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Safety Moment – Distracted Driving

- Statistics show that one in four car crashes is caused by a person using a cell phone while driving
- Doesn’t matter if it is a hand-held or a hands-free device
- Driving while distracted is a factor in 25 percent of police reported crashes
- Experts say that using hand-held or hands-free cell phones while driving produces the same effect in a driver as someone driving with a blood alcohol level of .08 percent. Studies conducted in developed nations, such as the United States, Sweden and Japan, have already shown that the risk of accidents is 4-5 times greater when drivers are drunk or are using hand phones.
- Cell phone use while driving reduces the amount of brain activity associated with driving by 37%
Oil, Gas and Energy Industry in Malaysia

Where we are today

- The oil, gas and energy sector is the mainstay of Malaysia's growth
- Contributes approx. 20% of national GDP

Vision for the future

- By 2020, Malaysia will have a more diversified oil, gas and energy sector that remains vital to our development, and that builds on the nation’s competitive advantages
- Key thrust: to intensify exploration and enhance production from domestic reserves
- Develop a strong regional oilfield services & equipment hub, and a stronger presence in the regional midstream logistics and downstream markets
- Potential to grow alternative energy sources such as nuclear, solar and hydro to overcome decline in natural gas production
Oil was first discovered in Malaysia in 1910 in Miri, Sarawak. Since then, two other ground-breaking events have helped shape Malaysia’s Oil & Gas industry. First, Malaysia’s Parliament passed the Petroleum Development Act and second, Petronas Nasional Berhad or PETRONAS was established to manage the country’s petroleum resources. It also provides support in terms of resource planning, distribution and marketing.

**PETRONAS at a Glance**

PETRONAS, the acronym for Petronas Nasional Berhad, was incorporated on 17 August 1974 under the Companies Act, 1965. It is wholly-owned by the Malaysian Government and is vested with the entire ownership and control of the petroleum resources in Malaysia through the Petroleum Development Act, 1974. Over the years, PETRONAS has grown to become a fully integrated oil and gas corporation and is ranked among the FORTUNE Global 500® largest corporations in the world.

**Exploration Acreages**

Malaysia has approximately 615,100 square kilometres of acreages available for oil and gas exploration. Of these, 218,678 square kilometres or 36% of the total acreages are currently covered by Production Sharing Contracts.

Exploration drilling in Malaysia by the Production Sharing Contractors has resulted in the discovery of 163 oil fields and 216 gas fields. Many significant discoveries were made in shelfal shallow waters as well as in deepwater environments.

Increasingly, new discoveries have been made through new play-types such as fractured basements, pinnacle reefs, low CO2 gas and turbidites. Application of new technologies have also greatly contributed to exploration successes, especially in deepwater areas.
Oil, Gas and Energy – National Key Economic Area (NKEA)

- Oil and Gas sector is expected to generate RM131.4 billion in Gross National Income by 2020, (5% annual growth) in the period from 2010 to 2020.
- 12 entry point projects (EPPs) have been identified under the oil, gas and energy sector.

- These EPPs have been developed across 4 themes to raise sector’s output and meet energy demands over the 10 year time frame. The themes are:
  - Sustaining oil and gas production
  - Enhancing growth in downstream
  - Making Malaysia the number one Asian hub for oil field services, especially Deepwater
  - Building a sustainable energy platform for growth

Oil, Gas and Energy – 12 Entry Point Projects

- Rejuvenating existing fields through enhanced oil recovery
- Developing small fields through innovative solutions
- Intensifying exploration activities
- Building a regional oil storage and trading hub (GIFT)
- Unlocking premium gas demand in Peninsular Malaysia
- Attracting MNCs to bring their global oil field service and equipment operations to Malaysia
- Consolidating the domestic fabricators
- Developing engineering, procurement and installation capabilities and capacity through strategic partnerships and joint ventures
- Improving energy efficiency
- Building up solar power capacity
- Deploying nuclear energy for power generation
- Tapping Malaysia’s hydroelectricity potential
Formation of Malaysia Petroleum Resource Corporation (MPRC)

- An agency under the Prime Minister’s office
- Provide direction and advice to domestic and global oil and gas companies – maximize their investment and growth opportunity
- MPRC takes a strategic long-term approach – Asia Pacific hub by 2017
- MPRC – set up Industry Consultative Council (ICC) – to address and resolve industry issues
- MPRC – instrumental in launching of incentives
New Tax Incentives for Oil & Gas Sectors

Five new incentives under PITA proposed to unlock and monetise stranded O&G resources are:

> An investment tax allowance of up to 60% to 100% of capital expenditure to be deducted against statutory income to encourage the development of capital intensive projects in the area of enhanced oil recovery, high carbon dioxide gas fields, high pressure high temperature, deepwater and infrastructure projects for petroleum operations.

> The tax rate of 38% currently for marginal oil field development would be reduced to 25% to improve commercial viability of the development.

> Accelerated capital allowance of up to five years from 10 years, where full utilisation of capital cost deducted could improve project viability.

> Qualifying exploration expenditure transfer between non-contiguous petroleum agreements with the same partnership or sole proprietor to enhance contractors’ risk-taking attitude, which could encourage higher levels of exploration activity.

> Waiver of export duty on oil produced and exported from marginal field development to improve project viability.
The Oil & Gas industry can be categorised into sectors that pertain to exploration, production and refining activities; research and development efforts right up to the marketing and distribution aspects. While some jobs are office-based, there are many that require field work, or working outside of normal hours or working in countries that are quite different from Malaysia.

**TRANSPORT & STORAGE**

Manage the movement of crude oil from oil fields to refineries and/or to storage areas, where the products are stored for distribution and for emergency reserves.

Crude oil is transported by two primary modes: tankers and pipelines.

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**DEVELOPMENT**

Execute drilling and servicing of oil and gas wells. Activities include managing manpower, rigs, material supply and stocks to ensure difficulties onsite are resolved to avoid delay in the drilling process.

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**EXPLORATION**

Study and explore the composition, structure and other physical aspects of rock formations associated with oil or natural gas deposits through geophysical prospecting and/or exploratory drilling. Construct wells if an economically feasible field is located.

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**OIL & GAS**

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**TRADING & MARKETING**

Track industry market movements through monitoring and collecting data on oil assets in the world markets.

Coordinate buyers and conduct trade with relevant parties agreeing to the product price.

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**PRODUCTION**

Involves the operation of control systems and equipment related to plant and facilities. This includes setting up, taking down, servicing the equipment and general clean up of both onshore and offshore oil rig areas.

This sector requires the combined expertise from both geosciences and engineering backgrounds.

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**REFINING**

Skilled personnel are required to ensure that oil refineries maintain their production levels and simply keep the refinery running.

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**DISTRIBUTION**

Distribution utilities, oil product wholesalers, petrol service stations and petrochemical companies are all part of this downstream sector.

This sector of the industry is responsible to deliver oil products and ensure product quality meets stringent specifications.
Malaysia’s oil and gas reserves stand at 20.56 billion Barrels of Oil Equivalent (BOE) with an average production of 1.63 million BOE per day (Petronas report 2010).

Malaysia is the 28th Oil producer in the world
Oil & Gas Challenges

**SUSTAIN**
Counter decline – maintain oil & gas production

**GROW**
Maximize value from downstream and services

**DIVERSIFY**
Move decisively towards sustainable energy

Oil & gas production will decline...

*Source: PETRONAS, OGE NKEA Lab*
What are the challenges and opportunities in Malaysia?

- Enhance Oil Recovery (EOR)
- Marginal and Mature Field Development
- Deepwater Development
- High-Pressure High-Temperature
- High CO2 (50 to 70%)
Enhance Oil Recovery

- ExxonMobil Investment
- Announcements – 11 January 2011
- ExxonMobil Exploration and Production Malaysia Inc., a subsidiary of Exxon Mobil Corporation, in conjunction with its Production Sharing Contract (PSC) partner, PETRONAS Carigali Sdn Bhd., has plans to invest in excess of RM 10 billion in new oil and gas assets.
KUCHING: The oil and gas (O&G) sector is expected to undergo a revitalisation with the signed production sharing contracts (PSCs) for the use of enhanced oil recovery (EOR) technologies between Petronas and Shell in two oil field projects offshore East Malaysia.

The contracts, with an investment of US$12 billion (RM38 billion) over 30 years, would cover nine oilfields in the Baram Delta off Sarawak and four fields in the North Sabah development area, following the heads of agreement signed between the two parties back in November last year.

In a sector update, AmResearch Sdn Bhd noted, “These investments are expected to extend the life of the fields beyond 2040 with Petronas and Shell aiming to raise the fields’ recovery factor from 36 per cent to about 50 per cent. “Petronas’s chief executive officer Shamsul Azhar Abbas said about 750 million barrels of oil reserves were expected to be recovered through the developments, translating into tens of thousands of extra barrels produced per day.

“We believe that the front-end engineering work for these EOR projects will likely be undertaken by foreign players such as Technip or Aker Solutions. But Malaysian operators such as MMHE Sdn Bhd and SapuraCrest Kencana Petroleum Sdn Bhd remain the preferred players to fabricate and install the new offshore structures in the fields.”

The Baram Delta EOR development included the Bokor, Bakau, Baram, Baronia, Betty, Fairley Baram, Siwa, Tukau and West Lutong oilfields, while the North Sabah EOR development would cover the St Joseph, South Furious, SF30 and Barton fields. Petronas would be the operator of the Baram Delta EOR PSC and hold a 60 per cent interest with Shell holding the remaining 40 per cent through its subsidiary Sarawak Shell Bhd. Shell would operate the North Sabah EOR PSC with each company holding a 50 per cent share.

Shell had unveiled a tender for its first vessel-based chemical-enhanced oil recovery project for the St Joseph field involving the injection of a water and chemical cocktail to boost recovery over five to eight years from late 2013.

The pilot vessel was likely to be a converted unit, initially equipped to handle 10,000 barrels per day of water and chemical injection during the pilot phase, AmResearch opined.
Enhance Oil Recovery – Challenges

- Offshore EOR (Chemical Injection) is new. No one has done it before. Malaysia will be the first country to embark on this.
- New approach and technical ability
- Requires more precise technology (cost) – fit for purpose
- Need for good reservoir management and understanding of subsurface architecture
- How to extend the life of platforms from 30 years to another 15 or 20 years
Enhance Oil Recovery – Opportunities

- Opportunity to create regional champions – Malaysian companies are positioned to take advantage
- Chemical needs → product requirement and processes
- Logistical requirement
- Need new and innovative approach
  - Can we lay pipe line and pump chemicals from onshore?
- Maintenance of platforms and aging facilities
  - PETRONAS is planning on spending RM275 billion from 2011 to 2015 on aging infrastructure
Definition: **Marginal Field refers to an oil field that may not produce enough net income to make it worth developing at a given time.** However, should technical or economic conditions change, such a field may become a commercial field. It is usually associated with small pockets of hydrocarbons that have a plateau of a few years. Marginal fields have several parameters that affect them. This includes environmental concerns, political stability, access, remoteness and, of course, the price and price stability of the produced gas/liquids.
Marginal Field

- Malaysia has 106 marginal fields, containing 580 million of barrels of oil
- General definition is a field with less than 30 million barrels of oil or oil equivalent with a recovery factor of 20 to 30%
- Special tax incentives given to these fields (tax, capital allowances, etc.)
- Special procurement arrangement
Mature Field

- **Definition:** An oil or gas accumulation that has matured to a *production plateau or even progressed to a stage of declining production*. Operating companies seek to extend the economic producing life of the field using **cost-effective, low-risk technologies**.
Marginal and Mature

- **Challenges**
  - Production is declining
  - Cost-effective approach
  - Need good reservoir understanding/management
  - This is not a space for big operators

- **Opportunities**
  - Attracting small operators (likes of Petrofac, ROC, Apache and Anadarko) – Marginal Fields
  - Alliances between local and MNC service companies
    - Developing local capabilities – Mature Fields
  - Cheap alternatives – slim platforms, MOPU
Malaysian DW Blocks – snapshot

- DW Block 2C: Newfield Sarawak/ Mitsubishi Co/ PCSB
- DW Block 2B: SSB/SSPC / PCSB
- DW Block E: SSB / PCSB
- DW Block F: HESS Malaysia/ TOTAL E&P/ PCSB
- DW Block G, J: SSPC / ConocoPhillips Sabah / PCSB
- DW Block H, P: Murphy Oil Sabah Co / PCSB
- DW Block K: PCSB / Murphy Oil
- DW Block ND1-ND4: PCSB
- DW Block ND5, ND7: SSPC / Shell Sabah Selatan / PCSB
- DW Block N, O: BHP Billiton / PCSB
- DW Block R, S: INPEX / JXNippon / PCSB
- DW Block CA-1: TOTAL E&P Brunei/ PCSB/ BHP Billiton/ Murphy Oil Brunei/ HESS
- DW Block CA-2: PCSB/ Brunei National Petroleum Co Sdn Bhd
Deepwater – Activity Challenges

- Water depth of 1200 to 1500 meters
- Technologies, product and service delivery
  - Fabrication limitations
  - Pipe lay barge (Sapura 3000)
  - Production facilities
  - Drill Ship ➔ Petronas Carigali alone need 3 drillship between 2010 to 2015
Deepwater – Opportunities

- Malaysia was probably 3rd biggest player in deepwater after GOM and Norway (not any more)
- Good local expertise – companies and people – we have to move fast.
- Make Malaysia the regional hub – incentives and government intervention (ETP).
- Financing in Malaysia seems to be difficult/lagging behind for O&G – paradigm shift
How We Define High Pressure /High Temperature

- **Standard**
  - > 69 MPa (10K psi)
  - > 150°C (300°F)

- **High Pressure/High Temperature (HP/HT)**
  - > 103 MPa (15K psi)
  - > 175°C (350°F)

- **Extreme High Pressure/High Temperature (Extreme HP/HT)**
  - > 138 MPa (20K psi)
  - > 200°C (400°F)

- **Ultra High Pressure/High Temperature (Ultra HP/HT)**
  - > 150°C (350°F)
  - > 200°C (400°F)
Malaysia HPHT Fields (Peninsular Malaysia) – Including Ultra HPHT (more than 430 degF)

PM-303, PM-324
TOTAL E&P / PCSB
PM-309, PM-313,
PM-314, PM 6/12
(Duyong Deep,
Resak Deep)
PCSB
Malaysia HPHT fields (East Malaysia)

SK-307 (Pujut, Tukau Timur Deep), SB-302 (Tembungo XC)  
PCSB  
SK-310  
Newfield Sarawak / PCSB  
SK-333 (Land)  
JXNippon Oil / PCSB  
SB-310 (Hi Pressure)  
Talisman / PCSB
High-Pressure and High-Temperature

- Normal temperature and pressure is anything below 300°F and 10,000 psi. Anything above is HPHT.
- Challenges
  - Technologies
  - Expertise
- Opportunity
  - Building local capability – joint developments
  - HPHT center of excellence
CO$_2$

KUALA LUMPUR: Petronas has signed a heads of agreement (HOA) with Total of France to jointly study the development and production potential of K5, a high carbon dioxide gas field offshore Sarawak.

In a statement today, Petronas said under the HOA, its new upstream research unit, Exploration and Production Technology Centre, and Total would explore the possibility of developing the field in ways that were technically, commercially and environmentally viable.

It said the study was set to commence immediately and would take 15 months to complete. "If the study finds it viable, K5 will be the first gas field with over 50 per cent carbon dioxide content to be developed in Malaysia," it said. -- BERNAMA
CO₂ – Challenges/Opportunities

- What to do with high CO₂ fields?
- Do we have the technology today?
- What is going to cost us?
- Can we be regional leader on CO₂ fields?
Other Opportunities

- Human capital development
- Technological transfers – shared services center – Tech Center
- Malaysia is a gateway to India and China
- High-quality infrastructure, cost-efficient place to do business and good quality of life
- High learning institutions – UTP, UTM, etc. for R&D
Conclusions

- Malaysia holds some of the most prolific hydrocarbon basins in the region
- Cutting-edge technologies will be rolled out
- Pro-business Malaysian government has a good road map in place and offer very attractive incentives
- Formation of MPRC
- Malaysia has a highly-skilled, professional, technical and multi-cultural workforce that are recognised all over the world
Halliburton History

1900-1955

1919
Erle P. Halliburton starts New Method Oil Well Cementing Co.

1922
Company cements its 500th well

1938
Halliburton cements the first offshore well using a truck on a barge off the coast of Louisiana

1952
Company revenues top $10 million

1956-1991

1962
Halliburton acquires Brown & Root

1965
Halliburton begins pilot operations of a computer network system – the first in the oilfield services industry

1972
Halliburton performs deepest hydraulic fracturing stimulation to date on a 22,400-foot well

1988
Develops a complete subsea wireline intervention system for use in the North Sea

1991
Halliburton helps extinguish over 220 of the 647 well fires set in Kuwait

1991-2012

1991
Halliburton Energy Services is formed

1991
Halliburton helps extinguish over 220 of the 647 well fires set in Kuwait

1998
Halliburton Dresser merger

2004
Halliburton celebrates 85th anniversary

2004
Halliburton wins a record Six meritorious awards for engineering innovation

2007
Halliburton/ KBR separation

2010
Halliburton Acquires Boots & Coots

2011
Halliburton Acquires MultiChem

2011
As of 31 December, Halliburton accounted for approx. $25 Billion in revenue

2012
Halliburton wins awards at OTC 2012 Spotlight on New Technology (Equiflow AICD) and other record Seven Meritorious Awards for engineering innovations
Halliburton

2011 revenue: $24.829B

2012 FAST FACTS
- Founded: 1919
- Employees: Nearly 70,000
- Operational Countries: 80
- Research Centers: 14
- Corporate Headquarters: Houston, Dubai
- Customers: National, International and Independent entities worldwide

Halliburton Locations
- Halliburton Headquarters
- Halliburton Research Centers
### Technology Leadership

<table>
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<tr>
<th>Patent ™ - March 2010</th>
<th>Tech Strength</th>
<th>Company / Concern</th>
<th>Patents Granted</th>
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<td>56.2</td>
<td>Nat’l - Oil Well Varco</td>
<td>39</td>
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*We are continuously introducing new technology that changes the way oilfields are discovered, developed and produced,* said Rao Abdullah Area Vice President, Halliburton. As can be seen from previous records, Halliburton is globally second on technology advancements as from the Patent Board independent scorecard in 2010.
Halliburton in Malaysia

- Halliburton has 33+ years of operations in Malaysia since 1977 under various entities
- Kuala Lumpur – Regional office for Asia Pacific since 1995 (one of the first registered Overseas HQ in Malaysia), now covers Eurasia also
- Employees in Malaysia – 1,173

![Employee Distribution Chart]

- Management, 82
- Technical, 853
- Non-technical, 238
Facilities in Malaysia
Halliburton in the media

Halliburton Training Center in Bandar Seri Iskandar, Perak, Universiti Teknologi Petronas Malaysia

The Malaysia Training Center (known as Halliburton Technical Excellence Center) facility is situated in the picturesque campus of Universiti Teknologi Petronas. The Aga Khan Award for Architecture complex is built on a 4 square kilometers site strategically located at Bandar Seri Iskandar, Perak, Malaysia along the Ipoh – Lumut Highway. The campus is 36 kilometers from Ipoh City.

VISION

To develop the Halliburton Technical Excellence Center into an Exploration and Production Technical Training Center in Asia Pacific.

Halliburton is a global organization and we ensure our employees are open to continuous learning as well as to growing and developing skills in order to lead the company towards achieving the Business Vision and Mission. Halliburton has a model of development that is competency-driven. Training does not equal competency – we define competency as the culmination of Knowledge + Skills + Behavior. In these learned halls, you will achieve one component of this three equation variable. You will attain Knowledge.

We know that development of our people is strategic to our ability to deliver the outstanding quality of services our clients expect from us. And it is through these training centers that we are affirming our commitment to do things right for our personnel and for our customers. Support provided by senior management, regional management, local management and employees has been instrumental in getting this center opened and operational in a timely manner.

The Delivery of Technical Training Program at Halliburton Technical Excellence Centre Malaysia

The Halliburton Malaysia Training Center (HTECM) is a modern facility, purpose-designed and dedicated to provide both classroom and hands-on operations training to Halliburton employees and to the collaboration Client. Here, we leverage instructor led training with computer-based simulators, distance learning via video conferencing with subject matter experts, mentoring and experiential training. Universiti Teknologi PETRONAS utilizes the Technical Training workshop as part of the curriculum for the Undergraduates and Post graduates programs.

The Malaysia Training Center currently provides Technical and Operational courses of Completion Tools, Testing and Subsea, Cementing, Wireline and Perforating, and Production Enhancement Product Service Lines.

HTECM has successfully delivered the courses through the advance technology of video conference equipments and also instructor led, to enhance the service quality of the modules. HTECM also uses cut off models of equipments for PSL courses for the betterment in technical presentatons.

The Halliburton Training Centre located on the UTP campus has significantly grown the collaborative relationship in the oil and gas industry. We are proud to be a contributor, and being a major source of both career opportunities and technical training for the students.

Photo above showing the Software Grant award by Halliburton to UTP in September 2010. Year to date, the software donation from Halliburton has increased to USD 32 million.