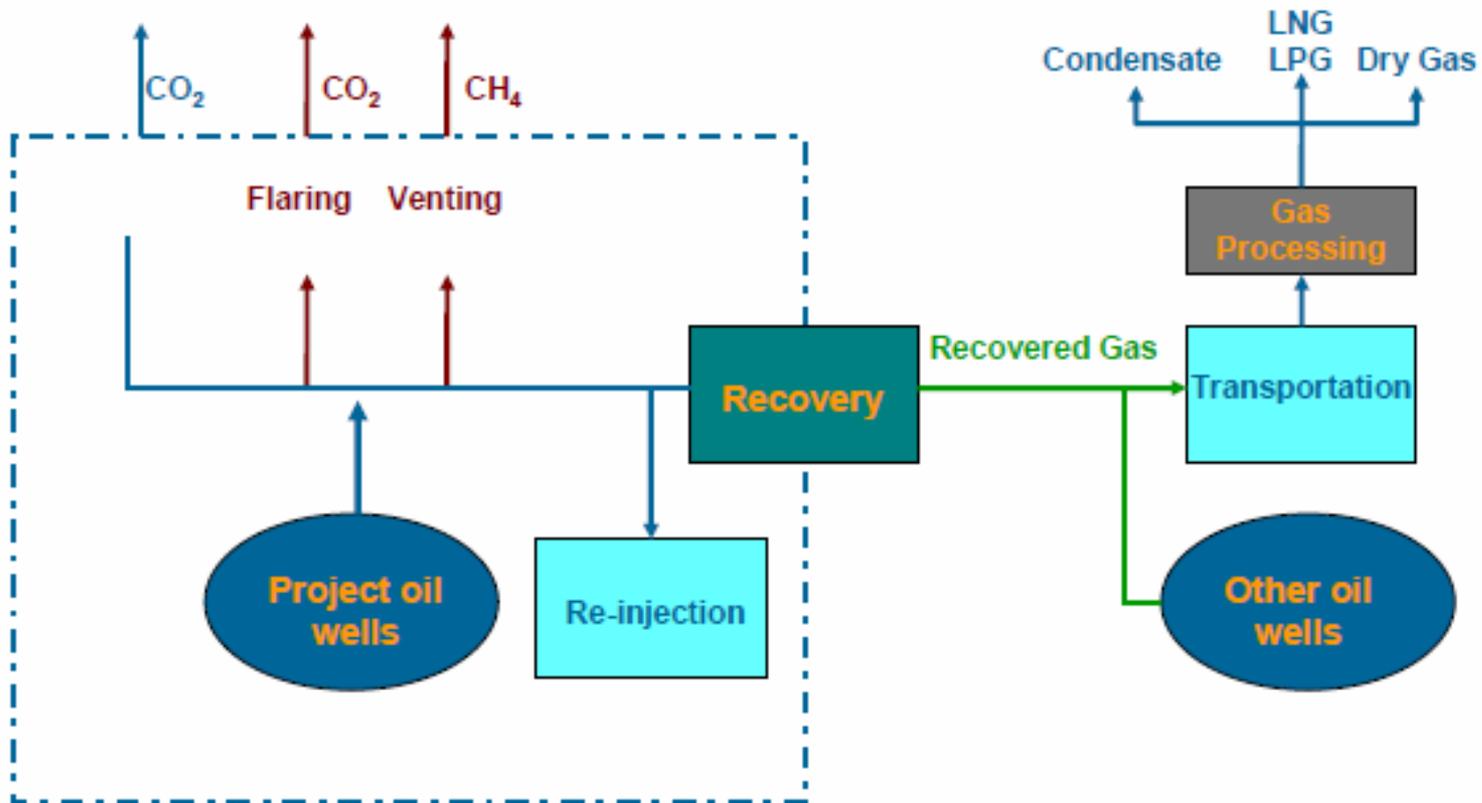


Oil and Gas Operations Concern of CH₄ Emissions



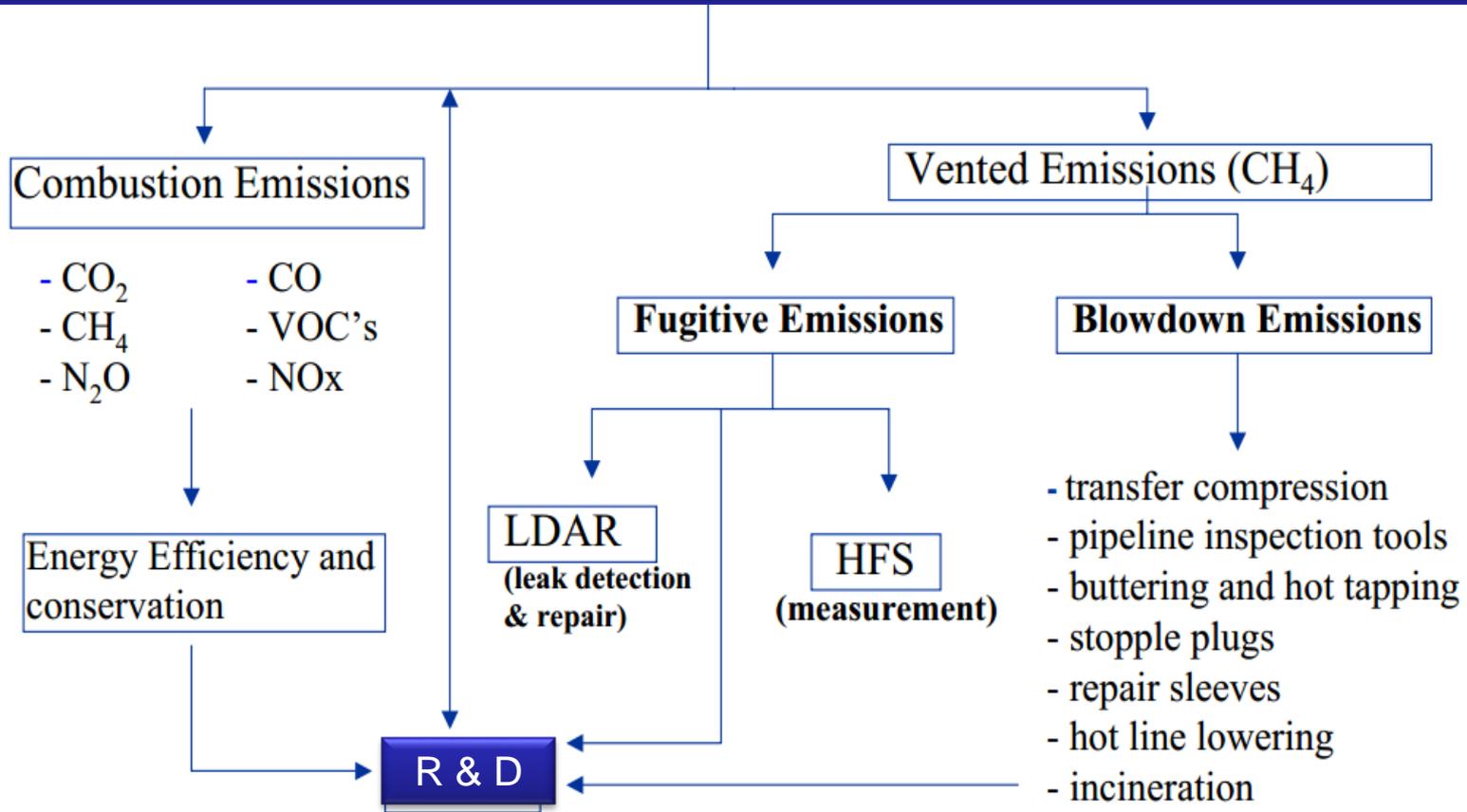


Gas Flaring and alternatives



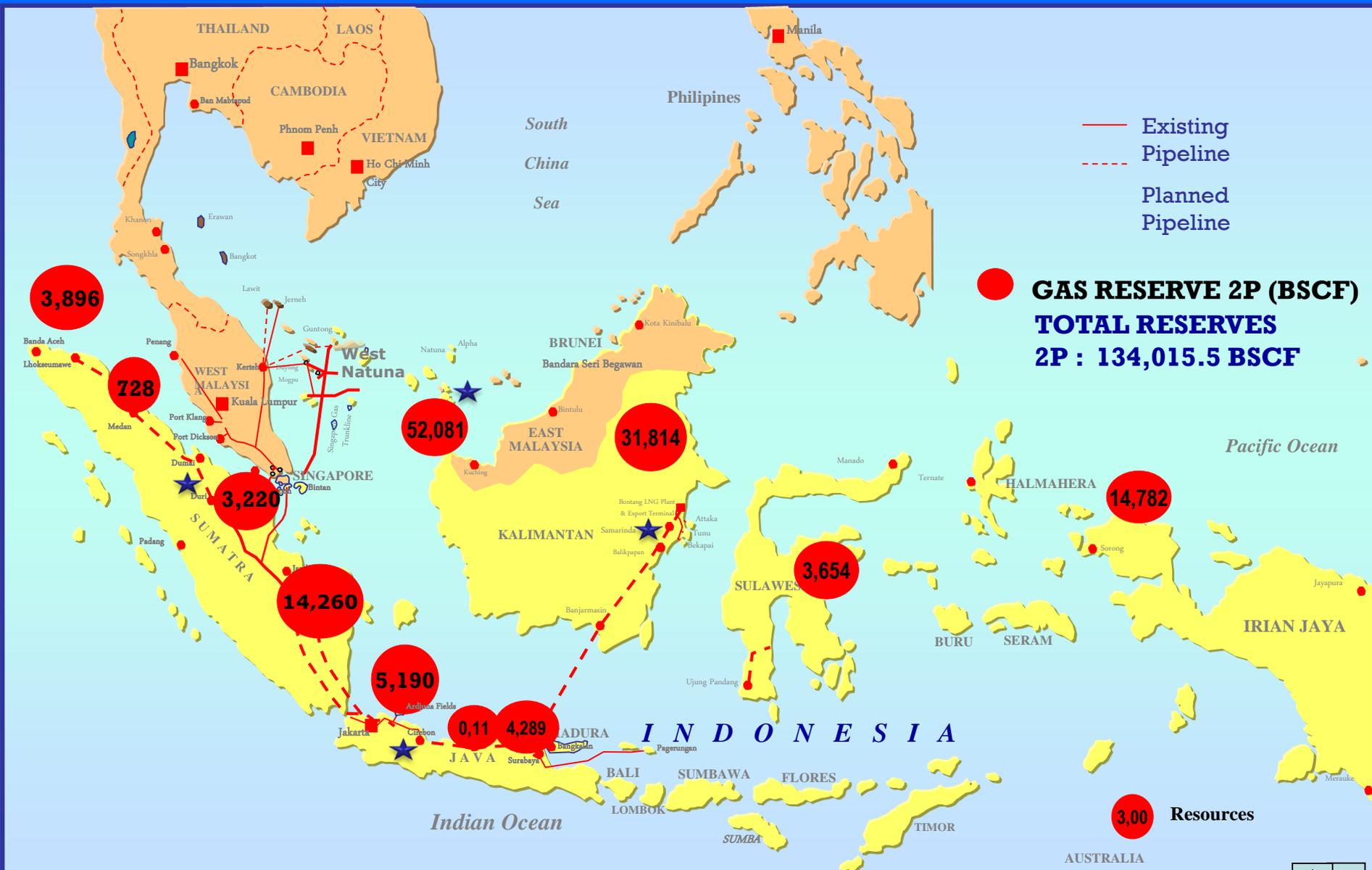


Oil & Gas Industry Emission Management System





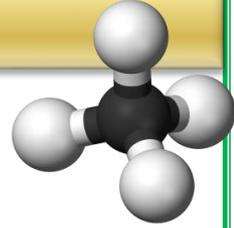
INDONESIA GAS RESERVES





Mitigation Options Targeting Production Platform’s Largest Methane Emissions Sources

Category	Emissions Source	% of Methane Emissions	Technologies and Practices for Reducing Methane Emissions	
Venting	Centrifugal compressor wet seal oil degassing	77.8%	<ul style="list-style-type: none"> - Replace centrifugal compressor wet seals with dry seals - Route centrifugal compressor wet seal oil vent to fuel 	
Venting	Cold vent	8.7%	<ul style="list-style-type: none"> - Route individual vented emissions sources to vapor recovery unit (including pig launcher venting) 	<ul style="list-style-type: none"> -Route routine compressor blow down to fuel gas system
Venting	Glycol dehydrator	0.9%	<ul style="list-style-type: none"> - Route non-condensable gas from condenser vent to vapor recovery unit 	
Venting	Reciprocating compressor rod packing vent	0.5%	<ul style="list-style-type: none"> - Economic replacement of rod packing 	
Venting	Storage tank venting	0.3%	<ul style="list-style-type: none"> - Install vapor recovery unit - Scrubber dump valve repair 	
Fugitives	Fugitives – all components	7.3%	<ul style="list-style-type: none"> - Leak detection, quantification and repair 	



refer to:

**The 2nd GMI Steering Committee Meeting
March 2013, Vancouver, British Columbia
Canada**

**Steering Committee Decisions
Outcomes and Charges to the Initiative**





Major Decisions and Outcomes: GMI Partner Action Plans

- Low rate of partner completion of action plans
- Identified key barriers:
 - Jurisdictional conflicts
 - Resources
 - Action plan “fatigue”
- Expressed support for development and completion of GMI Partner Action Plans
 - Beneficial way to communicate priorities, opportunities, activities and accomplishments across the partnership.
- Suggestions for moving forward:
 - Emphasize flexibility: in structure, format, even name
 - Don't want to duplicate planning efforts – take advantage of ongoing work through NAMAs, etc.
 - Better to do sector-specific plans than not at all



Major Decisions and Outcomes: GMI Partner Action Plans

Subcommittees:

- Continue to identify how to support Partners in the development and implementation of the GMI Partner Action Plans.

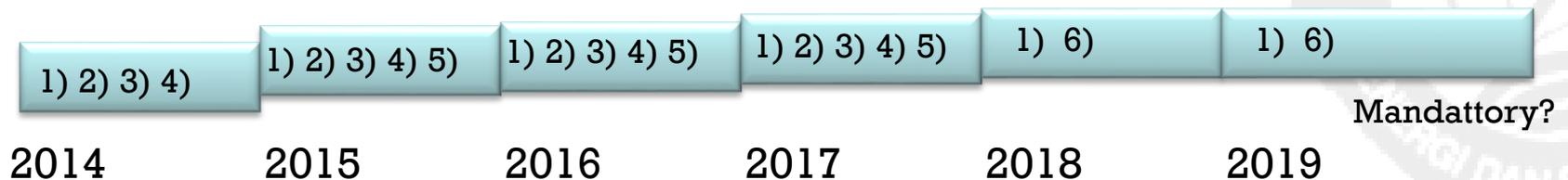




GMI INDONESIA ACTION PLAN 2014-2019

ENERGY SECTOR – Oil & Gas Subsector

- 1) SOCIALIZATION OF METHANE REDUCTION PROGRAM IN OIL AND GAS SUB-SECTOR
- 2) IDENTIFICATION OF CH₄ EMISSIONS FROM VENTED AND COMBUSTION PROCESS OF OIL AND GAS OPERATIONS
- 3) SURVEY AND MEASUREMENTS
- 4) ANALYSIS
- 5) RECOMMENDATIONS – Baseline and Regulation
- 6) POLICY IMPLEMENTATIONS





Year 2015-2016 Program – Oil & Gas Subcommittee

- 1) Implementation: Identification of CH₄ emissions from vented and combustion process of oil and gas operations – Survey, measurements and analysis:
 - East Kalimantan (2nd -7th November 2015): Monitoring program at Badak, Semberah and Nilam Fields – Vico
 - Sumatera (1st-4th December 2015) Jabung Jambi Gas Field, Petrochina
- 2) Focused Group discussion on baseline and economic calculations, Cirebon City West Java, 4-5 December 2015
- 3) GMI Pannel Discussion – HSSE Forum, Bandung 22nd-23rd March 2016. Capacity building & Field trip at Subang Gas Plant, West Java
- 4) Survey, measurements and analysis:
 - East Java (April-May 2016): at Tuban Gas Field – Petrochina & Pertamina

PICTURES AND VIDEOS

DISCUSSION

- Mostly point leak of findings are new locations, not mentioned in the previous List.
- Both of FLIR and Hi Flow instruments were working excellently.
- Raining was happened at 11.00-11.20, the activity was stopped and continued until 12.00
- Two Compressor Units (C-1980 and) had been observed and inspected and Pig Launcher Unit locations
- Top and Bottom flange at upstream control valve PSV 1351 at Compressor C-1980 showing significant value of 0,08 cpm methane rate



PICTURES AND VIDEOS

DISCUSSION

- Mostly point leak of findings are new locations, not mentioned in the previous List.
- Both of FLIR and Hi Flow instruments were working excellently.
- **Top and Bottom flange at upstream control valve PSV 1351 at Compressor C-1980 showing significant value of 0,08 cpm methane rate**





Recommendations

- Methane reduction program as a policy at ministry level
- Indonesia R & D in GMI efforts to be improved for Methane studies
- Improve National Capacity and GMI organizational concerns.
- Implement Methane Initiative communications linked to GMI International.
- Implement periodic monitoring and reporting.
- Strengthening promotion on methane potentials.



Conclusions

Oil and natural gas industry has an opportunity to cost-effectively reduce methane emissions resulting in:

1. Increased operational efficiency
2. Increased profits
3. Increased domestic gas supply
4. Improved safety
5. Improved environmental performance
6. Better public relations





Terima Kasih



Thank you

