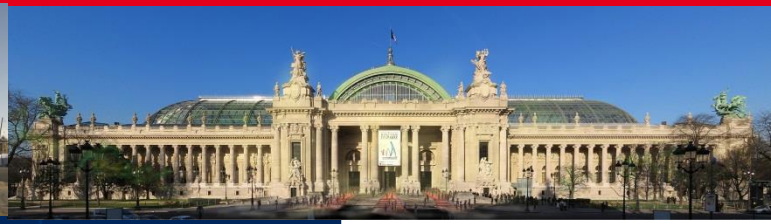
26th World Gas Conference

1 – 5 June 2015, Paris, France



Technological Advances in Gas Exploration and Production

WOC-1 Study Group 1.1 Leader
2012-2015 Report

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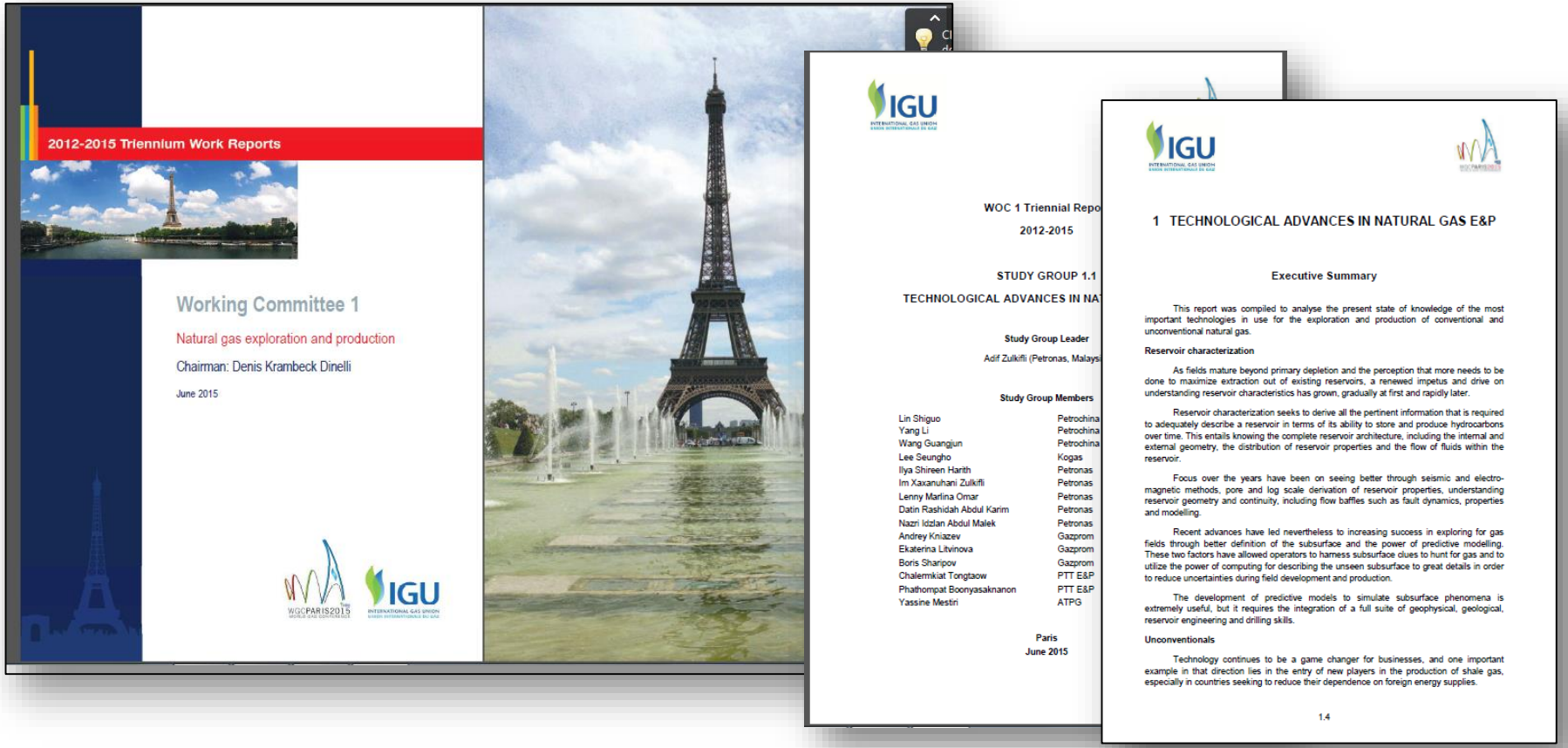
PETRONAS, Malaysia

IGU
WGCPARIS2015
WORLD GAS CONFERENCE

Working Committee-1 Report – Natural Gas Exploration and Production



Technology plays a key role in the E&P of Natural Gas

❖**Opens up access to and expand new sources of energy supply**

❖**Hastened adoption of sustainability driven business model**

Energy Supply

Energy Affordability

Sustainability

- ❖ Resource depletion makes it imperative to explore new sources in new areas or exploring new frontiers
- ❖ Technology advancement facilitates in bringing down cost and enhance project economics
- ❖ Technology will remain a key enabler to mitigate future rise in emissions

Angsi Platform, PETRONAS

Advancement and breakthroughs in technology will unlock and deliver various sources of energy to global markets

Current Triennium

TECHNOLOGICAL ADVANCES IN GAS E&P

SUPPLY

- Methane Hydrate
- Unconventional Shale Gas
- Gas Monetization

COST

- Shale Gas Factory Concept
- Better Imaging in Gas Reservoir

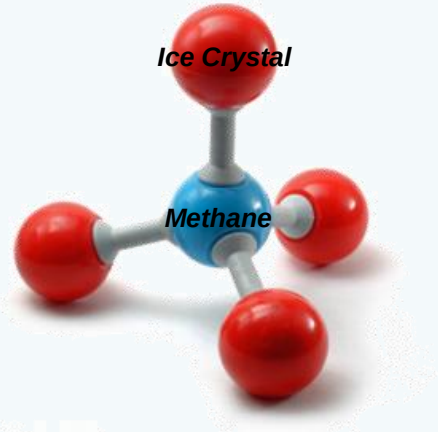
SUSTAINABILITY

- CO^2 Emission
- Zero Flaring Zero Venting
- Micro GTL

Diversification in energy supply has encouraged development of methane hydrates as an important energy in the future

Locating the Deposits

- ***Seismic***
- ***Well Logs***

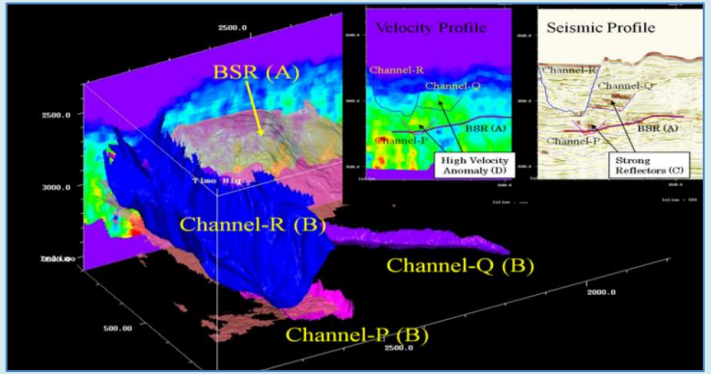


Resources Characterization

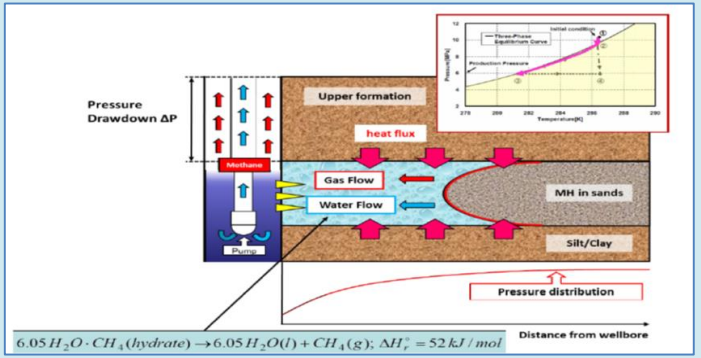
- ***Volumetric***

Production Technologies

- ***Depressurization***
- ***Gravel Pack Completion***
- ***Wells & Surface Monitoring Technologies***



Seismic visualization of methane hydrates accumulation

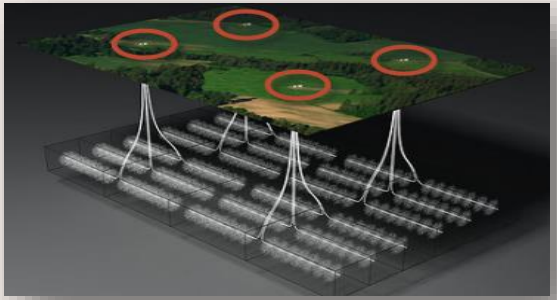


Concept of Methane Hydrate gas production method

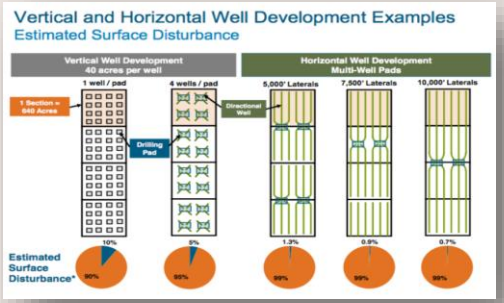
Improvements in “Shale Gas Factory” concept drives down E&P costs significantly throughout the value chain

Lean Manufacturing

Multi-well pads



Reducing surface disturbance



“Shale Gas Factory”

- Eliminate uneconomical delays
- Improving wells quality
- Reduce overall footprints

Skidding rigs

Simultaneous operations

Single pipeline connection

Numerous efforts are ongoing in developing energy efficient technologies to mitigate carbon emission

Zero Flaring Zero Venting

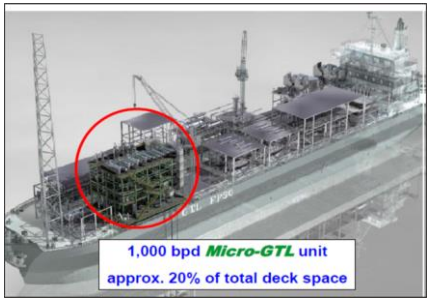
Standards :

- FVI

Financial Incentives :

- Fiscal & Tax Regimes
- Carbon Pricing

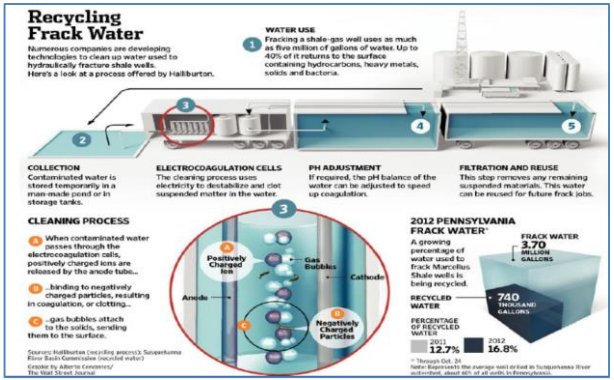
Technologies for Gas Flaring and Venting Reduction



Micro GTL

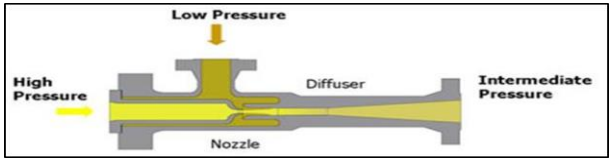
- Modular Design
- Simplicity
- Automation
- Robustness of Operation

Water Recycling in Shale Gas

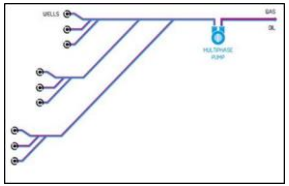


Recycling of Associated Gas

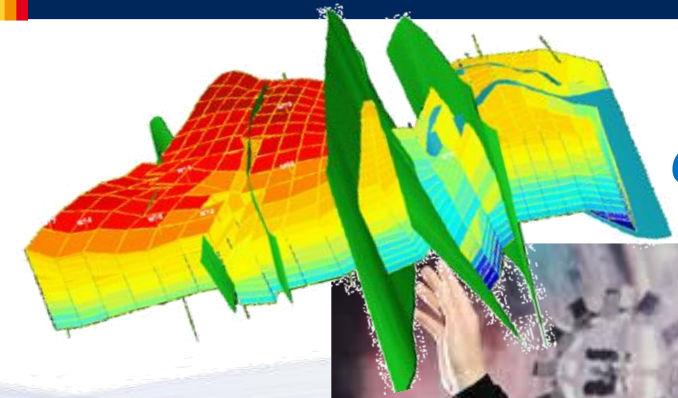
- Gas Ejectors



- Multiphase Pumps



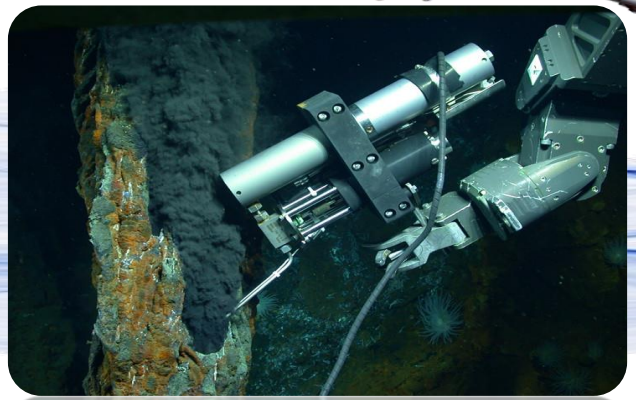
Advanced Computing and Robotics & Automation will be the next big thing



Advanced Computing

- **Data mining : Medical diagnostics to Basin/Prospect diagnostic**
- **Visualization : Gaming Industry into E&P**
- **Virtual Reality environments**

Robotics and Automation

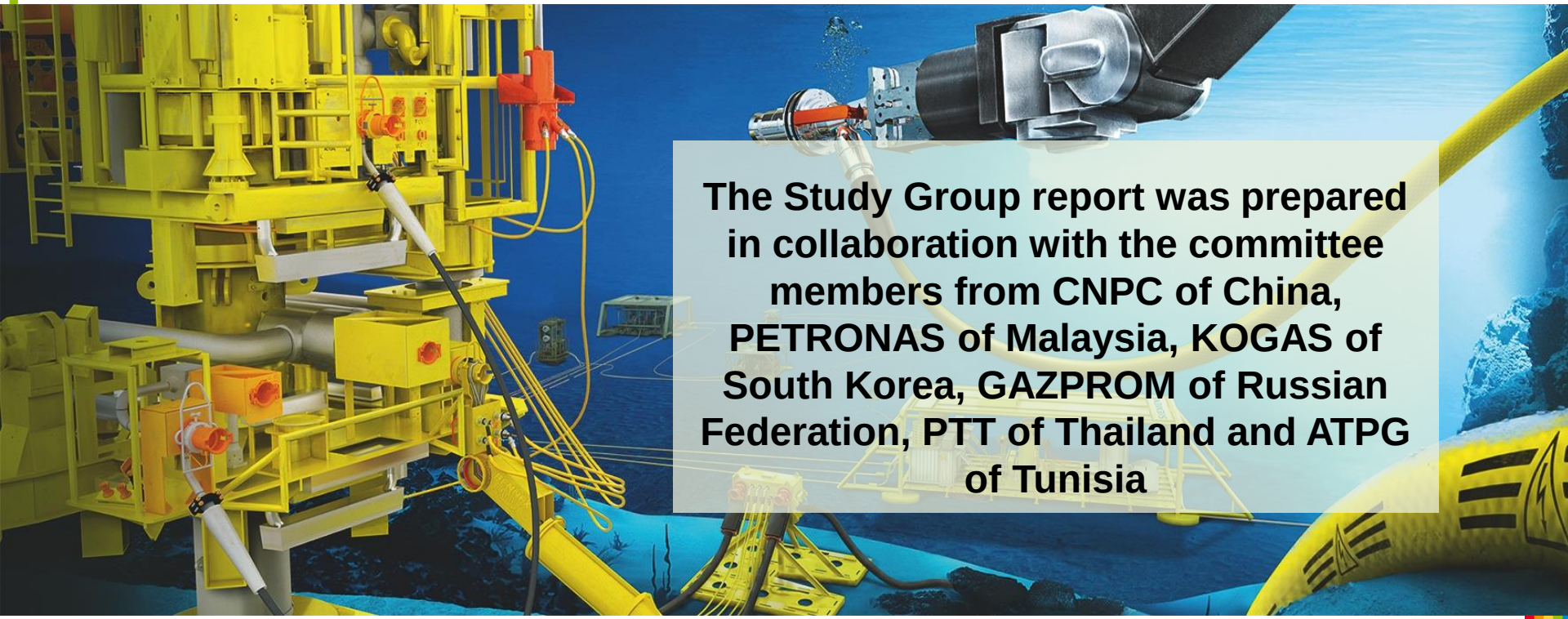


- **Asset Integrity**
- **Speed and Productivity**
- **Labor Turnover**

Conclusion

- Technology continues to be a game changer for businesses
- Under the current oil price scenario, the impetus to find technologies to lower cost of production of unconventional oil and gas has also impacted the production of conventional hydrocarbons
- The fields of automation, materials and robotic innovation is seen as future gamechangers in the fields of production and monetization as players seek to cut operating base costs, ensure profitability and increase affordability for higher risk exploration ventures
- The industry has moved ahead embarking on innovations that could yield a significant reduction of upstream emissions despite unattractive gas price

Special Thank You



The Study Group report was prepared in collaboration with the committee members from CNPC of China, PETRONAS of Malaysia, KOGAS of South Korea, GAZPROM of Russian Federation, PTT of Thailand and ATPG of Tunisia

Merci!