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# *Study on Talent Demand and Supply in the Oil & Gas Sector*

April 2012
Final Report

pwc

# Important Notice

This Report is subject to the following limitations:

- This Report is issued solely to Talent Corporation Malaysia Berhad ('TalentCorp') pursuant to the terms stipulated in our Terms of Engagement dated 01 December 2011.

- This Report is prepared based on the information supplied to us and oral representations made to us by the management and employees of various organisations engaged during the course of this study. We have accepted the information and representations as true, accurate and complete.

- Analysis contained in this Report is based on information collated during the study. The robustness of the analysis is dependant upon the information which was made available for the study.

- The forecast figures computed in this study and the figures associated with the analyzed shortages must be read along with the notes on survey participation and assumptions stated in the Report.

- The recommendations put forth are aimed at complementing and leveraging upon the existing national level programmes and policies in Malaysia.

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# Content

# *Content (cont'd)*

# *Glossary*

| Terms | Definitions |
|---|---|
| ALAM | Malaysian Maritime Academy |
| API | American Petroleum Institute |
| ASET | Assessment System for Employee Training |
| AutoCAD | auto computer aided design |
| b/d | barrels per day |
| bcm | billion cubic meters |
| BMI | Business Monitor International |
| BOKOR | Baram Delta EOR Development |
| $CO_2$ | carbon dioxide |
| DEC | December |
| DOSM | Department of Statistics Malaysia |
| EOR | enhanced oil recovery |
| EPP | entry point project |
| EPU | Economy Planning Unit |
| ETP | Economic Transformation Programme |
| FPSO | floating production storage and offloading |
| FT | foreign talent |
| Gas PP | gas processing plant |
| GDP | gross domestic product |
| GNI | gross national income |
| HC | human capital |
| HDI | Human Development Index |
| HITRSE | High Income Talent Research Scientist Engineer |
| HR | Human Resource |
| HRDR | Human Resource Development Review |
| HRSDC | Human Resources and Skills Development Canada |
| HSE | Health, Safety and Environment |
| I/O | input/output |
| ILMIA | Institute of Labour Market Information Malaysia |
| IMF | International Monetary Fund |
| INSEP | Industrial Skills Enhancement Programme |
| INSTEP | Institute of Technology Petronas |

# *Glossary*

| Terms | Definitions |
|---|---|
| IOR | Improved oil recovery |
| IPAA | Independent Petroleum Association of America |
| ISA | International Standard of Automation |
| JDA | Joint Development Area |
| L&D | learning and development |
| LMI | Labour Market Information |
| LNG | liquefied natural gas |
| MASCO | Malaysia Standard Classification of Occupation |
| MNC | multi national company |
| MOE | Ministry of Education |
| MOHE | Ministry of Higher Education |
| MPRC | Malaysia Petroleum Resources Corporation |
| MSD | Malaysian Student Department |
| MSIC | Malaysia Standard Industrial. Classification |
| MTA | Malaysian talent abroad |
| MTM | Malaysian talent in Malaysia |
| NDT | non-destructive testing |
| NKEA | National Key Economic Area |
| NOC | national oil company |
| NSA | National Skills Academy |
| O&G | oil & gas |
| OC | Oversight Committee |
| OFSE | oil field services equipment |
| OGE | Oil, Gas and Energy |
| OPITO | Offshore Petroleum Industry Training Organization |
| P&ID | piping and instrumentation diagram |
| PCP | Petroleum Competency Program |
| PEMANDU | Performance Management & Delivery Unit |
| PETRONAS | Petroliam National Berhad |
| PSC | production sharing contract |
| PSD | Public Service Department |
| PwC | Pricewaterhouse Coopers |

# Glossary

| Terms | Definitions |
|---|---|
| PwCAS | Pricewaterhouse Coopers Advisory Services |
| QA | quality assurance |
| QC | quality control |
| RAPID | Refinery and Petrochemicals integrated development |
| RCI | risk based inspection |
| RCM | reliability centered maintenance |
| RM | Malaysian Ringgit |
| RSC | risk sharing contract |
| Samur | Sabah Ammonia Urea |
| SCADA | supervisory control and data acquisition |
| SME | subject matter expert |
| SOGT | Sabah O&G Terminal |
| SPM | Sijil Pelajaran Malaysia |
| SSC | Sector Skills Council |
| SSGP | Sabah-Sarawak Gas Pipeline |
| TC / TalentCorp | Talent Corporation Malaysia Berhad |
| TESSDE | Technology Specialist in Specific Domain Expertise |
| UIA | International Islamic University Malaysia |
| UiTM | University Technology Mara |
| UK | United Kingdom |
| UKCES | United Kingdom Commission for Employment & Skills |
| UKM | University Kebangsaan Malaysia |
| UM | University of Malaya |
| UM Pahang | University Malaysia Pahang |
| UM Sabah | University Malaysia Sabah |
| UM Sarawak | University Malaysia Sarawak |
| UniKL MIMET | University Kuala Lumpur Malaysian Institute of Marine Engineering Technology |
| UPM | University Putra Malaysia |
| USA | United States of America |
| USD | American Dollar |
| UTM | University of Technology Malaysia |
| UTP | Petronas University of Technology |

# How to read this report

The final report provides an overview of the objectives, scope and approach undertaken for the talent demand and supply study as well as the key findings generated from our engagement with oil and gas companies in Malaysia. The report also contains recommended interventions to address key talent gaps. As a part of this study, we have also conducted a web based survey and the data has been captured in a Microsoft Excel-based labour database and forecasting model. Due to the confidential nature of the data, only findings from analysis performed at a sectoral level have been shared in this Final Report.

This final report contains the following sections:

| | |
|---|---|
| **1.0 Executive Summary** | Provides an overview of the Final Report - brief overview of our approach, summary of key findings from our industry engagement and the key interventions developed to enhance talent availability in the O&G sector |
| **2.0 Introduction** | Offers a brief introduction to the Malaysian O&G sector followed by a background to the study, including the objectives of the study and approach taken |
| **3.0 Phase 1 - Planning the primary study** | Presents the job classification framework, key demand drivers for the Malaysian O&G sector over the near to medium term and the talent supply profile for the O&G sector |
| **4.0 Phase 2 - Conducting the primary study** | Summarises key findings from our industry engagement (interviews with key O&G players and the web based survey) and key learnings from the analysis of talent management practices in selected developed economies. It also provides and overview of the key features of the labour database and forecasting model that we have deployed as a part of this study |
| **5.0 Phase 3 - Developing recommendations** | Outlines the key interventions developed to address talent availability in the O&G sector over the near to medium term |
| **6.0 Moving Forward** | Discusses the next steps which have been identified as critical to address the talent agenda of the oil and gas sector with emphasis on the labour market information management initiative |
| **7.0 Appendices** | Contains further details for selected information shared in the main body of the Final Report and is referenced accordingly |

# *Executive Summary*

# *1*

# 1. Executive summary

## Background and introduction

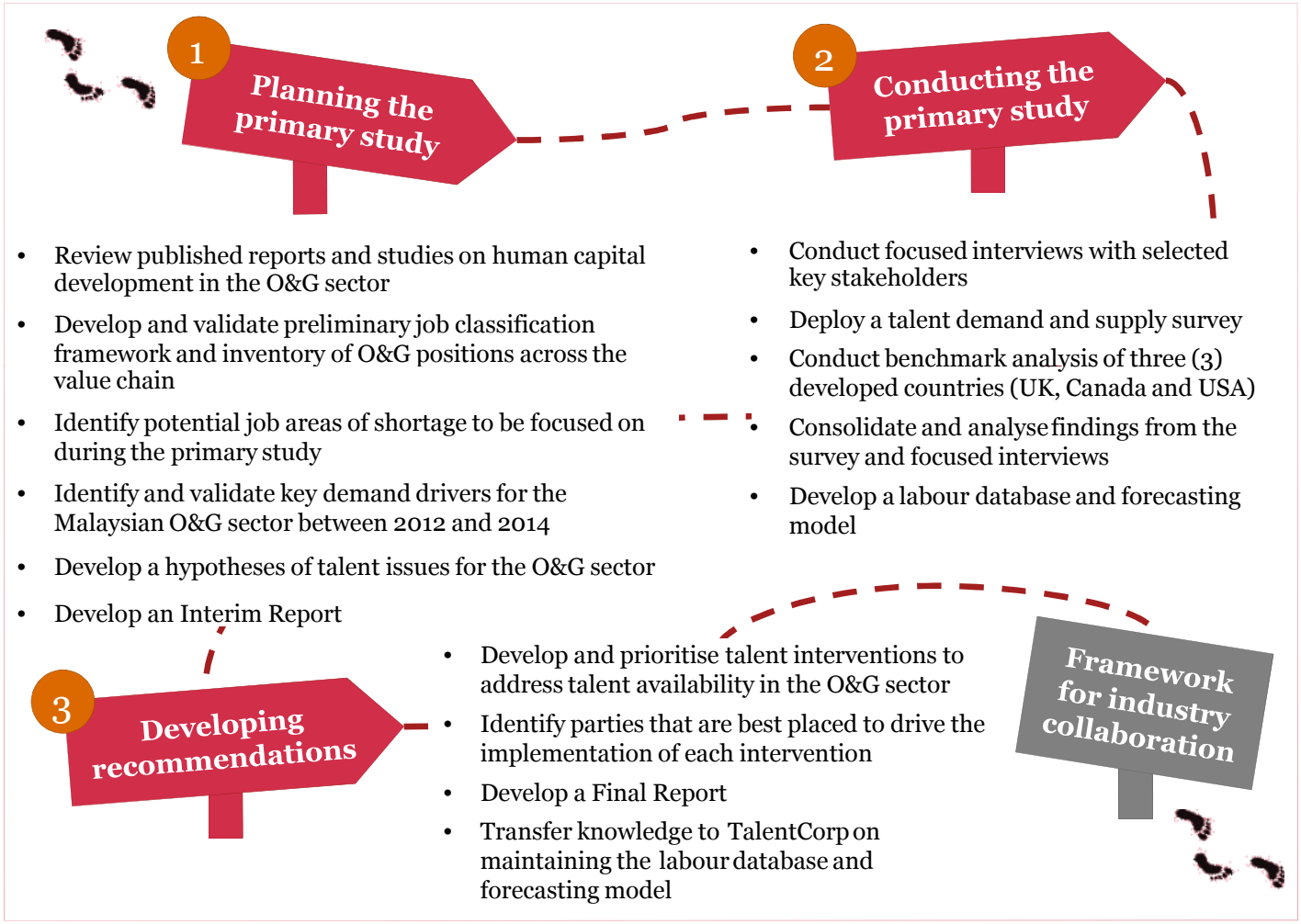
The oil and gas (O&G) sector has made significant contributions to Malaysia's economic growth; in 2009, the O&G sector alone represented about RM110 billion or 16% of the country's gross domestic product (GDP). As such, the O&G sector has been identified as one of the 12 National Key Economic Areas (NKEAs) under the Economic Transformation Programme (ETP).

Between 2010 and 2020, the Oil, Gas and Energy (OGE) NKEA targets to achieve an annual growth of 5%. In doing so, the NKEA is expected to deliver RM131.4 billion GNI impact and consequently, create an additional 52,300 jobs within the sector.

To assist the Government in ensuring that this demand for talent is met, TalentCorp commissioned a study on the talent demand and supply in the O&G sector to better understand the unique talent requirements of the industry over the next three (3) years (2012 - 2014) and to subsequently respond with specific interventions to address the key talent issues faced by O&G companies.

## Our approach

To develop a comprehensive set of interventions to address talent availability in the O&G sector over the next three (3) years, we adopted a robust approach with the following key objectives:



## Brief overview of key outcomes achieved during the study

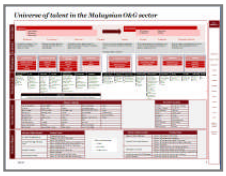
**Phase 1: Planning the primary study**

### What we accomplished

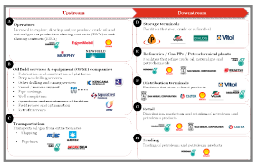
- We developed a **universe of talent for the O&G sector** which outlines the O&G value chain, key positions within each sub-sector, key sources of talent demand, common sources of fresh talent locally and key stakeholders that shape and influence the talent landscape in the Malaysian O&G sector
- We identified and validated the **classification of O&G companies across the value chain** with selected industry representatives and Oversight Committee members
- We developed and validated the **job classification framework and inventory of key O&G positions** with selected industry representatives
- We identified **key job areas of shortage** to be focused on during the primary study and **the preferred talent profile**
- We identified and validated **key demand drivers for the O&G sector between 2012 and 2014** and their implementation timelines with selected industry representatives
- We identified **common sources of supply for fresh talent** for the Malaysian O&G sector
- We identified **potential talent issues for the O&G sector** through secondary research
- We **developed and presented interim findings** to the Oversight Committee

### Outcomes

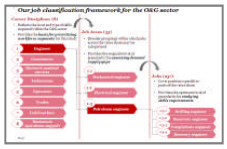
**O&G talent universe**



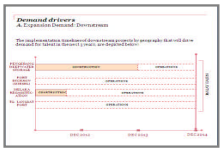
**Classification of O&G companies**



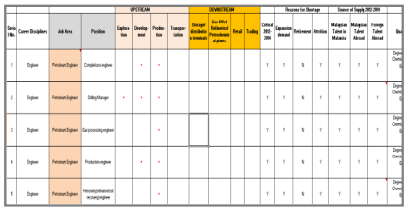
**Job classification framework**



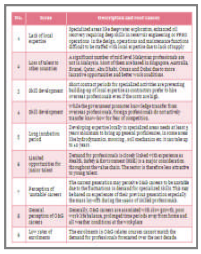
**Key demand drivers**



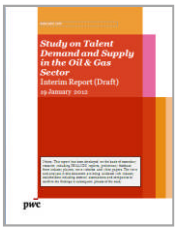
**Potential shortages and preferred talent profile**



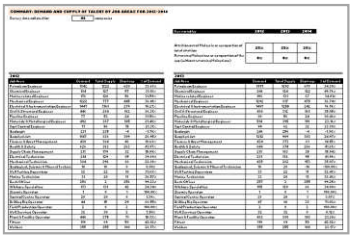
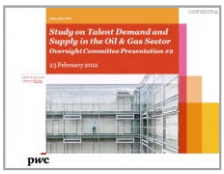
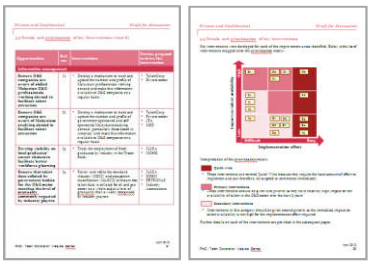
**Hypotheses of talent issues**



**Interim report**



## Brief overview of key outcomes achieved during the study (cont'd)

| | What we accomplished | Outcomes |
|---|---|---|
| **Phase 2: Conducting primary study** | • We conducted **focused interviews with 35 key stakeholders** (selected O&G companies, industry associations, government agencies) to gain insights into the sector's talent priorities, challenges and support requirements<br>• We **engaged 79 O&G companies** via a targeted web-based survey to quantify the gap in talent demand and supply for key job areas of shortage<br>• We **performed a benchmark analysis** of three (3) developed countries (UK, Canada and USA)<br>• We **consolidated and analysed findings from the survey and focused interviews**<br>• We developed a **Microsoft Excel-based labour database and forecasting model**<br>• We **presented key findings from the primary study** to Oversight Committee members | **Benchmark analysis**<br>  <br>**Key findings from industry engagement**<br>  <br>**Labour database & forecasting model**<br>  <br>**Oversight Committee Meeting no. 2 & 3**<br>  |
| **Phase 3: Developing recommendations** | • We developed our recommendations and worked with TalentCorp to **review and refine the proposed interventions**<br>• We **prioritised the interventions** based on its impact to talent availability over the next 3 years and the implementation effort<br>• We **transferred knowledge** to TalentCorp **on maintaining the labour database and forecasting model**<br>• We **developed and shared the Final Report** with Oversight Committee members for their feedback and comments, if any | **Talent interventions**<br>  <br>**Final report**<br>  |

## Summary of key findings from industry engagement

As part of the primary study, we engaged 79 companies via a web-based survey and 35 organisations through focused interviews. The data collated from the survey was used to compute talent shortages for selected key job areas over the next three (3) years. The top ten (10) job areas anticipated to experience the highest talent shortages in 2012 are as follows:

1. Chemical engineers
2. Petroleum engineers
3. Mechanical engineers
4. Electrical & instrumentation engineers
5. Geoscientist
6. Health, safety & environment
7. Civil & structural engineers
8. Materials & metallurgical engineers
9. Mechanic technicians
10. Electrical technicians

Details on the assumptions made in computing these talent shortages are explained in Section 4.2 of this report.

Based on our extensive engagement with key industry stakeholders and issues identified, we have summarised the following key focus areas for the Malaysian O&G sector to enhance the sectoral talent demand-supply dynamics:

1. **Pool of experienced O&G professionals in the country** needs to be increased to mitigate the widespread employee poaching that is currently affecting the sector
2. **Employability of local graduates** needs to be improved if the present and future talent needs of the O&G sector are to be met
3. **Information on talent availability and good talent management practices** needs to be made available to O&G companies and other key stakeholders to support the attraction and retention of talent
4. **Contribution of local companies around employee training and development** needs to be enhanced to help maintain a strong pipeline of experienced talent in the sector
5. **Public awareness around professions and career opportunities** in the O&G sector needs to be enhanced to ensure the continued supply of fresh talent for the sector

To ensure the smooth and successful implementation of initiatives in these five (5) key areas, it is important that an industry-led body is given the appropriate mandate to manage the diverse interest of various stakeholders and also coordinate their efforts.

## Development of recommendations

Based on findings from our industry engagement as well as key learnings gathered from the benchmark analysis, we developed a set of talent interventions for TalentCorp to initiate and implement with the support of other key industry stakeholders.

These interventions were further prioritised based on its impact on talent availability in the O&G sector over the next 3 years (2012 - 2014) and its implementation effort. We have outlined below interventions that were assessed as having high or medium impact on talent availability but involve varying degrees of implementation effort:

| Improvement area | Ref no. | Interventions | Implementation effort |
|---|---|---|---|
| **High impact** | | | |
| Coordinating industry body | B1 | • Identify a suitable platform for driving collaboration among O&G players to address talent issues and determine the critical success factors for such a platform to work |  |
| | B2 | • Develop and agree on a process to collate, track and disseminate talent demand-supply data and skills requirements at the sectoral level and subsequently use it for solutioning |  |
| Policy development | P1 | • Develop a list of key skills/positions in demand and work with relevant stakeholders to facilitate a need based inflow of O&G talent in the sector |  |
| Talent outreach | O1 | • Publish opportunities in advisory/ contract/ teaching roles available in a web-based portal and promote it to latent talent based in and outside of Malaysia |  |
| | O2 | • Publish aggregated job opportunities by specific job areas /positions to the Malaysian diaspora abroad |  |

**Legend:**

 Difficult

 Moderately difficult

 Easy

## Development of recommendations (cont'd)

| Improvement area | Ref no. | Interventions | Implementation effort |
|---|---|---|---|
| **Medium impact** | | | |
| Capability development | C1 | • Develop mechanisms to generate training funds/incentives either through:<br>– Government and private sector collaboration; or<br>– Private sector involvement only<br>• E.g. define a competitive bidding process for allocating training funds based on a predefined set of criteria, e.g. compulsory collaboration between MNCs and local companies operating within the same segment of the value chain |  |
| | C2 | • Develop career transformation programmes for young/ working professionals to switch sectors by defining training/certification requirements and available career paths<br>• Facilitate the development of self paced learning options for aspiring candidates |  |
| Policy development | P2 | • Streamline the supporting documentations needed for granting work permits to foreign talent |  |
| Information management | I1 | • Develop a mechanism to track and update the number and profile of Malaysian professionals working abroad and make this information available to O&G companies on a regular basis |  |
| | I2 | • Develop a mechanism to track and update the number and profile of government-sponsored and self-sponsored Malaysians studying abroad (particularly those based in America) and make this information available to O&G companies on a regular basis |  |

**Legend:**

- Difficult
- Moderately difficult
- Easy

## Development of recommendations (cont'd)

### Moving forward

In order to ensure that the talent challenges facing the oil and gas sector are addressed in a focused manner, TalentCorp will need to adopt a two pronged approach:

1. Drive the labour information management initiative to develop the foundation for all 'evidence based' action planning

2. Address the following critical levers for successful implementation of initiatives

    a. Get a comprehensive buy-in from sectoral stakeholders including companies, associations and related bodies to support the action plan over the short to medium term.

    - Obtain agreement from all the groups highlighted in the governance structure.

    b. Define the governance structure and the role of team members for governance as well as project implementation

    - Identify project team and define the roles & responsibilities of the various groups involved.

    c. Define implementation plans and support requirements from all the key stakeholders.

    - Define timelines for implementation of selected interventions and initiatives with clear indication of milestones.

# *Introduction*

# 2

# 2. Introduction

## 2.1 Brief overview of the Malaysian O&G sector

The oil and gas (O&G) sector has made significant contributions to Malaysia's economic growth; in 2009, the O&G sector alone represented about RM110 billion or 16% of the country's gross domestic product (GDP).

Some of the key developments that took place in the O&G sector since the 1970s, both globally and locally are outlined in the diagram below along with its impact on the talent landscape within Malaysia.

Average crude oil price (per barrel)

| | 1970 - 1980 (USD 62*) | 1981 - 2000 (USD32*) | 2001 - present (USD72*) |
|---|---|---|---|
| **Key developments in the O&G sector** | • Incorporation of PETRONAS through Petroleum Development Act in 1974 | • Oil and gas industry experienced a decline in crude oil prices<br>• Malaysia was faced with depletion of existing oil fields in the early 90s<br>• Foreign companies were invited to re-explore offshore blocks off Sabah and Sarawak | • Oil and gas industry in regions globally placed renewed focus on finding new oil and gas reserves<br>• Major oil and gas discoveries were made in offshore blocks in the Malay Basin and Sabah |
| **Talent landscape in the Malaysian O&G sector** | • Depended heavily on foreign talent and capabilities throughout the oil and gas value chain<br>• Healthy influx of talent into the industry as it was deemed to be a lucrative sector with vast growth potentials | • Major companies globally started laying off large numbers of employees<br>• Entrance of foreign companies provided Malaysia with the opportunity to build local capabilities | • Oil and gas industry in Malaysia sees a continued demand for O&G professionals<br>• Outflow of skilled professionals to other countries leaves a shortage for talent in Malaysia |

** Adjusted for inflation to 2012*

*Figure 2.1.1: Evolution of talent in the Malaysian O&G sector*

*Source: www.inflationdata.com accessed on April 2012; www.petronas.com.my accessed on April 2012; BMI, "Malaysia Oil and Gas Report", 2011; PEMANDU, ETP Handbook, 2010*

## 2.1 Brief overview of the Malaysian O&G sector (cont'd)

The incorporation of Petroliam Nasional Berhad (PETRONAS) in 1974 through the Petroleum Development Act provided vital stimulus to the development of O&G sector in the country. During this time, the country depended heavily on foreign talent and capabilities across the O&G value chain. The relatively high crude oil prices saw a healthy influx of talent into the industry as it was viewed to be more lucrative than other competing industries.

However, all of this changed with the decline in crude oil prices between 1981 and 2000 caused by the oil glut in the early 80s and much later, the Gulf war. Major O&G companies globally started laying off a large number of their employees. Malaysia, however, was faced with depleting oil fields in the early 1990s. To mitigate the decline in oil production, foreign companies were invited to re-explore offshore blocks off Sabah and Sarawak. Entrance of foreign companies provided the country with an opportunity to build local capabilities.

The oil and gas industry started to recover globally in the 2000s with the rise in crude oil prices. This led to countries placing renewed focus on finding new oil and gas reserves. In Malaysia, major oil discoveries were made in offshore blocks in the Malay Basin and Sabah thus leading to a continued demand for skilled O&G professionals. At the same time, the increased activity in the O&G sector globally has triggered a significant outflow of Malaysian talent to other countries, particularly the Middle East.

Recognising the significance of the industry to the country's economic growth, Oil, Gas and Energy (OGE) has been identified as one of the 12 National Key Economic Areas (NKEAs) under the Economic Transformation Programme (ETP) that was launched in 2011.

*Source: www.inflationdata.com accessed on April 2012; www.petronas.com.my accessed on April 2012; BMI, "Malaysia Oil and Gas Report", 2011; PEMANDU, ETP Handbook, 2010*

## 2.1 Brief overview of the Malaysian O&G sector (cont'd)

### Malaysia's aspiration to become a high-income economy

The Oil, Gas and Energy NKEA targets a 5% annual growth for the sector from 2010 to 2020.

The ETP has identified 12 Entry Point Projects (EPPs), as well as business opportunities within the sector and these EPPs are expected to contribute RM47.1 billion to Gross National Income (GNI) to meet the 2020 target. Therefore, the NKEA is expected to deliver RM131.4 billion GNI impact and consequently, create additional 52,300 jobs within the sector. A significant proportion of these jobs will be highly-skilled, with an estimation of 21,000 (40%) for qualified professional, e.g. engineers and geologists, with monthly incomes ranging between RM5,000 and RM10,000*.

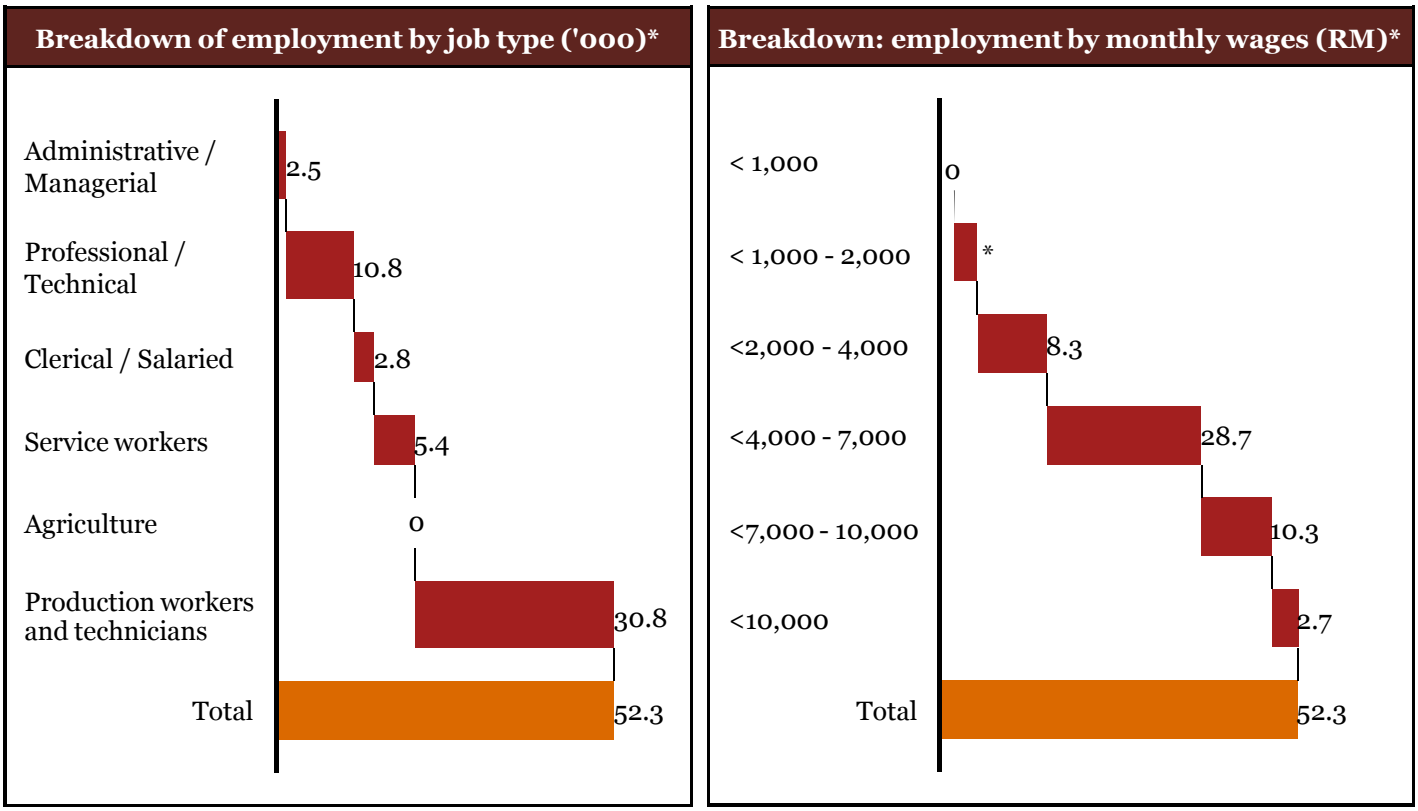



*Figure 2.1.2: Breakdown of the 52.300 new jobs to be created under the OGE NKEA by job type and salary levels*

**Source: ETP Handbook, 2010*

## 2.2 Study background

TalentCorp was established under the Prime Minister's Office to identify talent shortages in key sectors identified under the ETP and to subsequently initiate and facilitate the implementation of interventions that will help the country meets its future talent needs.

As a pilot initiative, TalentCorp commissioned a study on the talent demand and supply in the O&G sector to better understand the unique talent requirements of the industry and to subsequently respond with specific interventions to address the key talent issues currently faced by the sector.

The objectives of the study were as follows:

1. Identify and validate the gaps between demand and supply of key talent in specific sub-sectors

   - To provide a clear snapshot of the sub sectors and talent categories in the O&G sector
   - To provide insights on the sectoral demand supply scenarios between 2012 - 2014, including the talent priorities and preferences of O&G players

2. Develop actionable recommendations for addressing the critical talent gaps and key talent issues currently impacting the O&G sector

   - To identify improvement areas for TalentCorp to address based on key talent issues and demand supply gaps identified
   - To identify key interventions for TalentCorp to initiate and facilitate along with the support of various industry stakeholders

**Overview of our approach**

This study was conducted based on an "**Outcome based approach**" to address TalentCorp's overarching need to make a noticeable impact on the Malaysian economy by addressing the talent demands in high growth sectors, such as the O&G sector.

The main features of our "**Outcome based approach**" are as follows:

- Hypotheses on the key job areas of shortage and talent issues to provide clear focus for this study
- Primary fact finding involving survey and on the ground interactions to quantify the talent gap in selected key job areas to understand the talent dynamics and priorities for the sector
- Validating and proving the hypotheses throughout the process of the study to ensure that we came up with fact based interventions for TalentCorp to initiate and facilitate with the support other key stakeholders within the industry

To achieve the study objectives based on our "**Outcome based approach**", we structured our approach in the following manner:

- Phase 1: Planning the primary study
- Phase 2: Conducting the primary study
- Phase3: Developing recommendations

The overall approach for our study is shown overleaf.

## Overview of our approach (cont'd)

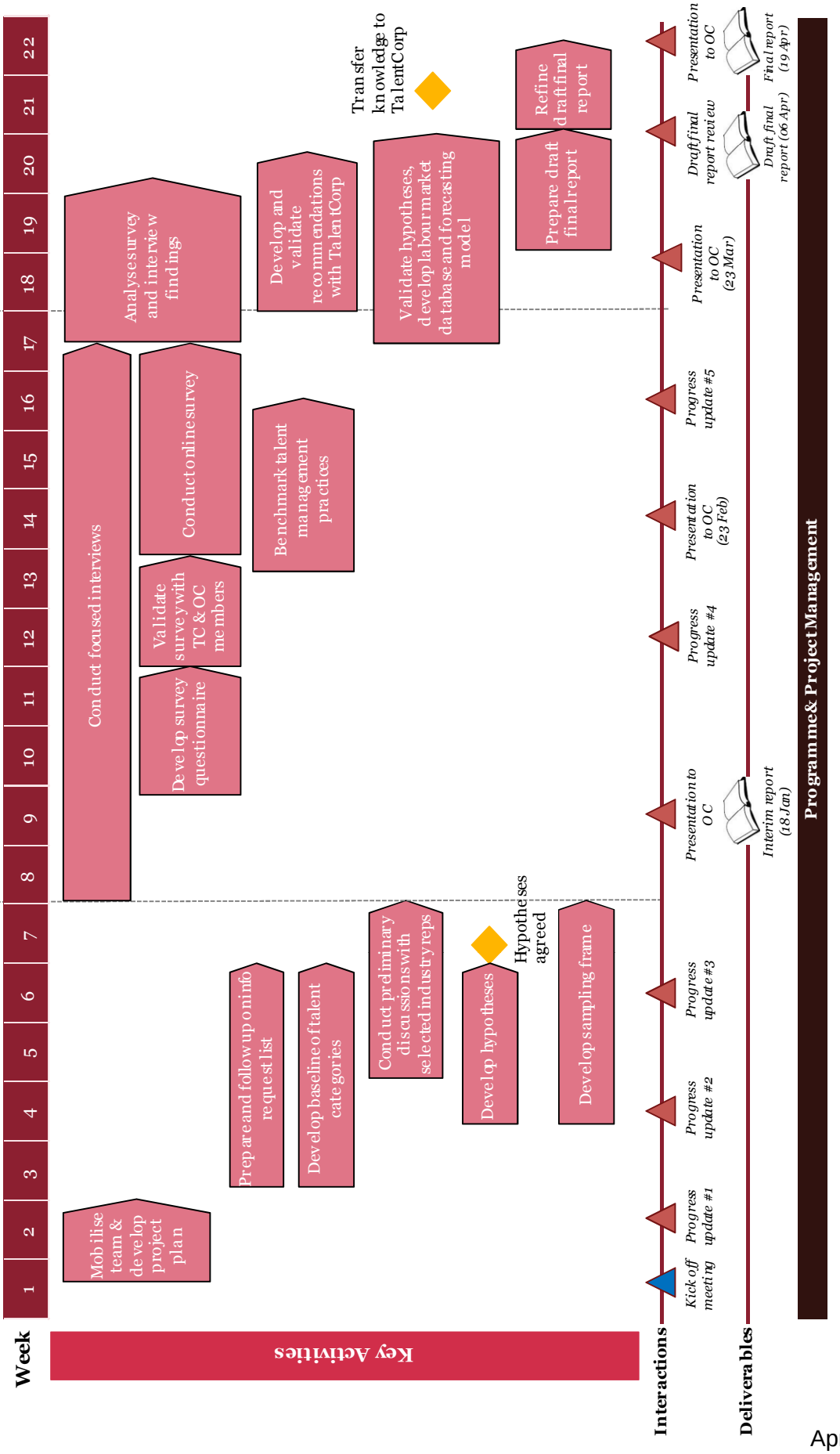



*Figure 2.2.1: Overall approach and timeline for the study*

**Key activities and outcomes**

The key activities undertaken for this study include detailed planning, rigourous data gathering and analysis, benchmark analysis of good talent management practices, presentation of key findings and recommendation of action plans to be executed by key stakeholders to ensure a sustainable talent pipeline for the Malaysian oil and gas industry.

Details of the key activities and outcomes for each phase are indicated below:

**1 Planning the primary study**

**Key deliverables**

- Job classification framework
- Inventory of positions across the O&G value chain
- Potential job areas of shortage and the preferred talent profile
- Key demand drivers between 2012 - 2014
- Hypotheses of talent issues
- Interim report

- We reviewed relevant published reports and studies with regards to the development of human capital in the oil and gas sector, both locally and globally
- Based on secondary research, we:
  - Developed a snapshot of sub-sectors, talent categories and key sources of supply and demand
  - Developed a preliminary job classification framework and an inventory of O&G positions across the value chain
  - Mapped key O&G positions to the value chain
  - Identified key demand drivers for the Malaysian O&G sector between 2012 and 2014
  - Identified key sources of fresh talent for the O&G sector
- Through discussions with selected key O&G companies and industry associations, we:
  - Validated the job classification framework and inventory of O&G positions
  - Identified key job areas of shortage to be focused during the primary study and the preferred talent profile
- We also developed and presented interim findings to the Oversight Committee members, comprising of government agencies and selected key O&G companies

## Key activities and outcomes (cont'd)

### 2 Conducting the primary study

**Key deliverables**

- Key findings from industry engagement
- Key learnings from benchmark analysis of three (3) selected countries
- Labour database and forecasting model

- We conducted focused interviews with 35 key stakeholders (key O&G companies, industry associations, government agencies) to gain insights into the sector's talent priorities, challenges and support requirements
- We validated the survey questionnaire with nominated representatives from the Oversight Committee
- We validated the target list of companies to be surveyed with TalentCorp and PETRONAS
- We launched a talent demand and supply survey to 271 companies to quantify the gap in talent demand and supply, identify key challenges faced and support required for addressing talent priorities and shortages
- We performed a benchmark analysis of three (3) developed countries (UK, Canada and USA) on the following areas:
  - Key talent shortages and issues
  - Key entities driving the sectoral talent agenda
  - Key talent interventions
- We consolidated and analysed findings from the survey and focused interviews
- We developed a Microsoft Excel-based labour database and forecasting model
- We presented key findings from the primary study to the Oversight Committee and incorporated their feedback to enhance the study findings

### 3 Developing recommendations

**Key deliverables**

- Key talent interventions
- Final report

- We developed a set of recommended interventions to address talent availability in the O&G sector based on input gathered during the industry engagement and Oversight Committee meetings
- We worked with TalentCorp to review and refine the proposed interventions and suggest key parties which were best placed to drive the implementation of each intervention
- We prioritised the interventions based on its impact to talent availability over the next 3 years and the implementation effort based on input from TalentCorp

## Key activities and outcomes (cont'd)

**3 Developing recommendations (cont'd)**

### The following activities are yet to be completed

- Share the final report to Oversight Committee members for their input and feedback
- Evaluate feedback from the Oversight Committee members and incorporate into the final report
- Conduct a knowledge sharing session with the TalentCorp team on operating the labour database and forecasting model

## Our study framework

We developed the following study framework to guide us in our study on the supply and demand of talent in the oil and gas sector.

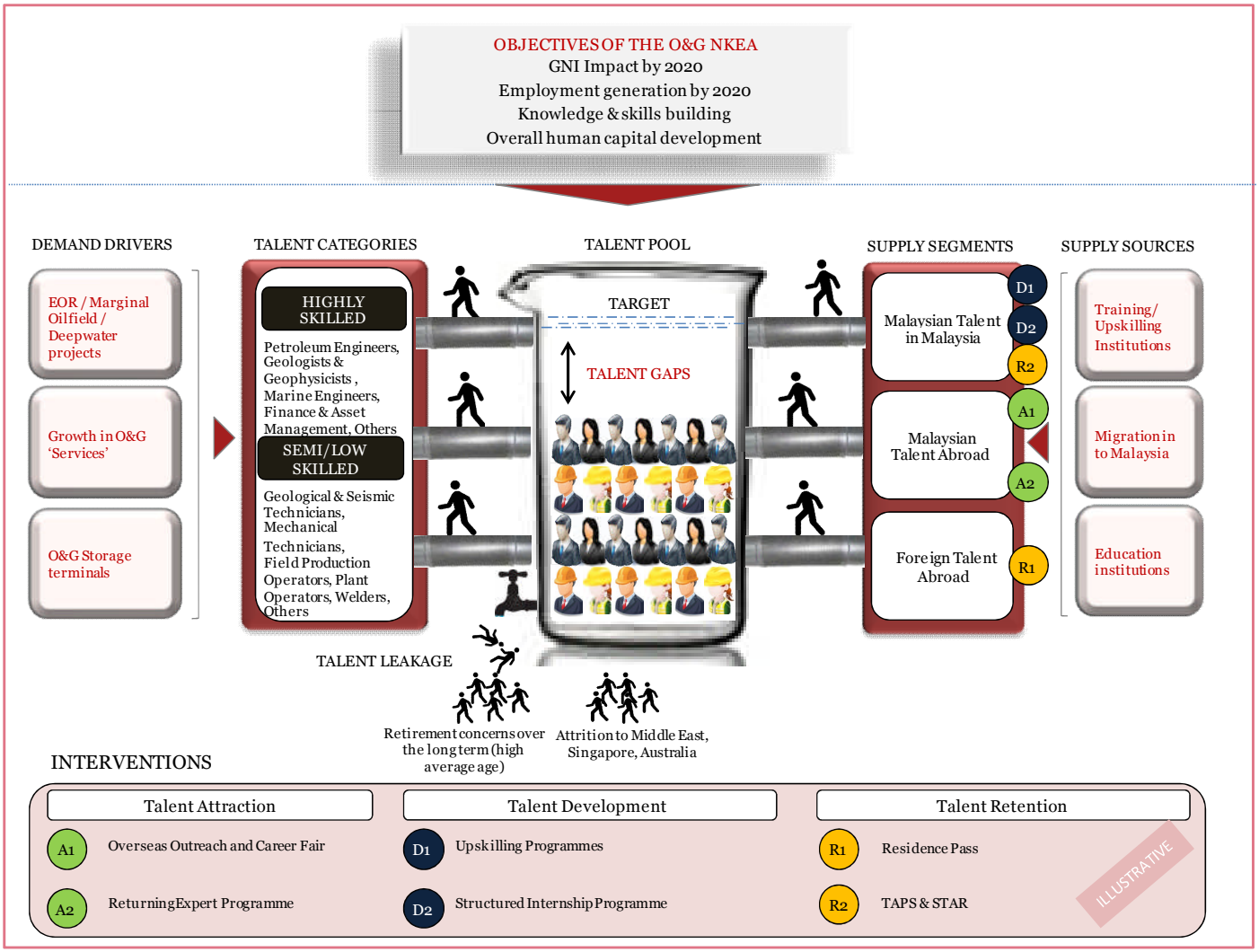



*Figure 2.2.2: Study framework*

Figure 2.2.2 illustrates the key elements that influence the talent pool in the O&G sector, i.e. **demand drivers, talent leakages and supply sources.** Demand drivers typically consists of existing and new projects or activities aimed at finding new reserves or involve the setting up of new infrastructure that lead to a demand for new talent. Talent leakages, on the other hand, represents the undesirable loss of talent as a result of retirement and attrition out of the sector or country and hence, reduce the available talent pool.

On the supply side, the common sources of talent are fresh graduates from universities, prospective or existing workforce that have undergone skills development training as well as the migration of talent from abroad. The mismatch between talent demand and supply is what leads to a shortage of talent in the O&G sector.

The key talent shortages identified along with the common challenges shared by O&G companies via the survey and focused interviews informed the development of interventions. The interventions were subsequently refined based on feedback received from members of the Oversight Committee during the 3rd meeting and finalised in consultation with TalentCorp.

## 2.3 Limitations of the study

This report is prepared based on information obtained via secondary research and supplied to us by key stakeholders via surveys, interviews and other means as highlighted in the report. Hence, there are some limitations associated with the findings presented in this study. The limitations are as follows:

1. **Comprehensiveness and relevance of data and information gathered through focused interviews**
   - Information obtained from key stakeholders through focused interviews may not be comprehensive and may not be fully representative of the entire industry as it is dependent on the stakeholder's industry experience and willingness to share. Additionally such views, opinions and data may be subject to change depending upon changing business priorities and trends
   - Different talent issues and support requirements were raised by industry representatives during the focused interviews but only those identified to be common to a fair proportion of O&G companies have been shared in this report and were considered when developing interventions

2. **Reliability of quantitative data collated from web-based survey**
   - The accuracy of talent shortages computed depend critically on the reliability of the data provided to us by participating O&G companies. Additional efforts have been made on our part through follow up calls to survey respondents to ensure that the data provided met the requirements stipulated in the survey questionnaire

3. **Limitations in response rate for survey deployed in Malaysia**
   - As with most surveys, the response rate was subject to respondents' willingness to engage and share information. So, the survey was diligently followed up with the target list of O&G companies on a best effort basis to achieve a response rate of 29%

4. **Reliability of sources and scope of research for benchmark analysis**
   - The benchmark analysis for the shortlisted countries were conducted based on publicly available sources to ensure a consistent and direct benchmarking of the three (3) selected areas, namely key talent shortages and issues, key entities driving the sectoral talent agenda and key talent interventions
   - Scope of research conducted is not exhaustive but is comprehensive and based on best effort

## 2.3 Limitations of the study (cont'd)

This report is prepared based on information obtained via secondary research and supplied to us by key stakeholders via surveys, interviews and other means as highlighted in the report. Hence, there are some limitations associated with the findings presented in this study. The limitations are as follows:

**5. Labour database and forecasting model**

- Currently there is a need for standardisation of jobs in the oil and gas industry which can be used across the sector for talent related measurement and policy initiatives. In the absence of an existing framework, we have developed an extensive job classification framework during the course of the study. While the response to the framework from the oil and gas industry players as well as the Oversight Committee members have been positive, the current framework will need to be updated from time to time to ensure relevance to the industry

- Additionally, the forecasts of talent shortages are based upon the workforce requirements provided by individual companies as a part of their workforce planning processes. In the absence of a validated implementation programme and detailed timelines of future oil and gas projects, we have relied upon the workforce requirements collated using our approach for industry engagement detailed in further sections in this report. The quantum and nature of shortages may vary depending upon the actual implementation timelines of the future oil and gas projects identified in Malaysia

# *Phase 1 : Planning the primary study*

# 3

# 3. Phase 1: Planning the primary study

## 3.1 Overview

In taking an **"Outcome based approach"**, we invested significant time and effort in planning and defining the scope of the primary study.

One of our main focus during this phase was developing a clear snapshot of the various sub-sectors within the O&G sector, key positions commonly associated with each of the sub-sectors as well as the key sources of talent demand and supply.

Once that was done, we sought to ensure that a standardised framework of job groups and jobs (positions) is used for assessing the demand and supply of talent. However, we noted that there was no standardised and commonly acceptable frameworks for 'highly skilled', 'skilled' and 'semi/low skilled' oil and gas jobs in Malaysia.

To address this challenge, we developed a classification framework of jobs areas and positions for the O&G sector for deployment in the primary study. The job classification framework was further reviewed and refined with selected key stakeholders within the industry to ensure robustness and alignment with the career opportunities in the Malaysian O&G sector.

This section aims to describe the following key outputs that we developed in preparation for the primary study:

1. Universe of talent in the Malaysian O&G sector
2. Categorisation of O&G companies by value chain
3. Key demand drivers for the Malaysian O&G sector (2012 - 2014)
4. Job classification framework
5. Key job areas of shortage
6. Talent supply
7. Hypotheses of talent issues

## 3.2 Universe of talent in the Malaysian O&G sector

The universe of talent provides a snapshot view of key talent categories across the sector as well as key entities that influence the talent landscape in the Malaysian O&G sector. The illustration depicts:

- O&G value chain and sub-sectors
- Work groups and positions within each sub-sector
- Selected key O&G companies that drive the demand for O&G professionals
- Selected local universities which provide the supply of fresh talent for O&G
- Relevant government agencies and industry bodies that shape and influence the talent landscape within the Malaysian O&G sector

The positions listed in the universe are illustrative in nature.

Please refer separate A3 pullout:

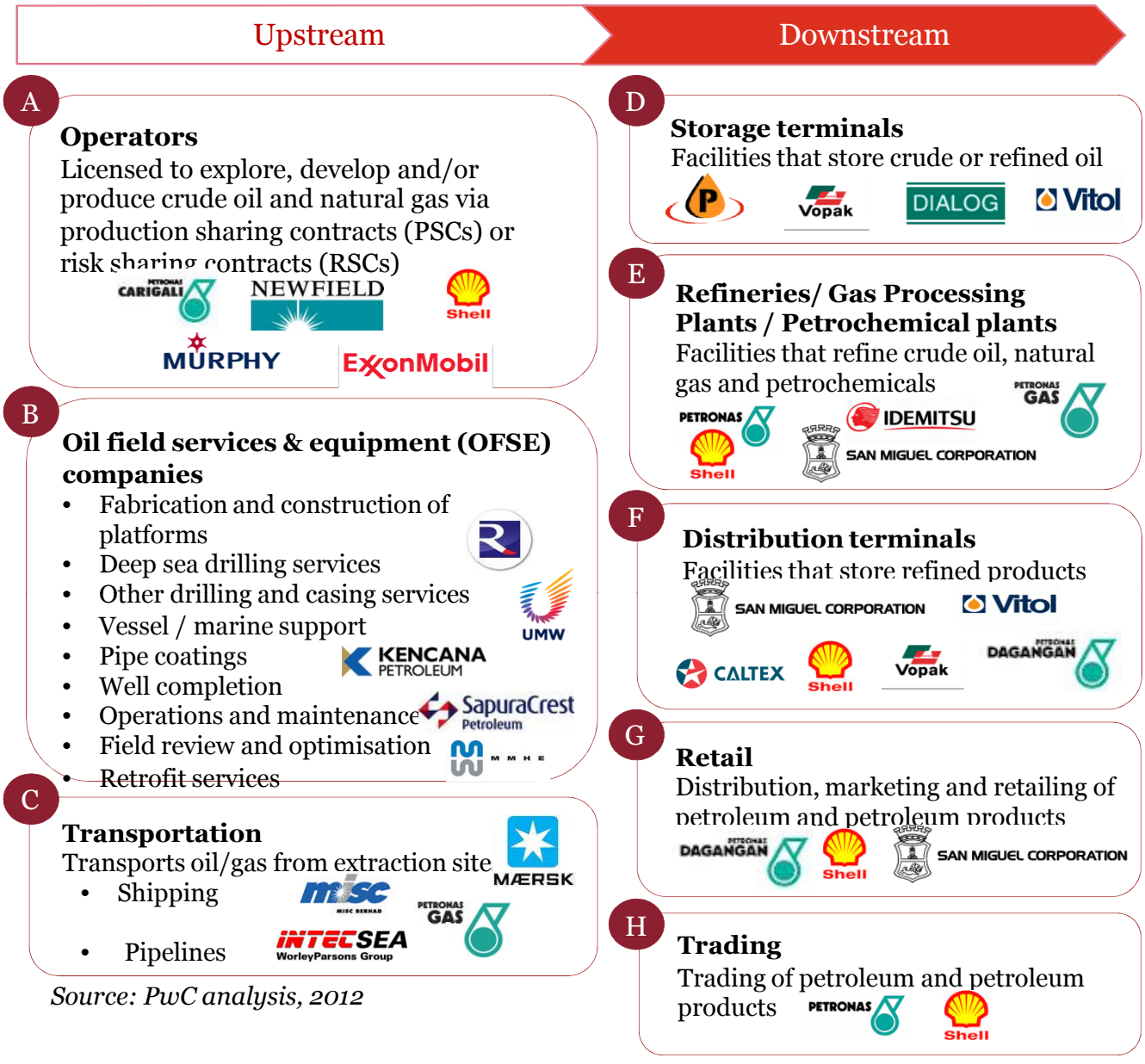
Universe of Talent in the Malaysian O&G Sector

## 3.3 Categorisation of O&G Companies by value chain

For this study, we have followed the commonly accepted method of classifying O&G companies into upstream and downstream. This approach has been validated with the Oversight Committee members as well as key industry players. Upstream covers companies involved in exploration, development and production of crude oil and natural gas as well as those involved in transporting these extracts. The three (3) categories of companies under upstream are operators, oil field services and equipments (OFSEs) and transportation.

For downstream, we have categorised companies into five (5) groups, namely storage terminals, refineries/gas processing plants/petrochemical plants, distribution terminals, retail and trading.

A sample of key O&G companies operating within each of the categories have been depicted in the diagram below.




*Source: PwC analysis, 2012*

## 3.4 Key demand drivers for the Malaysian O&G sector (2012 - 2014)

### Brief outlook of the Malaysian O&G Sector

Malaysia's proven oil reserves currently stands at 5.8bn bbl, representing 0.4% of the global total, and is expected to shrink gradually to 4.9bbl by 2016. However, the significant oil discoveries made since early 2000s by Talisman, Shell and Murphy Oil in Malay Basin, Gumusut and Kikeh, respectively is expected to help slow the decline in reserves. Our nation's natural gas reserves, on the other hand, stands at 2,397bcm and represents 1.3% of the world's natural gas. The gas reserves are expected to be stable over the near term as new prospects are developed for export.

### Oil

The production of crude oil, which averaged an estimated 651,700 b/d in 2010 is expected to rise over the medium term, with the support of enhanced oil recovery (EOR) schemes and some new fields, as forecasted by BMI. The development of marginal oil fields, which has been made viable by the strong oil price, is also expected to contribute to the production levels albeit in a smaller way. The oil consumption, however, is unlikely to keep pace with the country's economic growth as the Government continues to replace oil-fired power stations with coal-fuelled plants and to reduce fuel subsidies.

### Natural gas

There is a continuing growth in Malaysia's gas volume and exports due to exploration activity in the Malaysia-Thailand Joint Development Area (JDA), located in the lower part of the Gulf of Thailand and the continued production activity taking place in the Sarawak offshore blocks. As far as LNG exports are concerned, Malaysia currently provides around 13% of world LNG exports owing to its extensive LNG facilities. Nevertheless, the country is continuing to develop both import and export capacity to meet both its own energy profile as well as those of its region. The expansion of the Bintulu LNG terminal and the new LNG import terminal under construction in Melaka is expected to meet an impending shortfall of gas in Peninsular Malaysia as demand growth in densely populated regions surpass the local supply.

| Details | 09' | 10' | 11'f | 12'f | 13'f | 14'f | 15'f |
|---|---|---|---|---|---|---|---|
| Oil production, 000b/d | 679.9 | 651.7 | 632.2 | 632.2 | 663.2 | 743.3 | 786.0 |
| Oil consumption, 000b/d | 525.3 | 523.9 | 538.2 | 547.2 | 564.7 | 581.6 | 599.0 |
| Refining capacity, 000b/d | 514.8 | 514.8 | 514.8 | 514.8 | 514.8 | 514.8 | 514.8 |
| Gas production, bcm | 60.4 | 61.0 | 62.8 | 64.0 | 65.5 | 68.0 | 72.0 |
| Gas consumption, bcm | 31.1 | 32.4 | 34.6 | 36.2 | 38.2 | 40.0 | 41.8 |
| Gas exports, bcm | 29.3 | 28.6 | 28.1 | 27.8 | 27.3 | 28.0 | 30.2 |

*f= forecastedSource: Historical data: Energy Information Administration/BMI, All forecasted: BMI*

Further details on the key demand drivers for the Malaysian O&G sector is elaborated on in the subsequent pages.

*Source: Malaysia O&G Report Q2 2012, BMI*

## 3.4 Key demand drivers for the Malaysian O&G sector (2012 - 2014) (cont'd)

### Types of demand drivers

The key demand drivers for talent in the oil and gas industry can be classified into the following two (2) categories: expansion demand and replacement demand.

### A Expansion demand

Expansion demand refers to demand arising from new projects or activities aimed at finding new oil and gas reserves or involve the setting up of new O&G infrastructures. In Malaysia, these activities or projects can be grouped into two (2) broad categories:

1. Entry point projects (EPPs) announced under the ETP
2. Projects outside the ETP

The EPPs and non-EPPs that are anticipated to drive talent demand over the next 3 years (2012 - 2014) have been outlined in subsequent pages along with their implementation timelines.

### B Replacement demand

Replacement demand refers to demand caused by depletion in the existing workforce. The two (2) factors that typically lead to replacement demand are:

1. Retirement
2. Attrition

Based on feedback from key O&G companies, retirement is not viewed as a challenge for the Malaysian O&G sector in the short to medium term due to the ease of hiring retired professionals on contract. However, attrition is a major concern as indicated by most oil and gas companies. Specifically, oil and companies are concerned about the outflow of oil and gas professionals from Malaysia.

While the overall attrition rate for O&G companies was captured and analysed in our primary study, currently there is no source of information to gauge the outflow of Malaysian oil and gas professionals out of the country. Hence we have made an assumption on the attrition out of the country in computing shortages by job areas for the purpose of this study.

## 3.4 Key demand drivers for the Malaysian O&G sector (2012 - 2014) (cont'd)

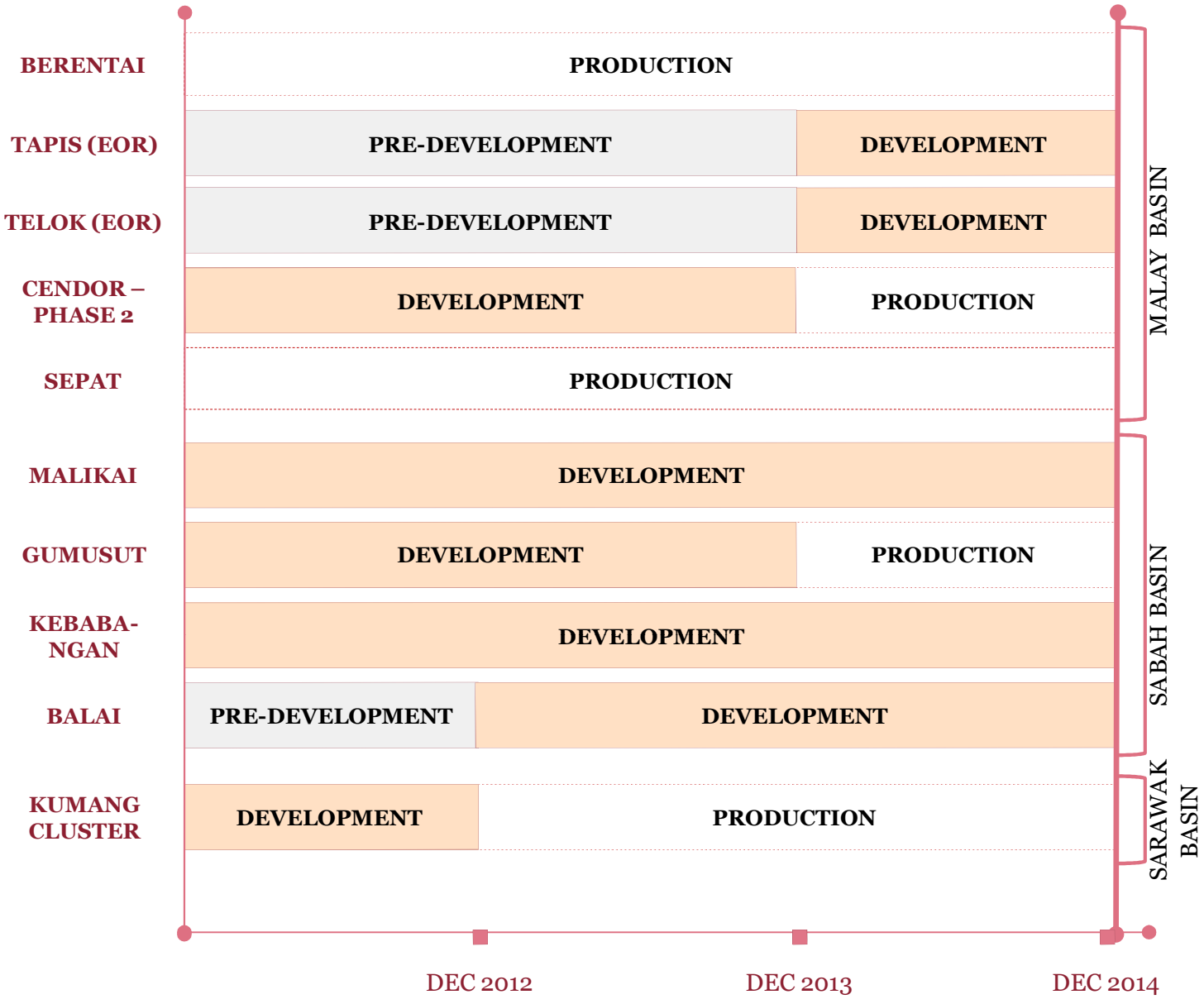
### A. Expansion demand

The following diagrams show both upstream and downstream projects that will drive demand for O&G talent between 2012 - 2014 and the respective implementation timelines.

We validated the information collated on the projects and their status from publicly available sources with selected industry representatives.

#### Upstream

The estimated tentative implementation timelines for upstream projects that will drive demand for talent in the next 3 years by geography are as follows:




**Legend:**

**Pre-development** typically involves the identification of O&G prospects, planning development locations and scenarios, performing research & analysis and drilling test wells

**Development** covers further exploration and assessment to identify the most economical option to monetise the O&G reserves and the development of additional wells

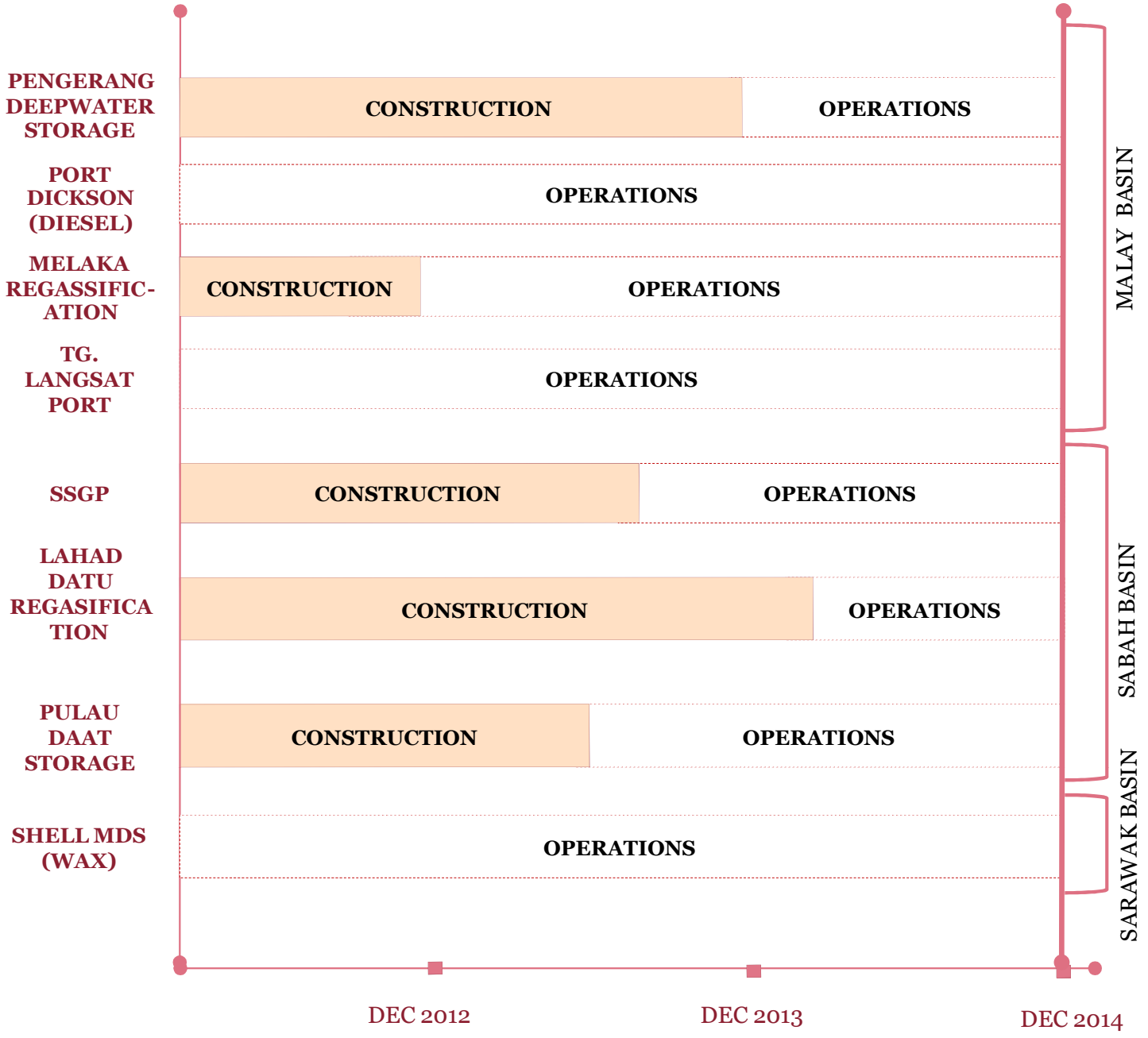
**Production** phase involves the monitoring and maintenance of wells and pipeline facilities for as long the well produces oil and/or gas

Source: Secondary sources and PEMANDU

## 3.4 Key demand drivers for the Malaysian O&G sector (2012 - 2014) (cont'd)

### Downstream

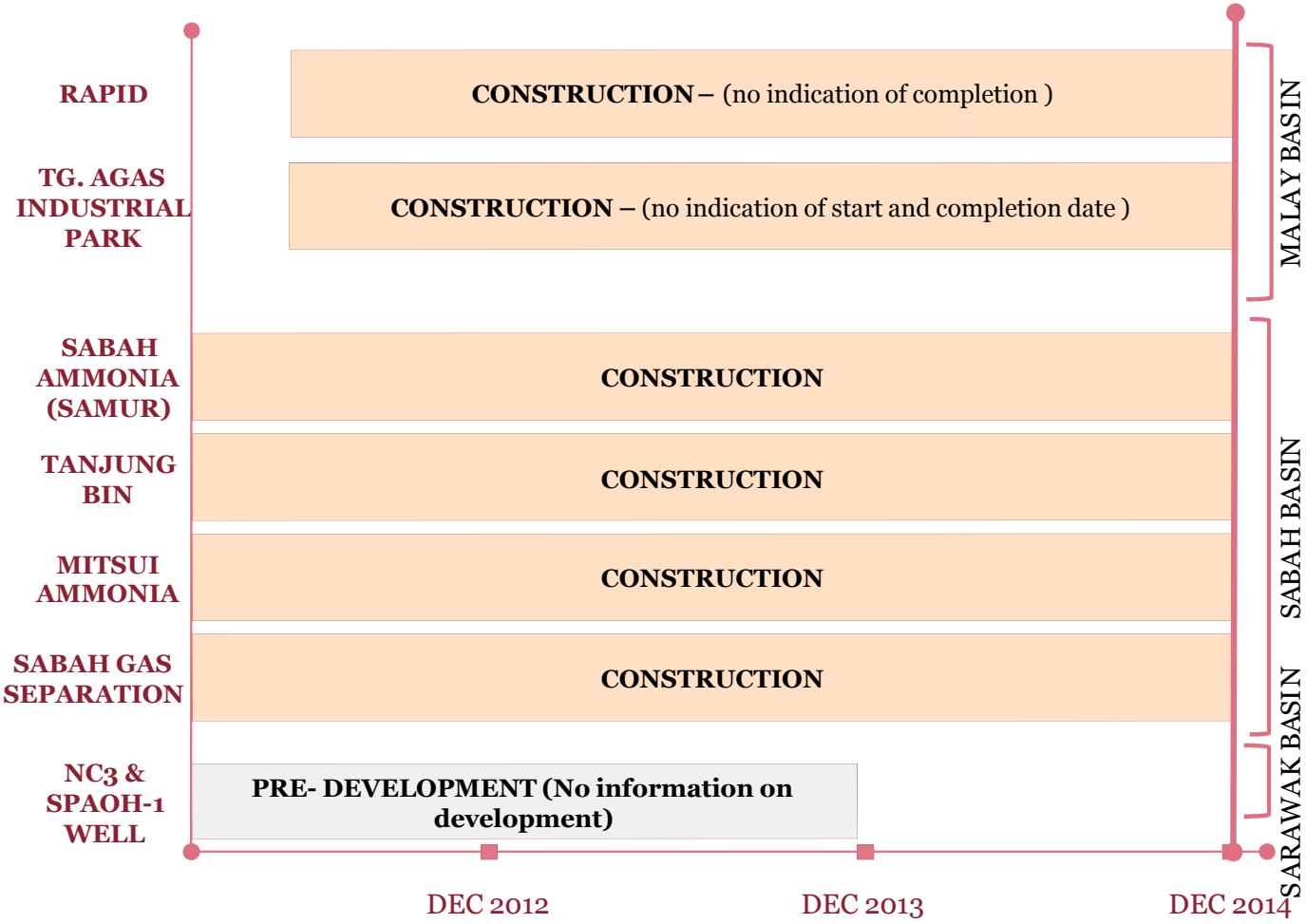
The estimated tentative implementation timelines for downstream projects that will drive demand for talent in the next 3 years by geography are as follows:




*Sources: UBS, "UBS Investment Research, Malaysia Oil Services Sector", 2011; Maybank,"Maybank IB Research, Oil & Gas", 2011; preliminary discussions with industry representatives (Dec '11 – Jan '12);* Other Secondary sources and PEMANDU

## 3.4 Key demand drivers for the Malaysian O&G sector (2012 - 2014) (cont'd)

Below is a list of projects for which the progression status and timelines are not available.




**Note on demand drivers:**

The O&G upstream and downstream projects listed above are complex initiatives that involve multiple stakeholders, companies and contractors. Additionally, the specific implementation plans are confidential in nature and the implementation timelines of such projects keep evolving on the basis of resource and other considerations.

While we have made multiple attempts to get the requisite information on the specific projects, it was not possible to get the required information due to various factors including the following:

- Implementation timelines have yet to be finalised
- Confidentiality constraints

Hence, our data collection activity was based on the manpower plans developed by individual companies based on their estimates of talent required for projects anticipated by them.

*Sources: UBS, "UBS Investment Research, Malaysia Oil Services Sector", 2011; Maybank,"Maybank IB Research, Oil & Gas", 2011; preliminary discussions with industry representatives (Dec '11 – Jan '12);* Other Secondary sources and PEMANDU

## 3.5 Job classification framework

Since there is currently no standardisation of positions in the O&G sector, we developed a job classification framework for the purposes of this study. The framework organises jobs into groups based on similarities of purpose, required skills, duties performed, work environment and other common factors.

We conducted extensive research of O&G positions currently available globally in order to develop the job classification framework.

The key steps taken in developing and finalising our job classification framework were as follows:

- Compiled an inventory of all vacant positions advertised by local and international oil and gas companies
- Researched job frameworks currently in use by other countries with a well established O&G sector
- Developed a preliminary job classification framework and inventory of O&G positions based on information gathered through desktop research
- Mapped all positions in the inventory against the O&G value chain
- Validated the overall framework and inventory of positions with selected key O&G companies and industry associations to contextualize it to the Malaysian O&G environment

The job classification framework we developed has three (3) levels of classification: career discipline, job area and positions. We have outlined below what each classification level means and how they were used in our study:

- **Career disciplines** refer to the **highest level of job families and indicates the broad nature of responsibilities and skills**. Career disciplines denote a distinct set of skills and responsibilities that may be applicable within a defined range of functions and business activity, e.g. engineers vs. operators. Career disciplines provided the **basis for prioritising workforce segments** for this study
- **Job areas** refer to the **sub-groups within career disciplines for which distinct specialisations may be required but the broad nature of competencies continues to be similar**, e.g. electrical & instrumentation engineers vs. mechanical engineers. Job areas provided the requisite level of granularity for **assessing talent gaps**
- **Positions** refer to **specific jobs within each job area which are closely linked to on-the-job experience, duration of exposure and job-specific skills**, e.g. drilling engineer and reservoir engineer within the job area of petroleum engineers. Positions provided the optimum level of granularity for studying **skills requirements.**

## 3.5 Job classification framework (cont'd)

The diagram below shows how positions within the O&G sector have been grouped within the framework by using the career discipline **"Engineer"** and job area **"Petroleum Engineer"** as an example.

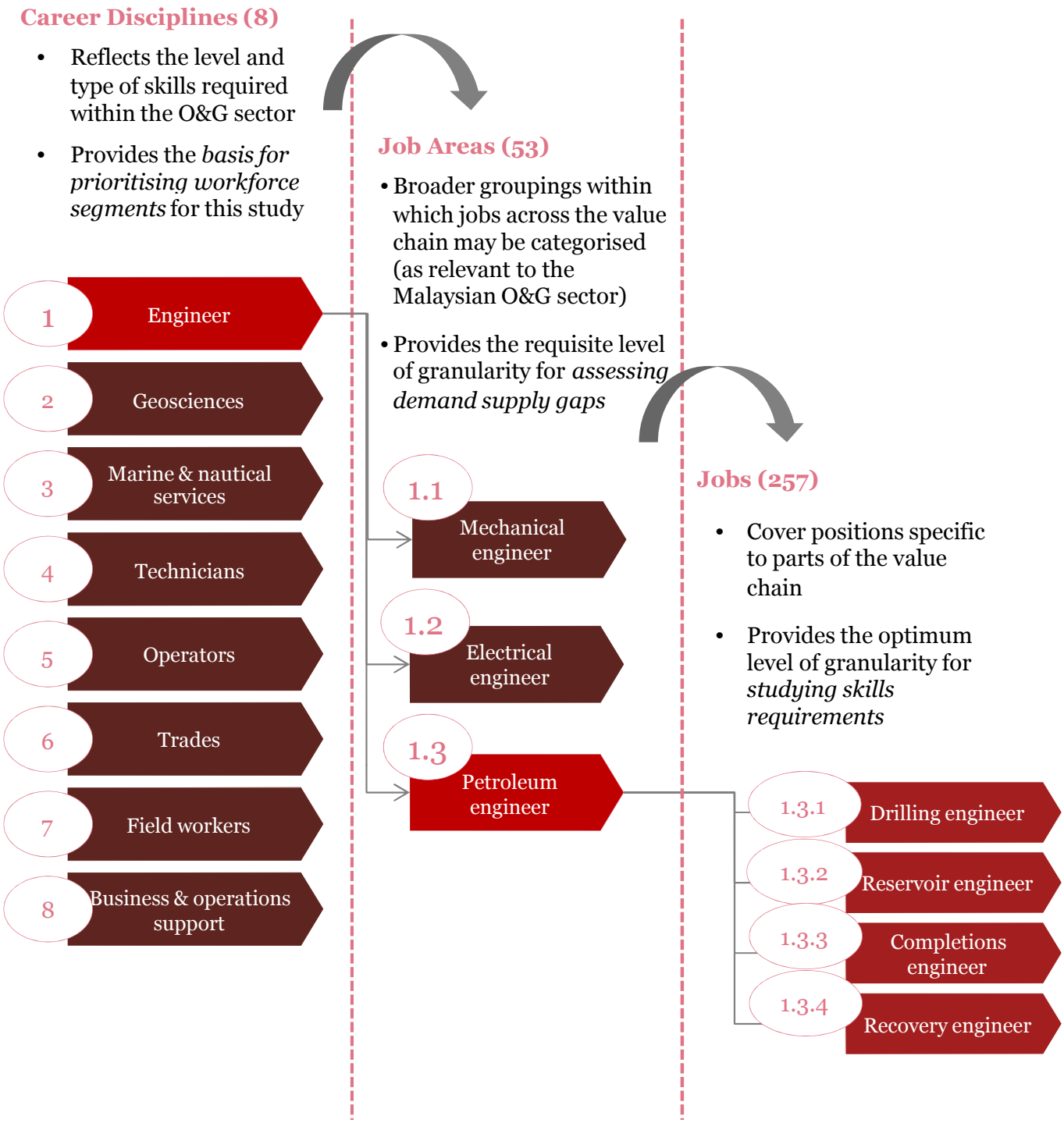



*Figure 3.5.1:Mapping of positions and job areas to career disciplines within the job classification framework*

## 3.5 Job classification framework (cont'd)

A brief description of the nature of responsibilities and requisite academic qualification for the eight (8) career disciplines has been provided below:

| No. | Career discipline | Description |
|---|---|---|
| 1. | Engineers | • Work typically involves the professional design, construction, operation, maintenance, quality control and optimisation of systems critical to the oil and gas value chain<br>• Requires an undergraduate degree in a related engineering discipline |
| 2. | Geosciences | • Studies the composition, structure and other physical aspect of the Earth<br>• Requires an undergraduate degree in geology or geophysics |
| 3. | Marine & nautical services | • Responsible for the design, operation, inspection, maintenance and/or repair of offshore marine equipments and facilities<br>• Qualification/ certification depends upon level in the hierarchy |
| 4. | Technicians | • Provides oil and gas related-technical support to professionals in related disciplines. Work typically involves the installation, operation, servicing, monitoring, troubleshooting and fixing of equipments<br>• Requires either a diploma in an engineering field or in some instances, technical certification of a related discipline would suffice |
| 5. | Operators | • Involves the operation of control systems and equipments related to plants and facilities, heavy equipment, rigs, wells and pipelines<br>• Requires either a diploma in an engineering field or in some instances, technical certification of a related discipline would suffice |
| 6. | Trades | • Involves in the design and fabrication of materials or operation of equipments used in the oil and gas sector<br>• Requires SPM qualification and certification in a related discipline |

*Table 3.5.1: Nature of responsibilities and academic qualification for the eight (8) career disciplines*

## 3.5 Job classification framework (cont'd)

A brief description of the nature of responsibilities and requisite academic qualification for the eight (8) career disciplines has been provided below:

| No. | Career discipline | Description |
|---|---|---|
| 7. | Field workers | • Entry point for the industry and assist in the operation of equipment when drilling, completing or maintaining a well as well as in downstream operations. This includes setting up, taking down and servicing the equipments, and general clean-up of the area, pipeline facilities and/or lease sites.<br>• Requires SPM qualification but companies may hire candidates without SPM qualification and provide them with basic training |
| 8. | Business & operations support | • Provides all the business support and general management services in O&G companies<br>• Requires an undergraduate degree in a related discipline |

*Table 3.5.1: Nature of responsibilities and academic qualification for the eight (8) career disciplines*

## 3.5 Job classification framework (cont'd)

The table below maps out the job areas under each of the eight (8) career disciplines.

| No. | Career discipline | Job areas |
|---|---|---|
| 1. | Engineers | 1. Petroleum Engineers<br>2. Chemical Engineers<br>3. Mechanical Engineers<br>4. Geological Engineers<br>5. Geomatics Engineers<br>6. Environmental Engineers<br>7. Civil & Structural Engineers<br>8. Electrical & Instrumentation Engineers<br>9. Marine-related Engineers<br>10. Materials & Metallurgical Engineers<br>11. Pipeline Engineers<br>12. Cost Control Engineers<br>13. Computer Engineers<br>14. Mining Engineers |
| 2. | Geosciences | 1. Geochemist<br>2. Geologist<br>3. Geophysicist |
| 3. | Marine & Nautical Sciences | 1. Deck Officers<br>2. Engineering Officers<br>3. Marine Operations<br>4. Offshore Specialties |
| 4. | Technicians | 1. Chemical Technicians<br>2. Mechanical Technicians<br>3. Electrical Technicians<br>4. Geological, Seismic & Mineral Technicians<br>5. Marine Technicians<br>6. Oil and Gas Transportation Services<br>7. Warehouse Technicians<br>8. Well Testing Services Supervisors |
| 5. | Operators | 1. Control Centre Operators<br>2. Drilling Rig Operators<br>3. Field Production Operators<br>4. Heavy Equipment Operators<br>5. Plant & Facility Operators<br>6. Seismic Operators<br>7. Well Services Operators (Cementing to Production Phases)<br>8. Well Services Operators (Production and Enhancement Phases) |

*Table 3.5.2: Job areas mapped to career disciplines*

## 3.5 Job classification framework (cont'd)

The table below maps out the job areas under each of the eight (8) career disciplines.

| No. | Career discipline | Job areas |
|---|---|---|
| 6. | Trades | 1. Insulators<br>2. Machinists<br>3. Millwrights<br>4. Pipefitters<br>5. Welders |
| 7. | Field Workers | 1. Drilling & Service Rig Work<br>2. Scaffolding<br>3. General |
| 8. | Business & Operations Support | 1. Finance & Asset Management<br>2. Health, Safety & Environment<br>3. Environment Management<br>4. Supply Chain Management<br>5. Trading<br>6. Sales & Marketing<br>7. Human Resource Management<br>8. IT |

*Table 3.5.2: Job areas mapped to career disciplines*

For a listings of positions under each of those job areas, please refer to Appendix 1. Each of the positions have also been mapped against the O&G value chain.

## 3.6 Key job areas of shortage

To arrive at the list of key job areas to focus on during the primary study, we applied two (2) sets of filter:

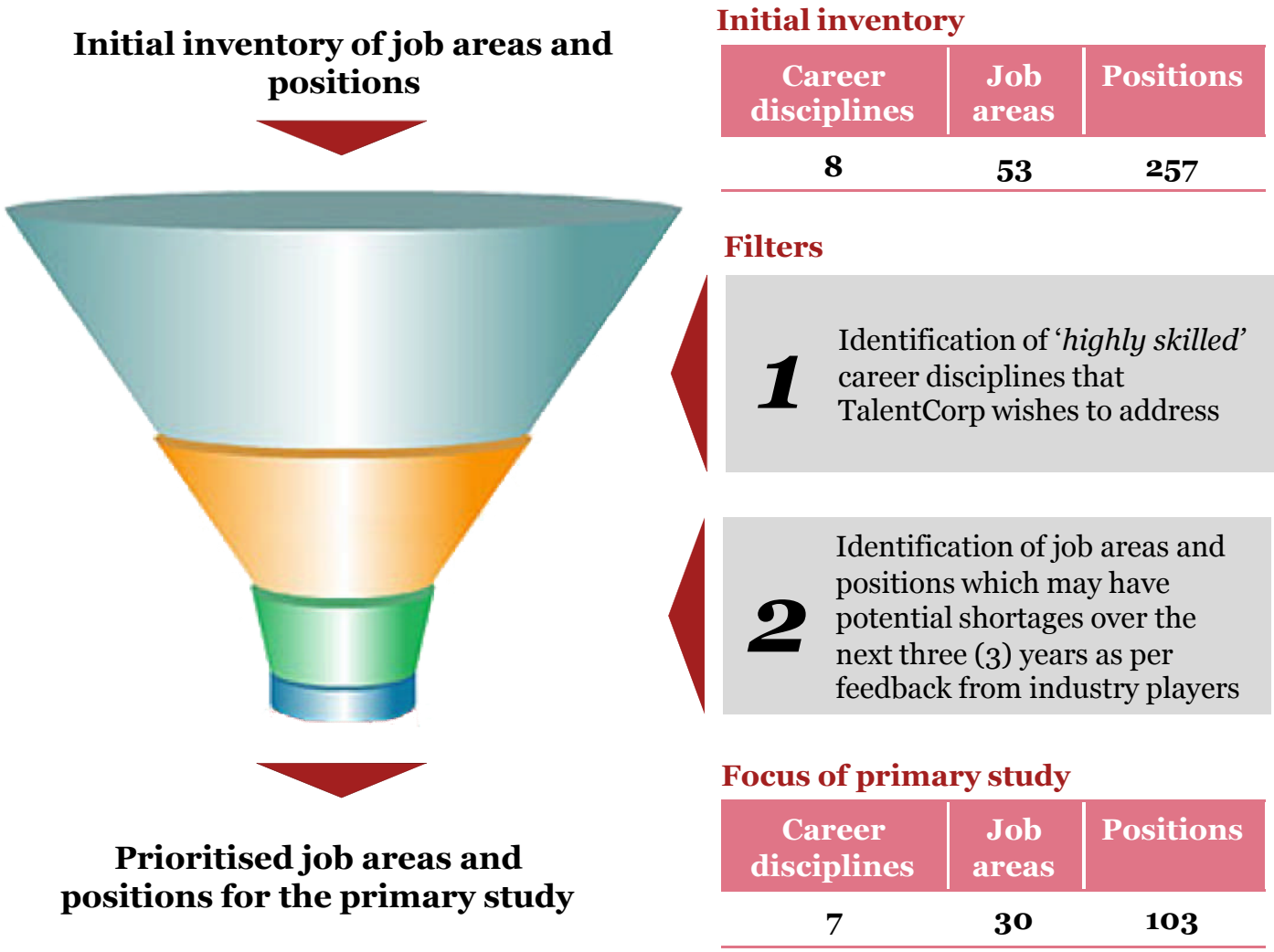



*Figure 3.6.1:Filtering steps for identifying career disciplines, job areas and positions of focus in the primary study*

### 1. Identification of career disciplines of interest for TalentCorp

TalentCorp's initiatives and interventions are targeted at the 'highly skilled' talent segments. While the O&G sector does not have a commonly acceptable definition for the 'skilled' category of workers, the highly skilled talent segments that TalentCorp wishes to address, have the following characteristics:

i. Well educated - typically have a minimum academic qualification of an undergraduate degree

ii. Possess specialised skills acquired through either education or 'on-the-job' training

iii. Possess highly mobile skill sets and demand for them exists at the national, regional and global level

## 3.6 Key job areas of shortage (cont'd)

The career disciplines of focus in the primary study based on TalentCorp's priorities have been highlighted in the table below:

| Level in hierarchy | Career discipline | Education profile | Experience profile |
|---|---|---|---|
| **High (specialists)** | Engineers | Degree / Post graduation | High |
| | Geosciences | Degree / Post graduation | High |
| | Business & operations support | Variable | Medium to High |
| **Medium to Low** | Marine and nautical sciences | Diploma /Vocational certification | Medium |
| | Technicians | Diploma / Vocational certification | Medium to Low |
| **Low** | Operators | SPM with training | Medium to Low |
| | Trades | SPM with training | Low |
| | Field Workers | SPM | Low |

*Table 3.6.1: Education and experience profile of the eight (8) career disciplines*

**Level of focus for this study:**

High

High for selective areas: Most positions may have an undergraduate degree but may not be critical; hence focus will be on the highly skilled and experienced positions

Low: Generally not very skilled, very limited number of positions may come under TalentCorp's purview

### 2. Identification of job areas and positions with potential shortages

To identify the job areas with critical shortages, we performed the following activities:

i. Validated the job areas and positions for the chosen career disciplines to ensure they are relevant to the Malaysian O&G industry with selected industry representatives

ii. Identified job areas in which the identified projects will create a shortage of talent based on secondary research and feedback from selected O&G companies

iii. Identified positions which are critical within each job area for subsequent definition of skill requirements based on feedback from selected O&G players

The validated job classification framework was deployed for engagement with industry players across the O&G value chain during the primary study.

## 3.6 Key job areas of shortage (cont'd)

The list of job areas with potential shortages for which the demand and supply of talent was assessed in the primary study, are as follows:

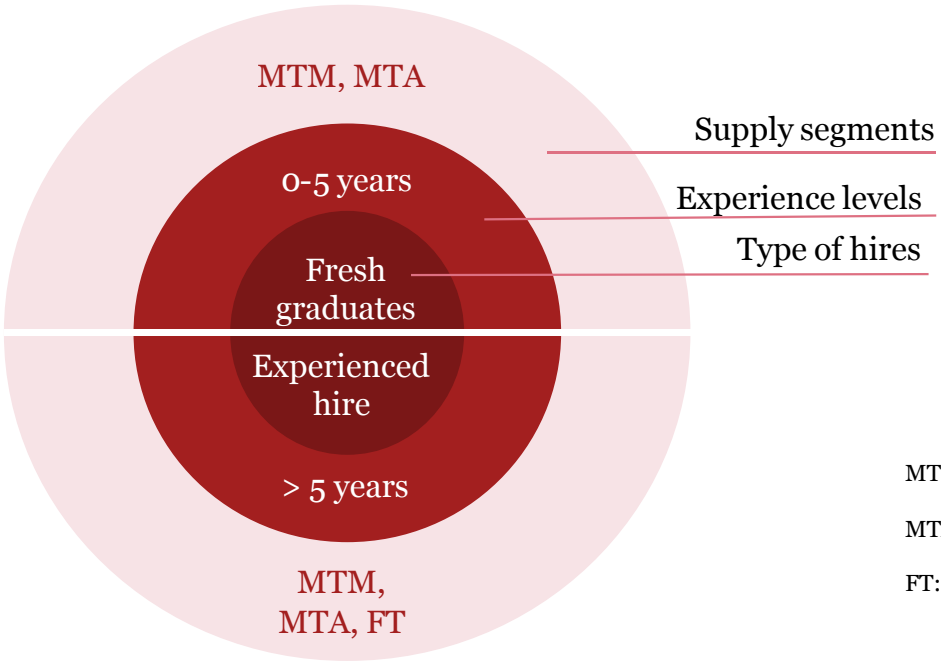
| Career disciplines | Job areas |
|---|---|
| **Engineers** | 1. Petroleum engineers<br>2. Chemical engineers<br>3. Mechanical engineers<br>4. Civil & structural engineers<br>5. Electrical & instrumentation engineers<br>6. Marine related engineers<br>7. Materials & metallurgical engineers<br>8. Pipeline engineers<br>9. Cost control engineers |
| **Geosciences professionals** | 1. Geologists<br>2. Geophysicists |
| **Marine & nautical sciences** | 1. Deck officers<br>2. Offshore specialties |
| **Business & operations support** | 1. Finance & asset management<br>2. Health, safety and environment<br>3. Supply chain management |
| **Technicians** | 1. Mechanical technicians<br>2. Electrical technicians<br>3. Geological, seismic & mineral technicians<br>4. Marine technicians<br>5. Well testing services supervisors |
| **Operators** | 1. Control centre operators<br>2. Drilling rig operators<br>3. Field production operators<br>4. Plant & facility operators<br>5. Seismic operators<br>6. Well services operators |
| **Trades** | 1. Pipefitters<br>2. Welders |

*Table 3.6.2: Career disciplines and job areas to be covered during the primary study*

## 3.7 Talent Supply

While individual oil and gas companies track and apply different ranges of experience, we have developed the following broad classification for the purposes of this study. Based on feedback from companies in the sector:

1. Fresh graduates or inexperienced hires typically have less than 5 years of experience which are , in general, Malaysians within the country or Malaysians abroad.
2. Experienced hires, on the other hand, typically have a minimum of 5 years of experience.
3. They can be sourced within the country or from a pool of Malaysians abroad and/or foreign talent outside Malaysia

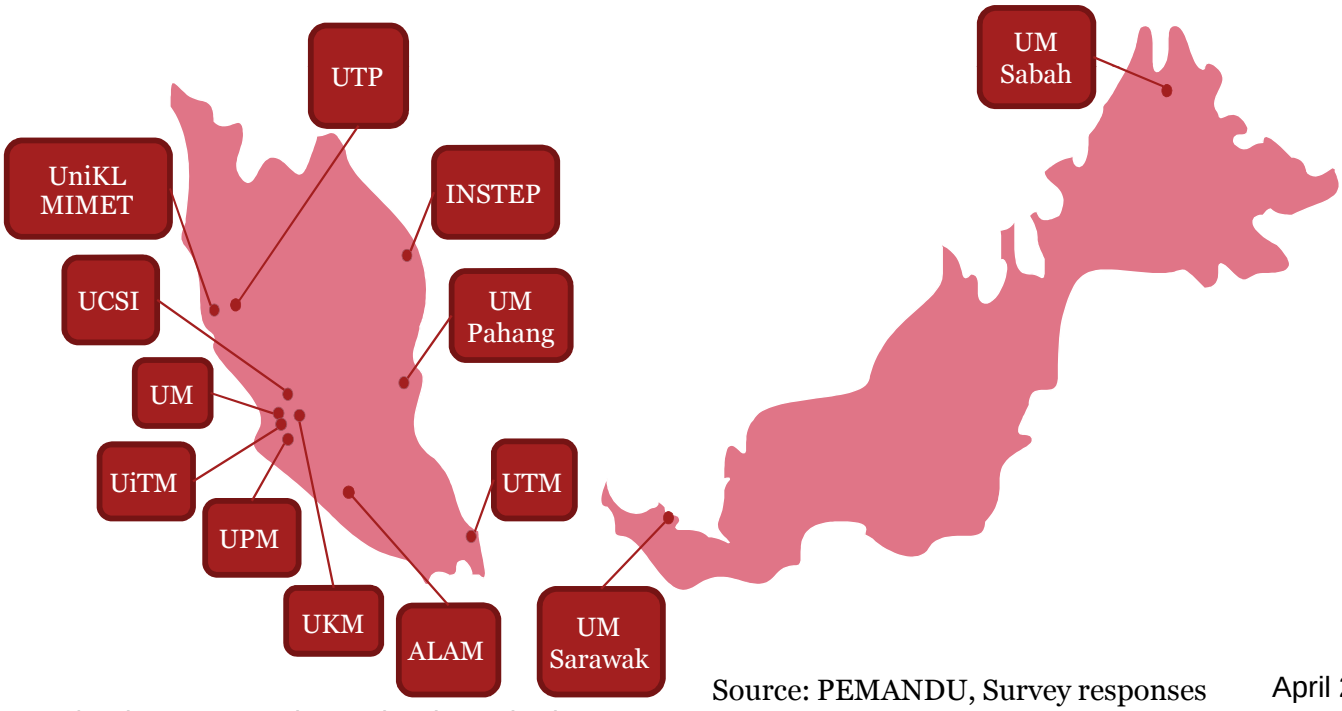



MTM: Malaysian talent in Malaysia

MTA: Malaysian talent abroad

FT: Foreign talent

O&G players in Malaysia typically source fresh graduates from the following academic institutions:




Source: PEMANDU, Survey responses

List of public universities that offer engineering or O&G related courses are as follows:

| Institutions | Courses Offered |
|---|---|
| ALAM | • Diploma in Marine Engineering |
| UCSI | • Bachelors of Engineering (Petroleum / Chemical/ Civil / Mechanical / Electrical & Electronic)<br>• Master of Engineering (Electrical) |
| UKM | • Bachelor of Engineering (Electrical & Electronics / Civil / Chemical / Mechanical) |
| UM | • Bachelors of Science (Geology & Applied Geology)<br>• Bachelor of Engineering (Chemical / Civil / Mechanical)<br>• Masters of Engineering (Mechanical)<br>• Masters of Science/PhD in Petroleum Geology & Geochemical |
| UM Pahang | • Bachelor of Engineering (Chemical / Electrical / Mechanical)<br>• Masters of Engineering (Chemical / Electrical & Electronics / Mechanical) |
| UM Sabah | • Advanced Diploma (Electrical / Instrumentation / Mechanical / O&G Production)<br>• Bachelor of Engineering (Civil / Chemical / Electrical & Electronics / Mechanical)<br>• Masters of Engineering & PhD in Engineering |
| UM Sarawak | • Bachelor of Engineering (Civil / Chemical / Mechanical)<br>• Masters of Engineering (Civil)<br>• Masters of Science in Organic Geochemical<br>• PhD in Engineering |
| UniKL MIMET | • Bachelors of Engineering (Naval Arch) |
| UPM | • Bachelors of Science in Petroleum Chemistry<br>• Bachelor of Engineering (Electrical & Electronics / Civil / Chemical / Mechanical) |
| UTM | • Bachelor of Engineering (Petroleum / Chemical / Civil / Mechanical / Electrical)<br>• Masters of Engineering (Petroleum / Gas / Chemical / Civil / Electrical / Mechanical)<br>• PhD (Gas Engineering / Petroleum Engineering /Materials & Structural Engineering) |
| UTP | • Bachelors of Engineering (Petroleum / Chemical / Civil / Mechanical / Electrical)<br>• Masters of Science (Chemical Engineering / Petroleum Engineering / Petroleum Geosciences) |

List of public universities that offer engineering or O&G related courses are as follows:

| Institutions | Courses Offered |
|---|---|
| UiTM | • Bachelor of Engineering (Chemical / Civil / Mechanical / Electrical)<br>• Masters of Engineering (Gas / Chemical / Civil / Electrical / Mechanical)<br>• PhD (Gas / Chemical / Civil / Electrical / Mechanical) |
| INSTEP (based on information provided by MOHE) | • Petroleum Technology Course 1<br>• Petroleum technology Course 2 |

## 3.7 *Hypotheses on potential talent issues and priorities*

As a part our outcome based approach, we conducted extensive research to identify the potential challenges faced at the national and global level to develop our hypotheses on talent issues and areas of shortage. The approach was designed to focus our efforts on the most likely issues and validate them through the primary study. The table below lists our hypotheses with descriptions and possible root causes.

| No. | Issue | Description and root causes |
|---|---|---|
| 1 | Lack of local expertise | Specialized areas like deepwater exploration, enhanced oil recovery requiring deep skills in reservoir engineering or FPSO operations in the design, operations and maintenance functions difficult to be staffed with local expertise due to lack of supply |
| 2 | Loss of talent to other countries | A significant number of mid level Malaysian professionals are not in Malaysia. Most of them are based in Singapore, Australia, Brunei, Qatar, Abu Dhabi, Oman and Dubai due to more lucrative opportunities and better work conditions. |
| 3 | Skill development | Short contract periods for specialized activities are preventing building-up of local expertise as contractors prefer to hire overseas professionals even if the costs are high. |
| 4 | Skill development | While the government promotes knowledge transfer from overseas professionals, foreign professionals do not actively transfer know-how for fear of competition. |
| 5 | Long incubation period | Developing expertise locally in specialized areas needs at least 5 years minimum to bring up general proficiencies, in some areas like hydrodynamics, mooring , soil mechanics etc. it can take up to 10 years. |
| 6 | Limited opportunities for junior talent | Demand for professionals is closely linked with experience as Health, Safety & Environment (HSE) is a major consideration throughout the value chain. The sector is therefore less attractive to young talent. |
| 7 | Perception of 'unstable' careers | The current generation may perceive O&G careers to be unstable due to the fluctuations in demand for specialized skills. This may be based on experiences of their previous generation especially the mass lay-offs during the 1990s of skilled professionals. |
| 8 | General perception of O&G careers | Generally, O&G careers are associated with slow growth, poor work life balance, prolonged time periods away from home and all weather conditions at the workplace |
| 9 | Low rates of enrolments | The enrolments in O&G relates courses cannot match the demand for professionals forecasted over the next decade. |

# *Phase 2 : Conducting the primary study*

# 4

# 4. Phase 2: Conducting the primary study

## 4.1 Overview

The primary study was conducted to provide insights into the sectoral talent demand supply dynamics between 2012 - 2014 as well as understand the talent priorities and preferences of Malaysian O&G players. In addition to that, we also explored the talent issues and challenges currently impacting the O&G sector in selected developed economies globally and how those countries were responding to them.

To achieve these objectives, we undertook the following activities:

1. Conducted **industry engagement** via a web-based survey and focused interviews with company Human Resource (HR) professionals, industry associations and relevant government agencies
2. Developed a **labour database and forecasting model** of talent in the Malaysian O&G industry between 2012-2014
3. Identified selected O&G sectors globally and performed a **benchmark analysis** of their talent management practices

### 1. Industry Engagement

The industry engagement involved:

- Deploying a web-based survey to **271** O&G companies
- Conducting focused interviews with **35** key O&G companies, industry associations and relevant government agencies

Below are the key objectives behind the web-based survey and focused interviews:

| Activity | Key objectives |
|---|---|
| Web-based survey  | 1. Quantify gaps in talent demand and supply for key job areas<br>2. Identify talent challenges and support requirements for O&G companies across the sector |
| Focused interviews  | 1. Identify key job areas with anticipated shortage<br>2. Develop a qualitative understanding of challenges affecting talent availability within the sector<br>3. Understand desired industry support |

*Table 4.1.1 Key activities involved in industry engagement*

Prior to launching the web-based survey, we sought feedback from TalentCorp as well as selected members of the Oversight Committee on the survey questionnaire to ensure that the structure and coverage of the survey was aligned with its objectives.

In addition, we also validated the target list of O&G companies to be surveyed with TalentCorp and PETRONAS, to ensure there was a balanced representation in the target list across the O&G sector.

All feedback received in relation to the survey and target list of companies were evaluated and subsequently incorporated prior to launch of the survey on 17 February 2012.

Findings from the industry engagement is elaborated upon in Section 4.2. The survey questionnaire, focused interview guide and list of O&G companies can be referred to in Appendix 3, respectively.

## 2. Labour database and forecasting model

The labour database was developed so that the talent demand and supply data can be periodically updated by TalentCorp and ILMIA with relative ease. The timely updates of such a database will enable TalentCorp and its key stakeholders to have continued visibility on the skills in demand in the O&G sector.

All input into the database is based on data provided to us by O&G companies via the web-based survey. All talent related data were gathered at the "job area" level as it was deemed to provide the requisite level of granularity for assessing the talent demand and supply gaps.

Details on how data collected through the survey was incorporated into the labour database and forecasting model has been further elaborated in the subsequent parts of this section.

## 3. Benchmark analysis of talent management practices in selected developed economies

A high level benchmark analysis was also performed against developed countries with a well established O&G industry to understand how they were managing talent within the sector. The benchmark analysis for the selected countries were conducted based on the following three (3) key areas:


The criteria used to identify the countries and key learnings from the benchmark analysis are elaborated on in Section 4.4.

## 4.2 Labour database, forecasting model and key findings from the industry engagement

**Overview of the industry engagement**

During the primary study, we engaged key stakeholders in the O&G sector primarily to quantify the talent demand-supply gap over the next 3 years, validate our hypotheses of talent issues and also to gain insights into their support requirements. The engagement was conducted via two (2) mediums: web-based survey and focused interviews.

Further details on the objectives, duration and organisation and personnel engaged via the survey and focused interviews are provided below:

| Category | Web-based survey | Focused interviews |
|---|---|---|
| **Objectives** | • Quantify gaps in talent demand and supply for selected key job areas between 2012 - 2014<br>• Identify key talent challenges and support requirements of O&G companies across the sector | • Identify key job areas with anticipated shortage<br>• Develop a qualitative understanding of key challenges affecting talent availability within the sector<br>• Explore further the support requirements desired by O&G companies over the near to medium term |
| **Duration** | • 30-45 minutes (estimated) | • Each interview ranged between 45-90 minutes long, depending on the interviewee's availability, industry experience and willingness to share |
| **Organisations engaged** | • Key O&G companies across the value chain | • Selected MNCs and local companies across the O&G value chain<br>• Industry associations<br>• Relevant government agencies |
| **Personnel engaged** | • HR personnel leading/involved in the workforce planning or recruitment function | • Senior/middle management personnel in each organisation who possess the right knowledge, expertise and experience to provide valuable input on talent related matters |

*Table 4.2.1 Details of the survey and focused interviews conducted in the study*

A profile of the organisations engaged and summary of key findings are presented in the subsequent pages.

## 4.2 Labour database, forecasting model and key findings from the industry engagement

**Using the labour database to forecast shortages:** We have collated quantitative as well as qualitative data and information on talent requirements and priorities from oil and gas companies in Malaysia through the web based survey*.

The following table provides a snapshot of the broad areas in which data and information were gathered and the framework used to forecast shortages for highly skilled job areas.

| No. | Quantitative data | Qualitative information |
|---|---|---|
| 1 | Total workforce size | Scope of operations (within / outside Malaysia) |
| 2 | Baseline for job areas in which companies anticipated shortages over 2012-2014: Breakdown of current headcount by Experienced vs. Fresh talent | Sources of talent (Malaysian talent vs. expatriate talent, within vs. outside Malaysia) |
| 3 | Breakdown of current headcount by size of contract workforce<br><br>(Contract headcount was defined as employees who have direct fixed term contracts with the company; subcontracted workforce was excluded) | Countries from which talent is typically sourced |
| 4 | Attrition rate over the last 3 years at the organization level | Additional skill requirements anticipated for future business growth of companies |
| 5 | Average time to fill positions by job areas of potential shortage | Hiring preferences at the university level (local public/local private/foreign) |
| 6 | Total annual requirement for experienced headcount for 2012, 2013 and 2014 | Specific universities preferred and satisfaction with course curriculum<br><br>Improvements desired at the university level |
| 7 | Additional number of headcount available due to internal promotions by each job area highlighted as an area of potential shortage | Challenges faced in attracting and retaining local as well as foreign talent; key strategies deployed to manage talent |
| 8 | Annual hiring plan for inexperienced / fresh talent by identified job area of shortage for 2012, 2013 and 2014 | Support requirements and awareness of existing support options available |

*Table 4.2.2 Details of data and information gathered in the web based survey*

*For the full questionnaire, please refer to appendix3. The focused interviews were used to further examine points of views of different players across the sector and understand their talent priorities using a set of predefined questions

## 4.2 Labour database, forecasting model and key findings from the industry engagement

**Using the labour database to forecast shortages (cont'd):**

The responses from the web based survey have been organised into a labour database that is based on a standardised classification of job areas and positions to forecast the state of talent supply and demand in the industry.

To address the project objectives and timelines, the survey was configured to identify specific shortages as against developing census information on the oil and gas talent in Malaysia. The data collated was used to compute shortages of talent for 2012, 2013 and 2014 for job areas identified as areas of potential shortages by survey respondents. The overall computation of shortages is represented below for quick reference:


The specific elements and key assumptions have been explained below:

| Element | Definition |
|---|---|
| Demand of the year | Required 'experienced' headcount for the year |
| Baseline of the year | Total current 'experienced' headcount deducting attrition leaving the country/industry |
| Additional availability due to internal promotions | Number of 'experienced' employees that are expected to be promoted during the year |
| Shortage/ Surplus for the year | Computation of the elements defined above |

*Table 4.2.3 Elements involved in computation of shortages of talent*

## 4.2 Labour database, forecasting model and key findings from the industry engagement

**Using the labour database to forecast shortages (cont'd): Key Assumptions:**

| No. | Assumption | Rationale |
|---|---|---|
| **Assumption 1:** | All contract staff are experienced | Organizations will hire professionals on contract for specific capabilities and experience. Fresh/Inexperienced professionals will not be hired on contract |
| **Assumption 2:** | All contract staff will be available for retention by companies. Hence we have assumed that attrition will not be applicable to this section of the workforce. | While it is possible to encounter attrition among contract staff, companies have the opportunity to ensure that contract staff continue in service - especially when faced with talent shortages |
| **Assumption 3:** | Retirement will not impact the available pool of talent over the next 3 years as retired personnel can be employed on contract | Interview respondents have consistently stated that retirement is not a critical issue in managing talent requirements in oil and gas as retired professionals can be further employed on contract |
| **Assumption 4:** | 25% of the permanent experienced professionals leaving a company (attrition) will leave Malaysia for international employment opportunities | Anecdotal evidence gathered during interviews suggests that a considerable proportion of trained professionals leave the country for better opportunities outside Malaysia. This factor has been considered as a variable in computing shortages and the forecasting model provides the option to revise this proportion for computing shortages |
| **Assumption 5:** | The attrition rate provided by a respondent is applicable to individual job areas and segments by experience | Most organizations do not track attrition by job families or 'job areas'. O&G players face most of the attrition in the experienced category |

*Table 4.2.4 Assumptions made for computing shortages in talent*

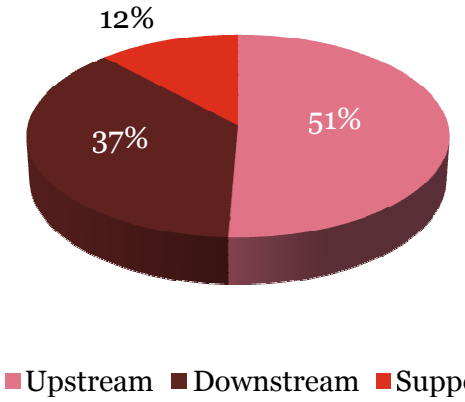
The findings of our industry engagement activity, stated in the following section, combine data and information gathered through the web based survey as well as focused interviews.

## 4.2 Labour database, forecasting model and key findings from the industry engagement

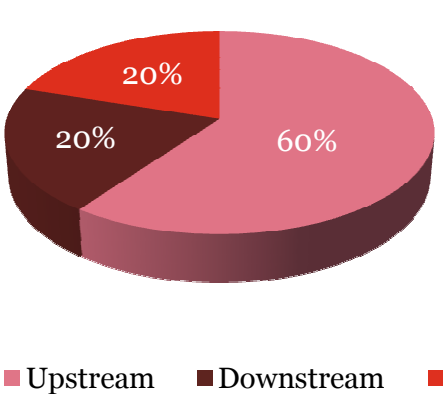
### Organisation profile

A breakdown by value chain of organisations engaged via the survey and focused interviews are shown below:

**Survey**

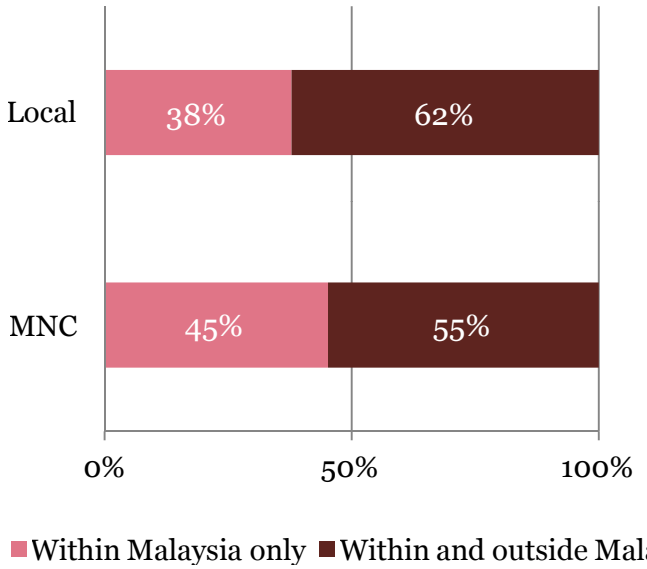



**Focused interviews**

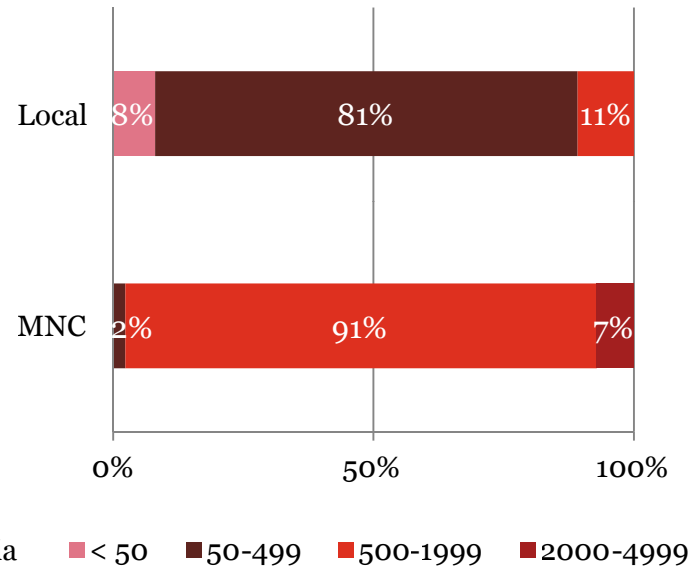



We engaged **79** companies through the **survey** and **interviewed 35** organisations, including industry associations, relevant government agencies and University Technology PETRONAS (UTP). A breakdown of surveyed companies according to the organisation type and extent of their business operations and workforce size is provided below:

**Scope of operations**




**Size of workforce**




A significant proportion of multinational companies (MNCs) and local companies surveyed have operations within and outside of Malaysia. While most MNCs (98%) have a workforce strength of 500 or more, majority of the local O&G companies (81%) fall within the 50-499 bracket.

## 4.2 Labour database, forecasting model and key findings from the industry engagement

### Summary of key findings

We consolidated and analysed the findings from both the survey and focused interviews. Key findings from both activities are presented in this section. The remaining survey results can be found in Appendix 7.

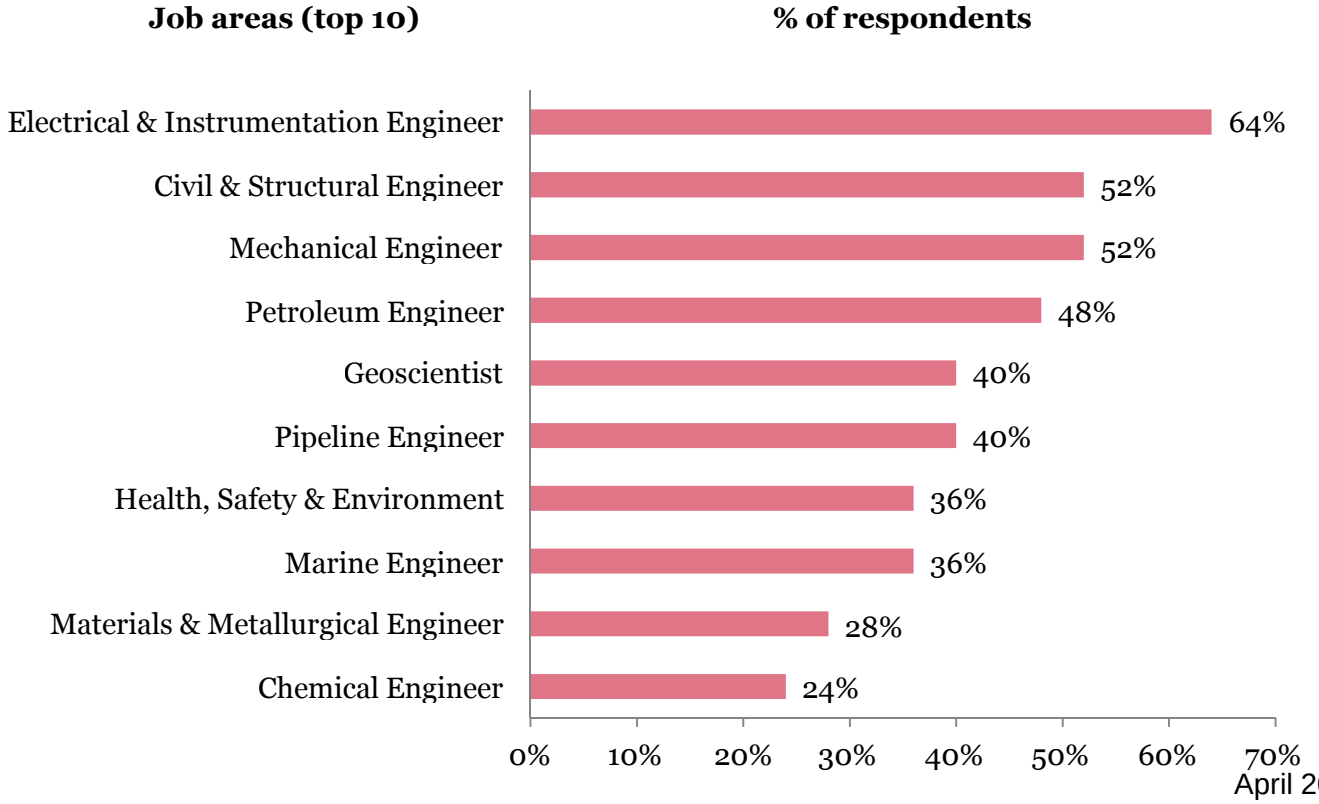
We have structured key findings from our industry engagement into the following broad categories:

1. Experienced talent
2. Inexperienced/fresh talent
3. Attrition and challenges faced in attracting and retaining talent
4. Talent management practices
5. Desired support requirements

### 1. Experienced talent

For experienced talent, most O&G companies expect to face shortages in engineering related job areas, particularly for **Electrical & Instrumentation Engineer, Civil & Structural Engineer, Mechanical Engineer** and **Petroleum Engineer**.

***Q. Please select the job areas for which you are likely to face shortages over the next 3 years***



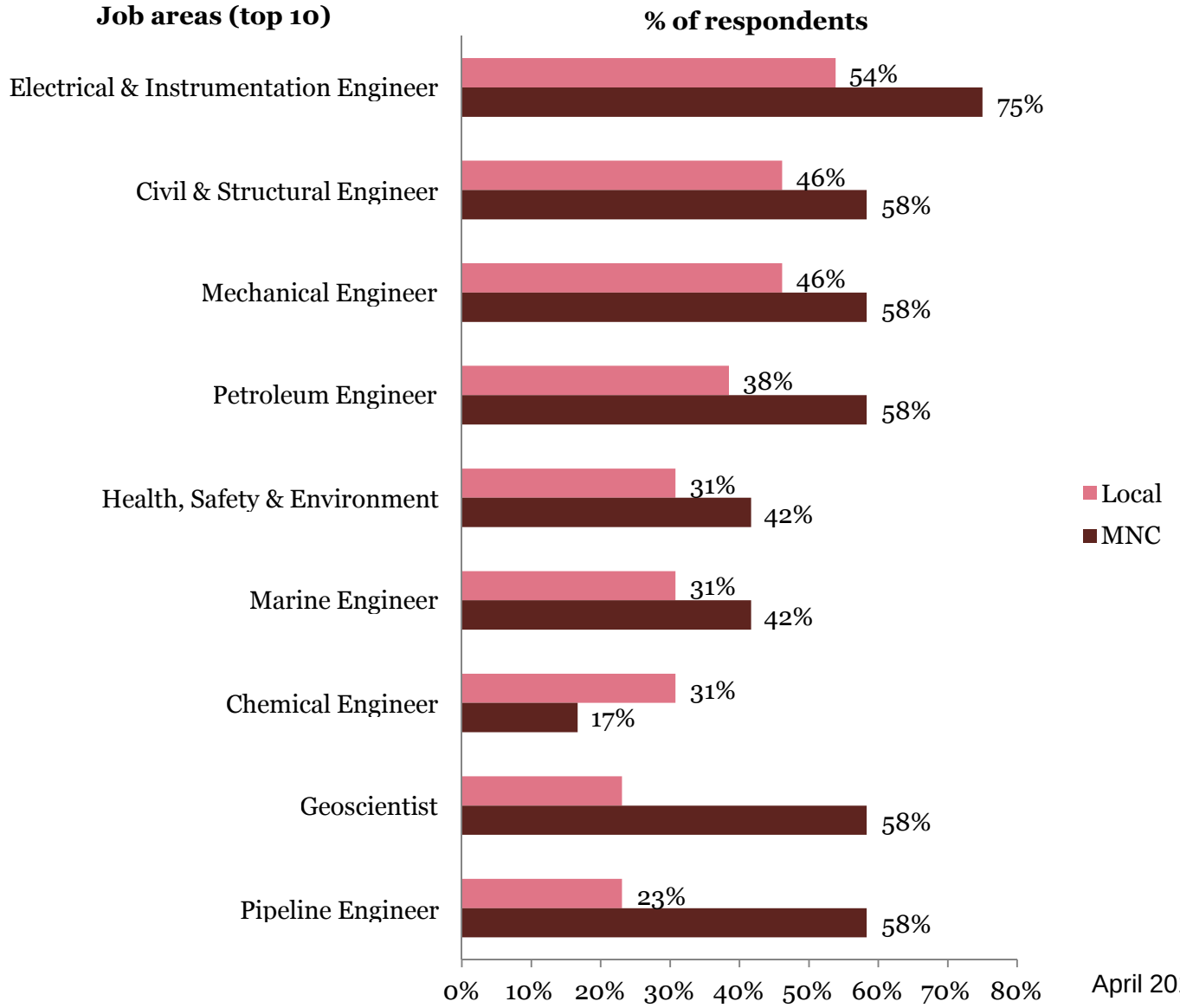
## 4.2 Labour database, forecasting model and key findings from the industry engagement

### 1. Experienced talent (cont'd)

Apart from the engineering jobs, companies also anticipate difficulties in sourcing talent in the area of **Geoscientist** and **Health, Safety and Environment**.

Further analysis of the responses by organisation type showed that most **MNCs** anticipate shortages for **Electrical & Instrumentation Engineers**, **Civil and Structural Engineers**, **Mechanical Engineers**, **Petroleum Engineers**, **Geoscientists** and **Pipeline Engineers** while **local companies** anticipate shortages in **Electrical & Instrumentation Engineers, Civil and Structural Engineers** and **Mechanical Engineers**.

The job areas of shortage highlighted by MNCs and local companies are broadly aligned to the business activities that they are typically involved in: MNCs are usually directly involved in oil and gas exploration and production activities while local companies are mostly involved in providing support services and equipments in both upstream and downstream projects.




April 2012

## 4.2 Labour database, forecasting model and key findings from the industry engagement

### 1. Experienced talent (cont'd)

For the job areas of shortage selected, respondents were subsequently asked to provide their workforce numbers as at 31 December 2011 as well as their future talent requirements for 2012, 2013 and 2014.

In addition to the headcount data, respondents were also requested to indicate the overall attrition rate for their organisation. The attrition figure provided were applied to all job areas although during interviews, it was noted certain job areas, e.g. Geoscientist, experience higher attrition rates than others. But since only a small numbers of O&G companies formally track attrition by job areas, it was only deemed practical to request companies to provide their organisational level attrition rate. The attrition rates highlighted by respondents will be elaborated on in the next sub section.

Based on our calculation, the top ten (10) job areas anticipated to experience the highest talent shortages in 2012 are shown overleaf. For each of the job areas, we have also indicated the average time to fill positions commonly quoted by respondents.

**Note on project engineers:**

From the survey responses, we received headcount data for the current baseline as well as requirements in 2012, 2013 and 2014. However, certain companies provided headcount data only as per the job classification followed by them. Hence we were required to map the data from a few survey participants for certain data points (e.g. project engineers) to the job areas being used for the study.

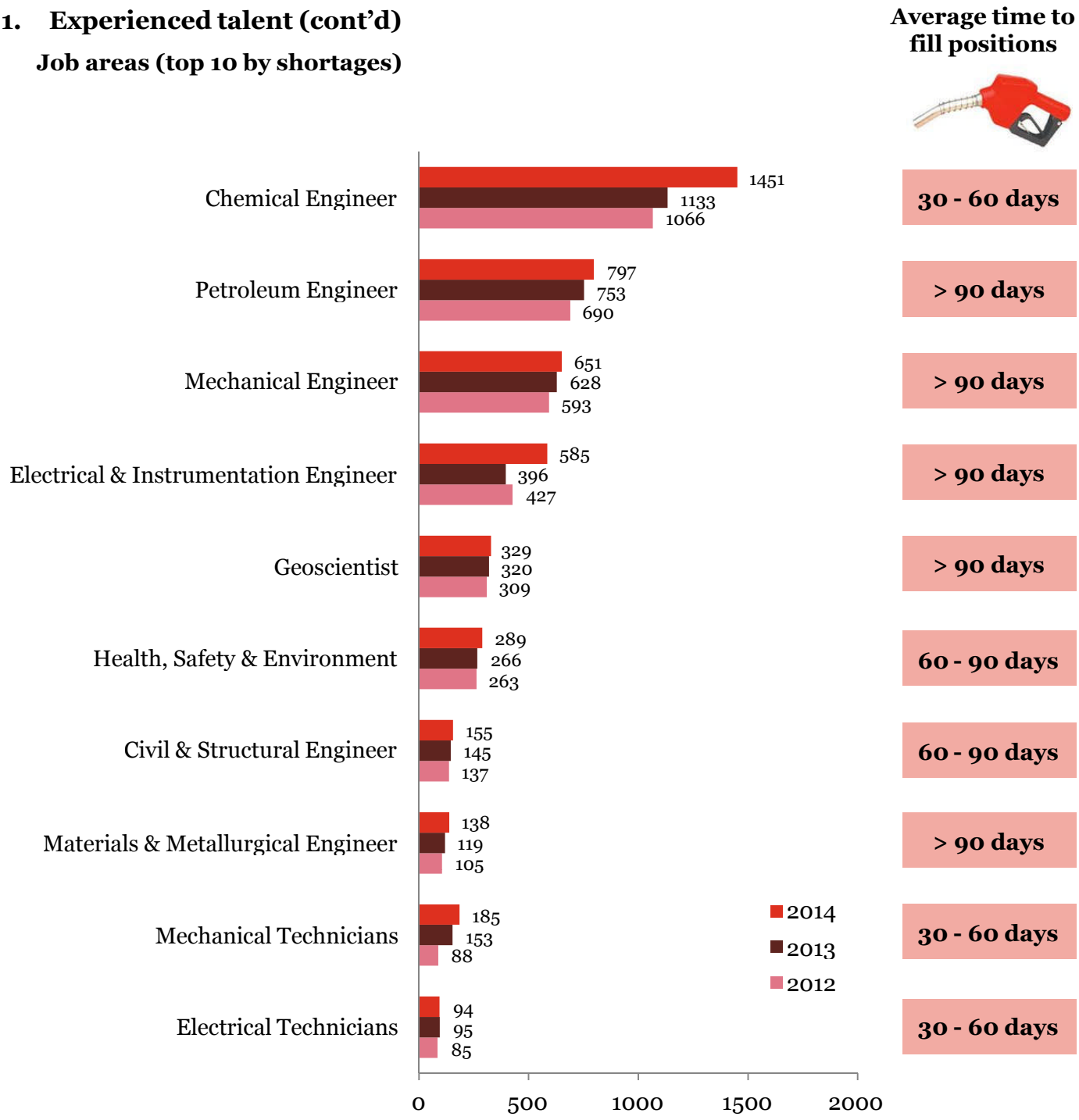
**Note on Deck Officers:**

The survey responses indicate that there will be a shortage of deck officers in Malaysia to the extent of 256 additional requirements. However the number of respondents who have indicated this job area as an area of potential shortage are not adequate to draw conclusions at the sector level. Hence we have not included this job area in the list of top ten areas of shortages.

## 4.2 Labour database, forecasting model and key findings from the industry engagement

### 1. Experienced talent (cont'd)

**Job areas (top 10 by shortages)**




For almost all job areas, the talent shortages are expected to rise over the next 3 years. Again, 6 out the top 10 job areas of shortage are related to engineering. Significant shortages are expected for **Chemical Engineer, Petroleum Engineer, Mechanical Engineer** and **Electrical & Instrumentation Engineer**. In the absence of any interventions, talent shortages for Chemical Engineer is expected to increase by about 36% from 2012 to 2014 whilst for Electrical & Instrumentation Engineer, it is anticipated to rise by 37%.

## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

### 1. Experienced talent (cont'd)

The fairly long average time to fill positions highlighted by respondents for most job areas will certainly increase the severity of talent shortages within the sector. Average time to fill positions refers to the average number of days from when the requisition for positions are opened until the offer is accepted by the candidate.

Whilst the average time to fill positions are largely influenced by the workforce planning and recruitment processes of individual companies as well as the notice periods that candidates are required to serve at their previous company, this parameter can also be affected by external factors that are beyond the control of companies.

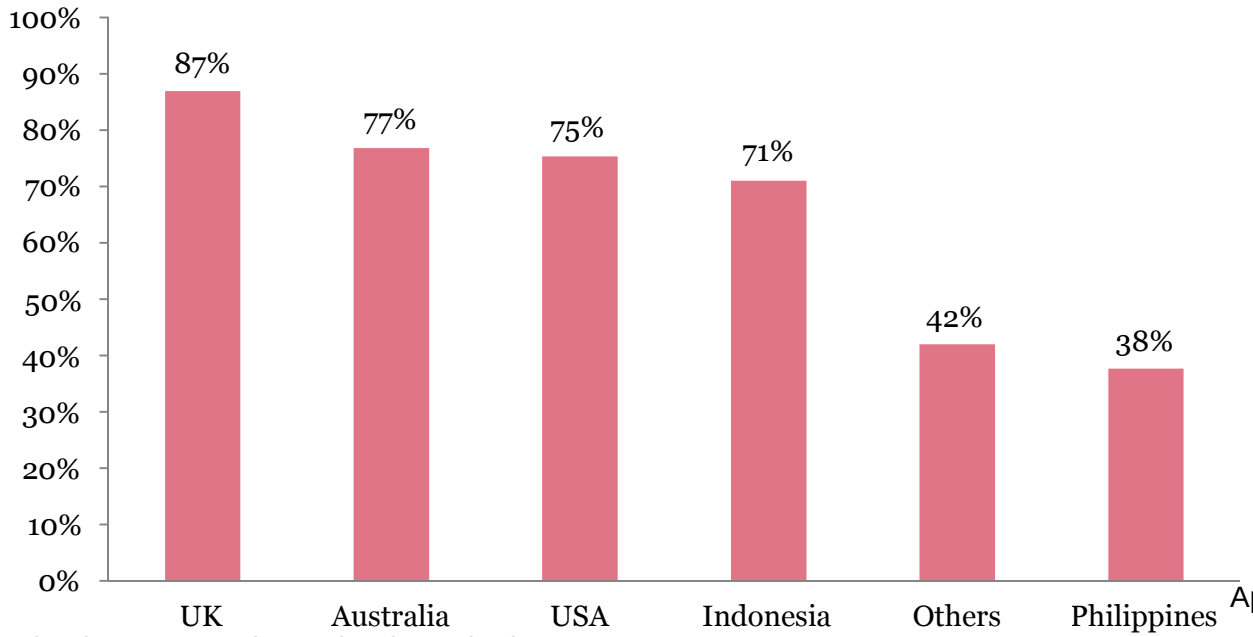
The external factors commonly raised by companies as attributable to the longer than expected average time to fill positions in the O&G sector are:

- Limited pool of experienced O&G professionals
- Mismatch of employability skills of a significant proportion of local graduates with the expectations of O&G companies
- Time taken to gather documentation requested by the Immigration Department for granting work permits to foreign talent is long (~ 1-2 months)

When sourcing for foreign talent, respondents seem to broaden their search to either countries with well established O&G industry such as United Kingdom, Australia and United States of America where there is ready supply of experienced O&G talent or countries that are geographically close to us, i.e. Indonesia and Philippines.

Under others, India was the most common country highlighted by respondents.

***Q. If foreign talent is a supply source for your organisation, which countries do you typically hire from?***




April 2012

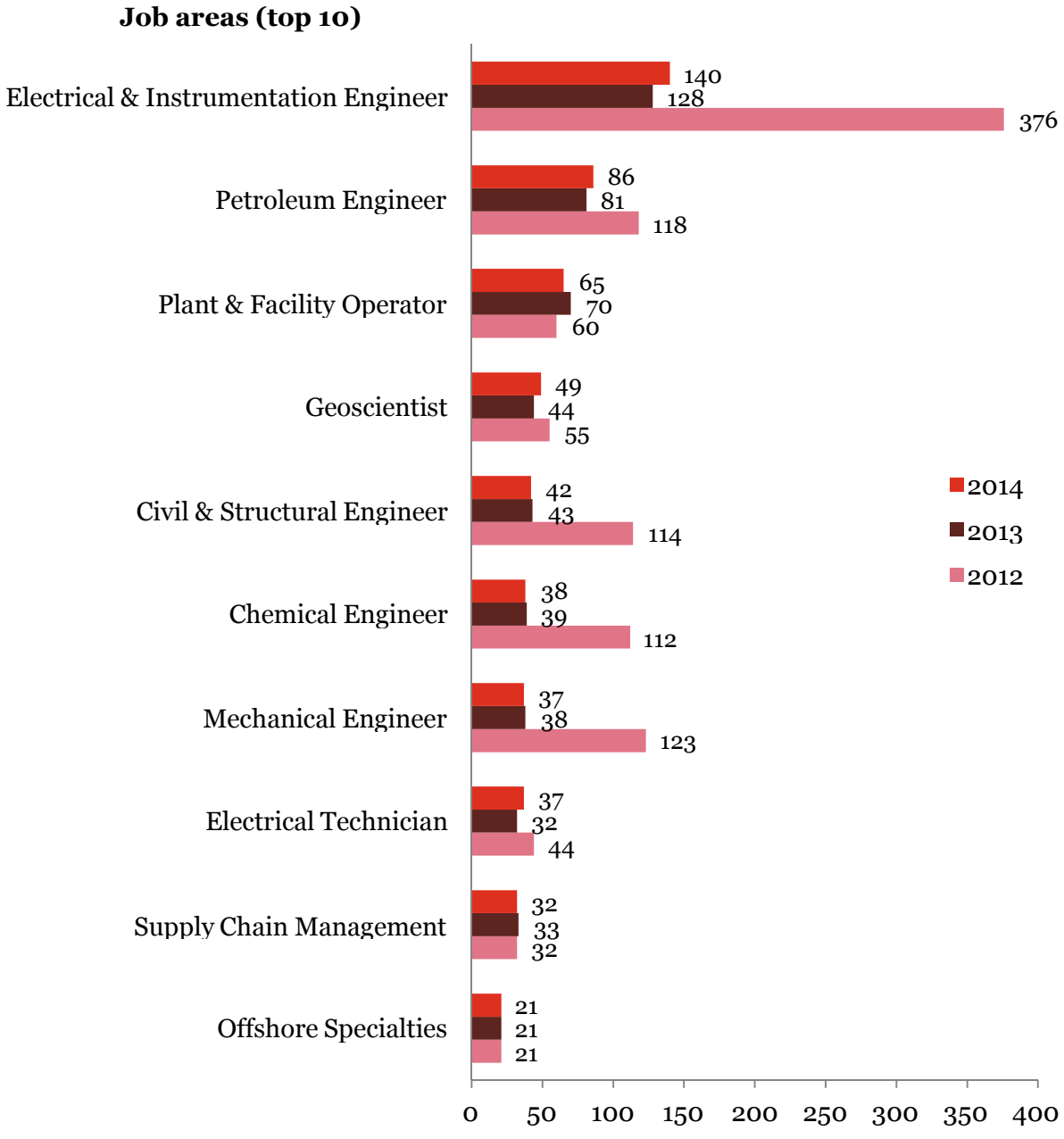
## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

### 2. Inexperienced/fresh talent

For inexperienced/fresh talent, the demand is also focused around engineering related job areas with the top five (5) being **Electrical & Instrumentation Engineer**, **Mechanical Engineer**, **Petroleum Engineer**, **Civil & Structural Engineer** and **Chemical Engineer**.

Interestingly, the demand for Electrical & Instrumentation Engineer in 2012 is expected to be three (3) folds that of other engineering positions.

***Q. Please provide details of your hiring plans for the 'fresh / inexperienced' category***



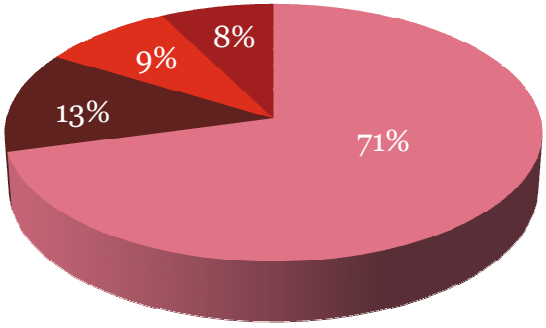
## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

### 2. Inexperienced/fresh talent

Besides engineering, respondents also indicated a strong demand for **Plant & Facility Operator** and **Geoscientist** over the next 3 years.

Overall, the demand for inexperienced/fresh talent appears to decrease over the next 3 years but this could be due to the limited visibility that O&G companies have around commencement/award of future O&G projects.

***Q. Please indicate your preference when hiring fresh graduates***




"We find that local graduates can't work independently and lack leadership skills compared to graduates from foreign universities"

*- Local player*

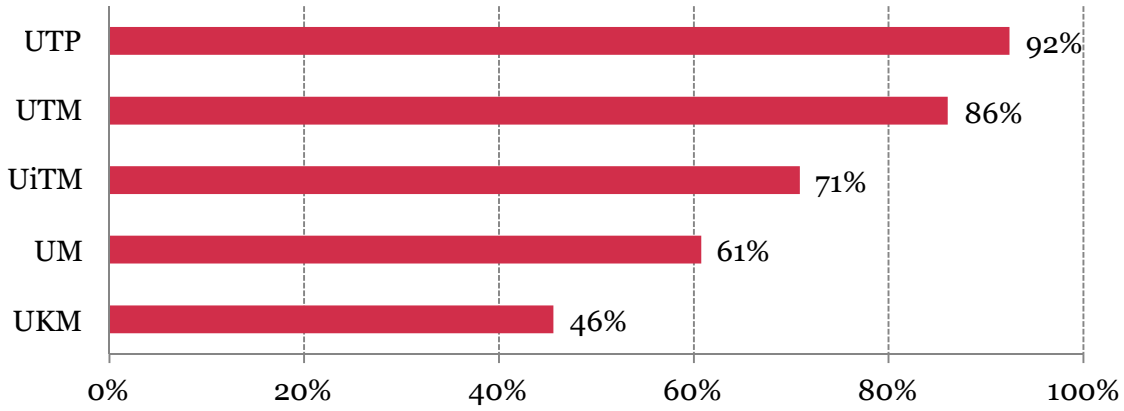
When asked about their preference when hiring fresh graduates, majority of respondents (71%) shared that they did not have any preference. A small number of companies (13%), however, expressed a preference for fresh graduates who graduated from universities outside of Malaysia.

During interviews, companies highlighted that graduates from foreign universities are able to work independently and demonstrate better leadership skills compared to their counterparts from local universities. This is perhaps the main reason why some O&G companies chose to consciously hire foreign graduates.

## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

### 2. Inexperienced/fresh talent (cont'd)

***Q. Please select the local academic institutions from which you typically source fresh graduates***




Locally, O&G companies prefer to hire graduates from UTP (92%) and UTM (86%). Graduates from these universities are said to better meet their expectations, though some companies did share during the interviews that UTM graduates often fall short in their communication skills. UTP graduates on the other hand are widely recognised within the O&G sector as being well rounded individuals with good technical and soft skills.

Companies also shared that the 7-month internship programme conducted by UTP provided graduates adequate exposure to the expectations and needs of O&G employers and therefore, helped them make a smooth transition into the workforce.

"We find that the 7-month internship programme offered by UTP allows students to gain adequate exposure to the O&G sector; we would like to see other local universities do the same."

*- MNC/Local player*

"We find that graduates from UTM have good analytical skills but the same can't be said for their communication skills"

*- MNC*

## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

### Good practices for developing employability skills of graduates

To produce well rounded graduates, it is important to establish an education system that places equal emphasis on both technical and soft skills development. We have outlined below some key success factors for developing graduates with good employability skills:

#### *A holistic academic philosophy*

- Adopt an **"outcome based education"** philosophy that is focused on producing **quality graduates** with **a balance of technical competency and soft skills**; 4 out of the 7 qualities in UTP's graduates model focus on soft skills

UTP's 7-attributes of well-rounded graduates model

#### *Periodic review of alignment of academic programmes to industry needs and expectations*

- Establish a clear process for seeking feedback from well recognised academicians and industry professionals on **strategic directions of academic programmes,** such as course content, campus planning initiatives, academic policies and research and development activities

#### *Well structured internship programme*

- **Offer a 7-months long internship programme** that provides undergraduates with **adequate exposure to the work environment of the O&G sector** as well as the **opportunity to improve their communication skills and teamwork capabilities**
- **Conduct formal evaluation of students' performance** at the end of their internship programme to ensure that students have met the programme objectives

#### *Student exchange programme*

- Provide students with the **opportunity to develop their knowledge and gain experience in a culturally diversified environment**

#### *Regular industry interactions*

- Organise **lectures/seminars/talks by industry professionals** to share their on-the-job experiences and knowledge with students

#### *Proactive career services centre*

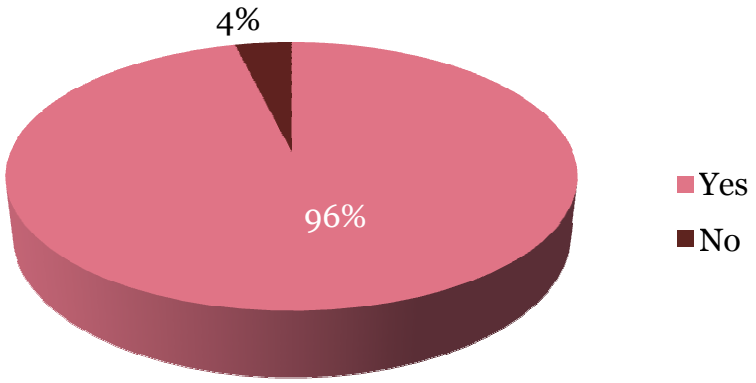
- Actively play a role in **creating career awareness among students** by conducting numerous activities such as career exhibitions, career talks, resume writing courses and mock interviews
- Develop and manage a **database of companies** to **facilitate student placement for internship programme and secure employment for students** upon graduation
- Set **clear targets on employment rate of graduates** and closely track performance against target

*Source: Focused interview with UTP representatives, March 2012*

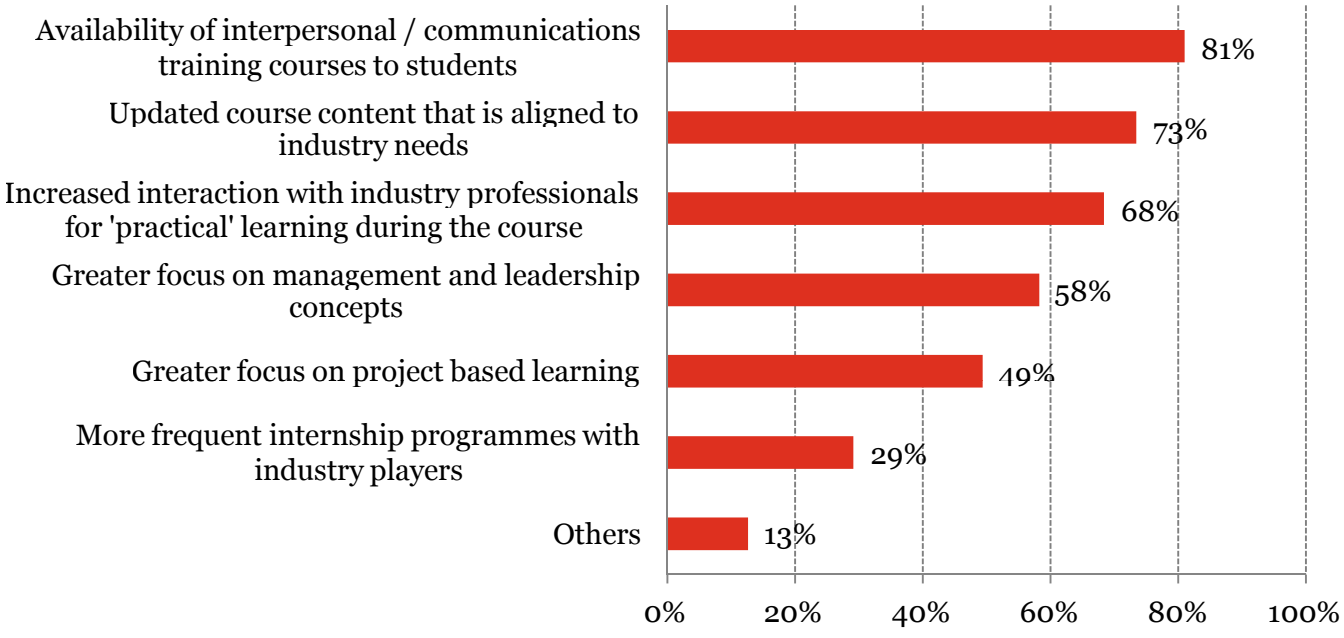
## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

### 2. Inexperienced/fresh talent (cont'd)

***In your opinion, have the courses / programmes offered by the above academic institutions met your expectations when hiring fresh graduates??***




***Q. What improvements would you like to see at the university / institution level to better meet your expectations for fresh graduates?***




Even though an overwhelming majority of respondents (96%) indicated that the courses/ programmes offered by local institution met their expectations, a significant proportion (81%) would to see local academic institutions offer interpersonal /communications training courses to their students. Many HR professionals shared that the English language proficiency among a larger proportion of undergraduates was relatively poor.

## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

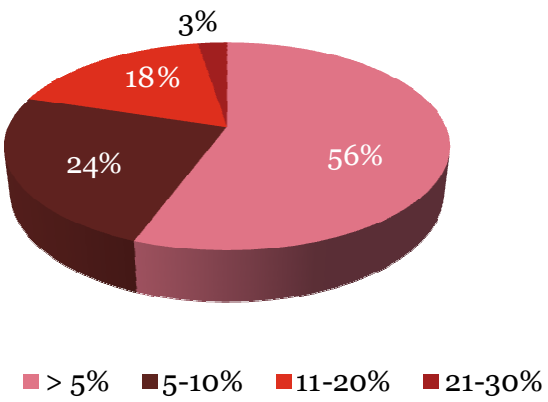
### 2. Inexperienced/fresh talent (cont'd)

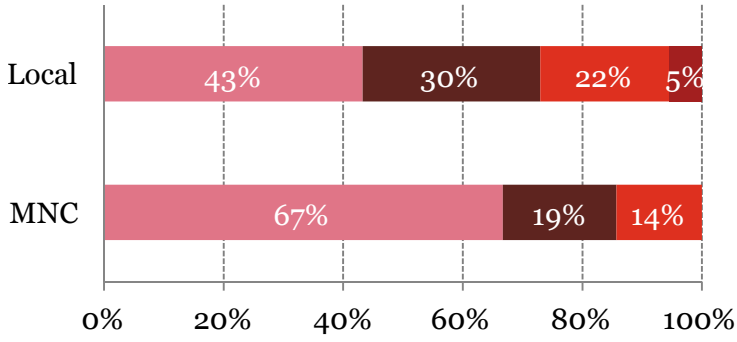
Ranked second (73%) by respondents was the better alignment of course content to industry needs. When explored further during interviews, companies indicated that they would like to see internship programmes extended to 6-9 months to give undergraduates adequate time to be exposed to the nature of work in the O&G sector.

Additionally, companies also feel that the 'practical' learning aspect can be enhanced in local institutions by increasing the interactions between students and industry professionals.

### 3. Attrition and challenges faced in attracting and retaining talent

***Q. What is the overall attrition rate in your organisation?***




Although majority of respondent (80%) report an overall attrition rate of 10% or less, a major concern among many O&G companies is the continued loss of skilled Malaysian professionals to other countries, particularly to the Middle East.

Further analysis by organisation type demonstrated that in general, more local companies have higher attrition rates than MNCs. This could be due to local companies not possessing the same level of workforce management capabilities and processes that MNCs have to attract, develop, engage and retain talent.

"Attrition rate is highest among employees with 3 -7 years experience category because that's when their market value starts growing."
*- MNC*

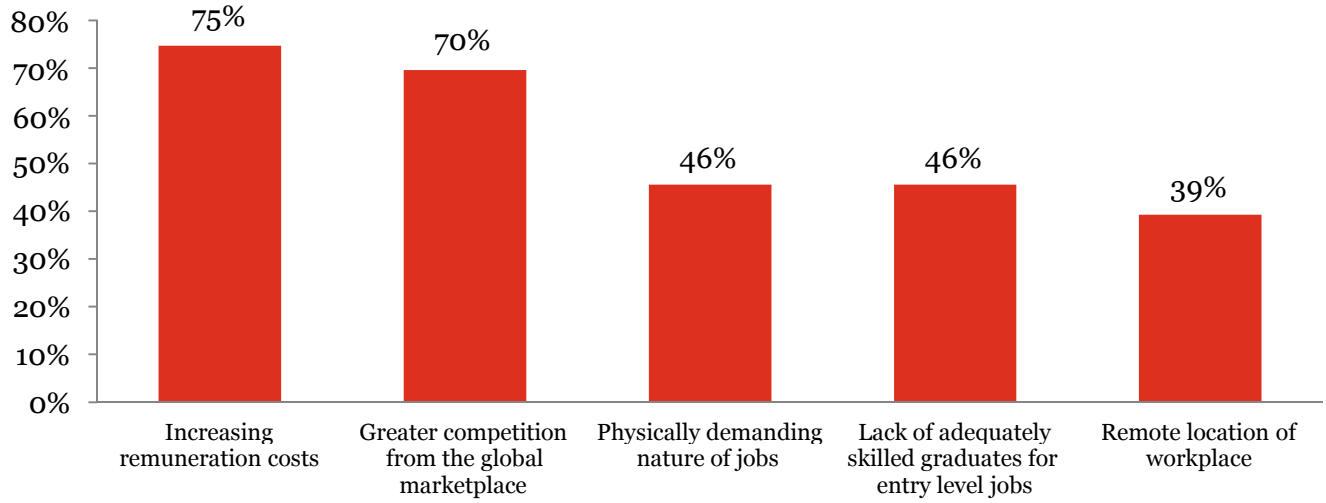
"Many of our technical staff leave us for better pay in the Middle East."
*- Local player*

"If we could get all Malaysians abroad to return, there would be no shortage"
*- MNC*

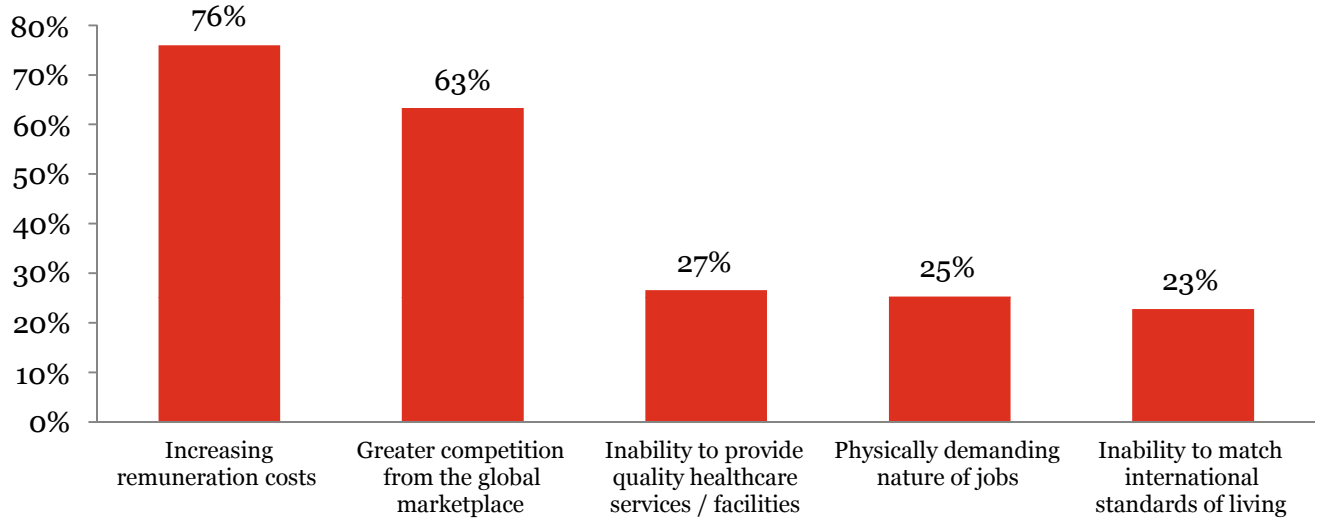
## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

### 3. Attrition and challenges faced in attracting and retaining talent (cont'd)

***Q. Which of the following challenges does your organisation face in recruiting local talent?***




***Q. Which of the following challenges does your organisation face in recruiting foreign talent?***




According to survey respondents, the top two (2) challenges faced in recruiting local and foreign talent are the same: **increasing remuneration costs** and **competition from the global marketplace**. Many companies highlighted that the increase in remuneration costs was a result of intense inter-company competition for skilled, experienced professionals, not just at a national level but also at a global level.

## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

### 3. Attrition and challenges faced in attracting and retaining talent (cont'd)

Some companies shared that a significant proportion of O&G companies in Malaysia preferred to poach talent from established industry players rather than invest in learning and development capabilities. They fear that if this trend continues, it could impede the growth of the sector in the longer term.

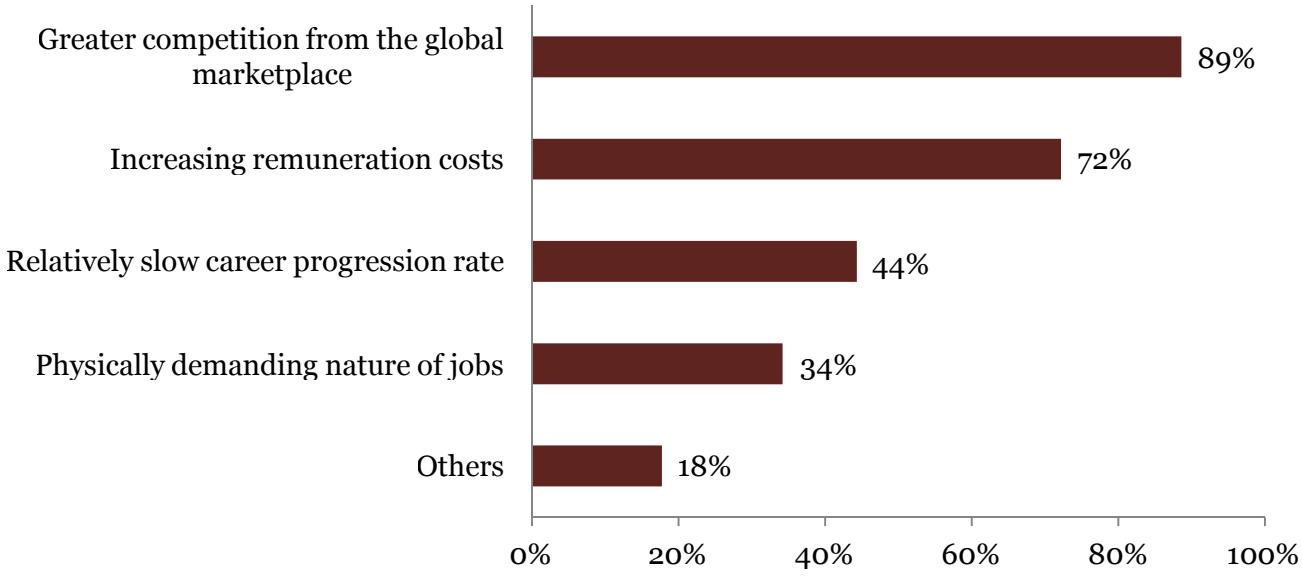
Since no differentiation was made for recruiting experienced local talent versus fresh talent in the survey, lack of adequately skilled graduates for entry level jobs was ranked third along with the physically demanding nature of O&G jobs. However, many companies highlighted during the interviews that the employability skills of most local graduates are below industry expectations and that they would like to see more being done to address this issue.

Other key challenges cited by respondents in recruiting foreign talent were the inability to provide quality healthcare services, physically demanding nature of jobs as well as the inability to match international standards of living. Whilst none of the surveyed companies highlighted any challenges in getting work permits for foreign talent approved, many of the companies interviewed cited issues with the documentation process and turnaround times in completing the necessary procedures.

"Instead of investing in L&D capabilities, most companies prefer to poach from established industry players - this will harm us in the long run"
*- Local player*

"Documentation required for the approval of work permits for expats is not standardised and the preparation time is very long; In Singapore, it takes less than half the time"
*-Regional player*

***Q. Which of the following challenges does your organisation typically face in retaining talent?***



## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

### 3. Attrition and challenges faced in attracting and retaining talent (cont'd)

When it comes to retaining talent, the global demand for talent was highlighted as the top challenge followed by rising remuneration costs. These issues are likely to persist with crude oil prices currently at one of its highest level in many years and more O&G activities anticipated to come online globally over the near to medium term. Under others, respondents commonly cited the widespread employee poaching within the industry as a key challenge.

> "Companies from Qatar set up a hiring office in a hotel outside our company HQ to poach talent"
> *- Local player*

> "We are aware that globally about 90 plants are scheduled to come online by 2015. So, recruiting and retaining experienced talent is going to be a serious challenge for us"
> *- MNC*

We have listed below common challenges highlighted by O&G companies in attracting and retaining talent during the focused interviews:

| Challenges faced | Potential root causes identified during focused interviews |
|---|---|
| Increasing remuneration costs | • Widespread employee poaching within the industry<br>• Greater competition from global marketplace |
| Insufficient suitably qualified labour pool | • Enforcement of certain conditions for the hiring of foreign talent<br>• Difficulty in attracting Malaysians working abroad to return home<br>• Lack of information on location and number of Malaysian O&G professionals working abroad<br>• Financial constraints faced by local companies to invest in employee training and development<br>• Lack of capability among local companies to develop in-house training programmes |
| Limited pool of good quality fresh graduates | • Limited number of local universities offering undergraduate courses that are closely aligned to the needs of the O&G sector<br>• Lack of leadership skills and ability to work independently among local graduates |

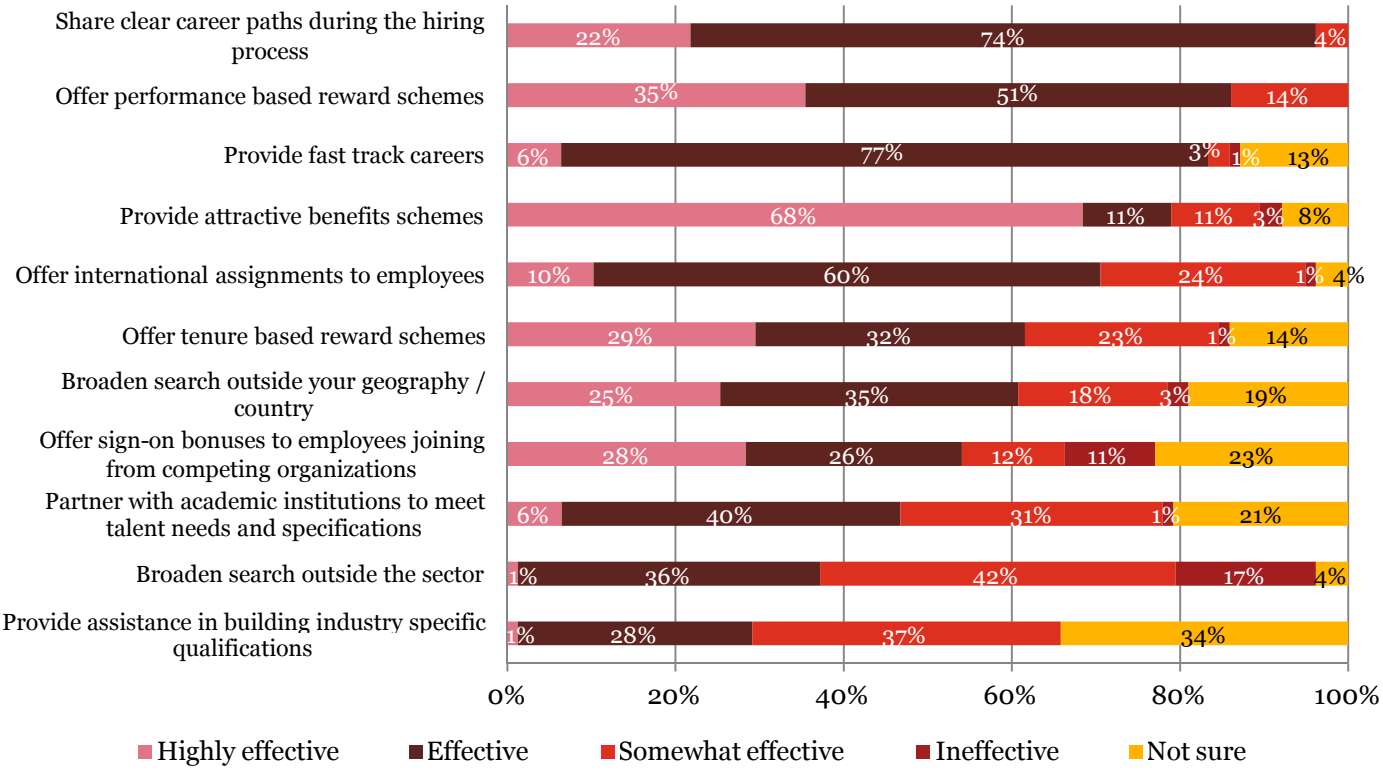
## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

### 3. Attrition and challenges faced in attracting and retaining talent (cont'd)

| Challenges faced | Potential root causes identified during focused interviews |
|---|---|
| Difficult to attract/recruit foreign talent | • Documentations required by the Immigration Department for granting work permits to foreign talent are not standardised<br>• Time taken to gather documentations required by Immigration Department to process work permit application of foreign talent is long (approx. 1- 2 months) though processing time typically takes about 2 weeks<br>• Difficult for skilled spouses to secure work in the country |

### 4. Talent management practices

***Q. Please indicate the effectiveness of the following strategies for your organisation in attracting and retaining talent***




Respondents believe that sharing clear career paths and offering performance based rewards and fast track careers to be highly effective or effective in managing talent. Many companies shared that these strategies were particularly important when hiring Gen Ys into the workforce.

## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

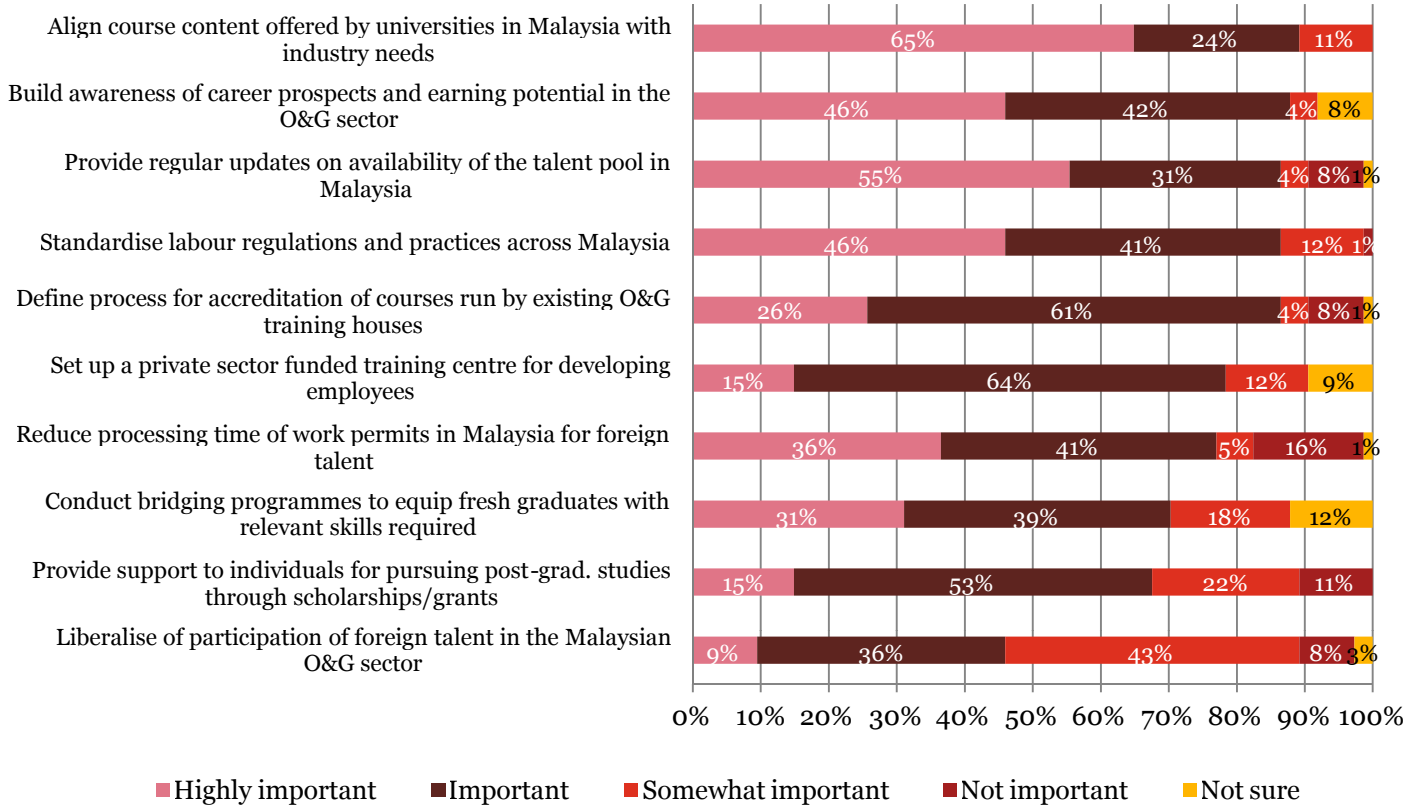
### 4. Talent management practices (cont'd)

O&G companies also shared that broadening the talent search outside of the country was more effective than searching outside the sector as personnel with the requisite skills and knowledge sought by O&G employers cannot be easily found in other sectors.

Building partnerships with academic institutions and providing assistance to employees to gain industry specific qualifications were regarded as the least effective strategies for attracting and retaining talent.

### 5. Desired support requirements

***Q. Please state the level of importance you attach to each option for addressing your talent needs***




The top three (3) areas of support sought by respondents are:

1) alignment of course content in local universities with industry needs

2) building public awareness around the career prospects and earning potential of the O&G sector

3) Providing regular updates on talent availability in Malaysia

Although reducing the processing time of work permits for foreign talent emerged as a middle ranking option, companies interviewed cited that the documentation processes and turnaround times are areas which could definitely be improved in Malaysia.

## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

### 5. Desired support requirements (cont'd)

In comparison, respondents placed low importance on conducting bridging programmes, offering scholarships/grants to individuals to pursue post graduate studies and liberalising the participation of foreign talent within the O&G sector.

Some common areas of support cited by O&G companies during focused interviews are as follows:

1. **Setting up an industry body** to facilitate O&G companies to share their knowledge around talent development
2. **Assistance to reach out to Malaysians working abroad**, e.g. organise career expos abroad with the participation of Malaysian O&G companies
3. **Facilitate easy entry of foreign talent** into Malaysia, particularly in areas where **high experience** and **specialised knowledge** is required immediately
4. **Incentives** for Malaysians **to pursue post-graduate courses or participate in R&D programmes** to foster greater innovation within the Malaysian O&G sector
5. **Streamline the documentation requirements** for granting work permits to foreign talent
6. **Better tax incentives for returning Malaysians**, e.g. tax rebate for their children's international schooling and purchase of continental cars
7. **More financial incentives for upskilling** employees
8. **Local universities** to:
   - **offer O&G related modules** in their undergraduate courses
   - **implement a performance evaluation process** for undergraduates participating in internship programmes
   - **standardise the duration of internships** (6 months is thought to be a min. duration)
9. **Regular updates** on location and number of **Malaysians working/studying abroad**
10. **Increase public awareness on professions and career opportunities** in O&G sectors

## 4.2 Labour database, forecasting model and key findings from the industry engagement (cont'd)

**Key takeaways from industry engagement**

Below is the list of key takeaways from our engagement with Malaysian O&G companies and other key industry stakeholders:

1. **Pool of experienced O&G professionals in the country** needs to be increased to mitigate the widespread employee poaching that is currently affecting the sector
2. **Employability of local graduates** needs to be improved if the present and future talent needs of the O&G sector are to be met
3. **Information on talent availability and good talent management practices** needs to be made available to O&G companies and other key stakeholders to support the attraction and retention of talent
4. **Contribution of local companies around employee training and development** needs to be enhanced to help maintain a strong pipeline of experienced talent in the sector
5. **Public awareness around professions and career opportunities** in the O&G sector needs to be enhanced to ensure the continued supply of fresh talent for the sector

To ensure the smooth and successful implementation of initiatives in these five (5) key areas, it is important that an industry-led body is given the appropriate mandate to manage the diverse interest of various stakeholders and also coordinate their efforts.

# 4.3 Benchmarking Analysis of Talent Management in O&G Developed Economies

The benchmarking track of this engagement was aimed at identifying leading practices in managing sectoral talent requirements in developed / high income countries. In doing so, the practices and/or initiatives implemented by sectoral bodies at the national/sectoral level were identified.

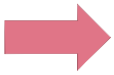
Our findings are based on secondary research, feedback from PwC industry specialists and insights generated from our knowledgebases. We have relied on the information available on the websites of industry leading bodies in the selected countries for developing insights and our points of view.

For selecting the countries for benchmarking, we have used the following criteria:

**Criteria for selection**

1. Is considered as a 'developed' country and economy
2. Is classified as an economy with a very high Human Development Index (HDI)
3. Is among the top 25 oil producing countries worldwide
4. Has clearly documented and published practices for talent management at the sectoral level

Source: CIA Factbook, IMF, HRDR



**Selected Countries**

- United States
- Canada
- United Kingdom

In addition to the United States, Canada and United Kingdom, we also examined the practices in the following countries to develop our points of view:

- Australia
- Netherlands

Our findings for the selected three countries are grouped under the following three categories:

1. Context: Key talent issues and shortages
2. Key entities driving the sectoral talent agenda
3. Key talent interventions

Our findings and analysis are subject to availability of data and information and have been developed on a best effort basis under each of the above mentioned categories for the three countries selected for benchmarking.

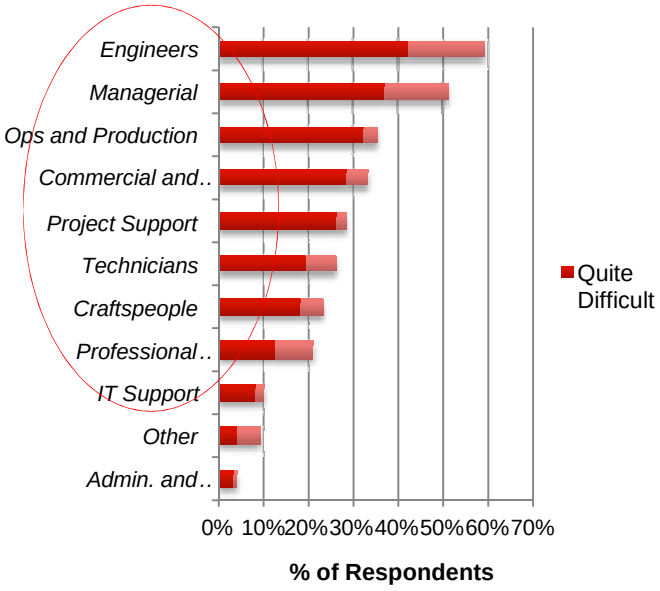
# 4.3 Benchmarking Analysis of Talent Management in O&G Developed Economies

## 1. Key talent issues and shortages

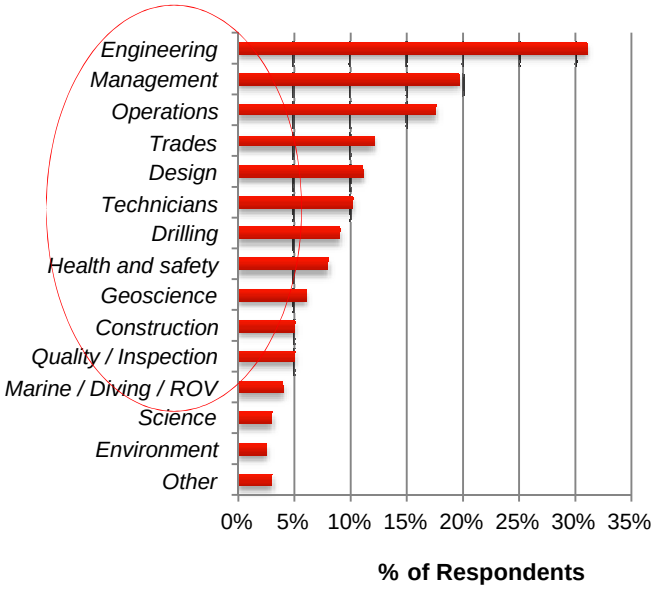
This section involved us analysing the current talent issues and shortages in the selected countries to better understand the current talent situation in the global economy.

**Selected Country:** United Kingdom

**Most difficult-to-fill vacancies**




**Skills/experience lost due to retirement**



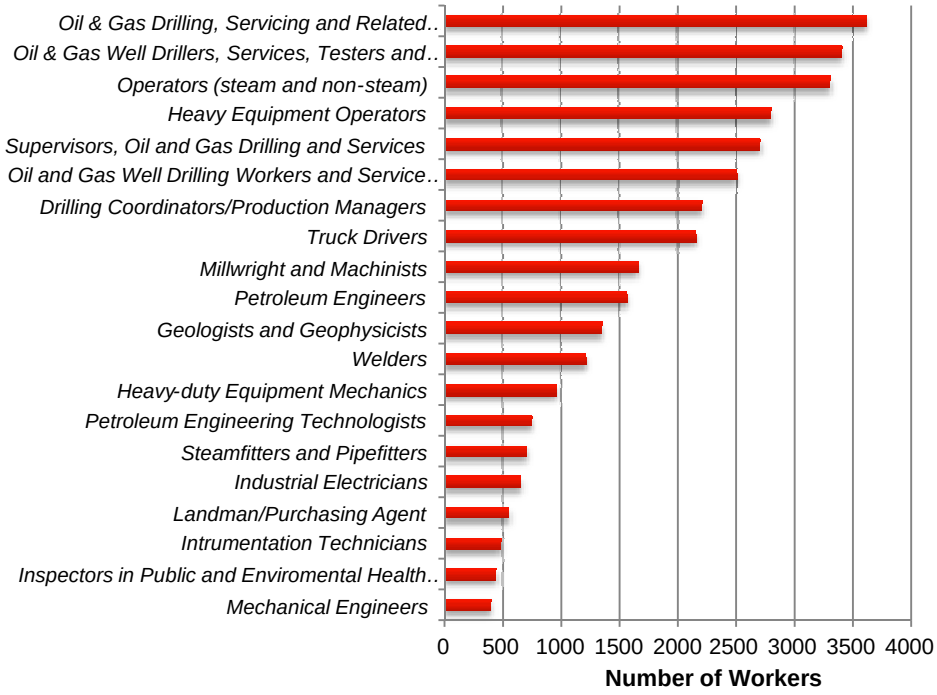

- The shortage for oil and gas talent in the UK is made acute by the large scale retirement of the workforce, expected in the next 5-10 years.
- Companies are expecting significant growth in the demand for talent over the next few years due to the expectation of further growth in the industry in the short-medium term.
- Positions that are facing shortages include talent from the engineers, managerial, operations and geosciences categories.

*Source: OPITO, "Labor Market Information Survey" 2011*

## 1. Key talent issues and shortages (cont'd)

**Selected Country:** Canada

**Occupations with Greatest Requirement for Additional Workers from 2010 -2020**




- Talent trends in the Canada oil and gas industry also point towards shortages to meet the talent demands of the industry between 2011 – 2020

- The **'high demand'** positions in Canada require high levels of experience and are similar to the shortages in Malaysia, such as the following:
  - Geoscience professionals
  - Experienced engineers: Reservoir/development, production/operations, drilling, completions, pipeline integrity, process and field engineers
  - Completions specialists
  - Business & operations support roles

**Selected Country:** United States of America

Published reports on specific shortages in the United States of America were not available. However, limited statistics are available on the websites and publications of American Petroleum Institute (API) and Independent Petroleum Association of America (IPAA). We have provided the key highlights in the summary of talent issues and shortages in the next section.

*Source: www.petrohrsc.ca*

## 1. Key talent issues and shortages (cont'd)

The talent issues and related trends in developed economies are similar in nature and suggest that talent shortages for certain job areas may be global in nature.

| Category of Issues | Description of Issues | | |
|---|---|---|---|
| | United Kingdom | Canada | USA |
| **Ageing workforce** | •The peak age of technical personnel in the industry increased from 43 yrs in 2000 to 60 yrs in 2012 | •30% of the industry's core workforce is expected to retire within the next decade | •Industry statistics show that more than 50% of the oil and gas industry's engineers will reach retirement age by 2015 |
| **Lack of suitably qualified labor** | •By 2014, there will be a net shortfall of 5000 professional – technically skilled personnel | •There is insufficient labor entering the industry to accommodate the age related attrition of skilled labor | •Bachelor of Science degrees granted in petroleum engineering has declined by 74% between 1983 and 2006 |
| **Growing competition & poaching** | •NOCs are venturing abroad with local talent while MNCs are coming in trying to localise their operations abroad | •Unemployment rates are low, as competition exists within and among other sectors for technical talent | •50,000 job additions this year are expected for the Barnett shale of Texas, and 48,000 in the Marcellus shale of Pennsylvania, West Virginia |
| **Increasing cost of labor** | •Global phenomenon for highly skilled / highly experienced professionals | •Global phenomenon for highly skilled / highly experienced professionals | •Global phenomenon for highly skilled / highly experienced professionals |
| **Changing energy perspectives** | •Younger generation are aware of environment hazards and are looking for environmental friendly industries. | •NA | •In the 1970's, 40 US colleges offered degrees in petroleum engineering. Today, there are less than 20 in the US |

*Source: www.petrohrsc.ca, www.opito.com/uk & www.api.org*

## 1. Key talent issues and shortages (cont'd)

**Key takeaways**: Through our benchmarking of the three countries oil and gas industries, we have derived the following key points which may govern the success of sectoral talent management initiatives:

i) There is a global shortage for technical experienced talent. Specifically, there is a shortage for experienced engineers, geosciences professionals and specialized supervisory and trades categories

ii) Professionals in the identified job areas are globally mobile and command high salaries. Competition for such talent occurs on a global scale and across industries.

iii) Poaching is not a sustainable solution for managing talent requirements and is significantly driving labor costs up

iv) Most of the key positions in which shortages are anticipated, require significant 'on-the-job' experience and training both of which require a significant amount of time.

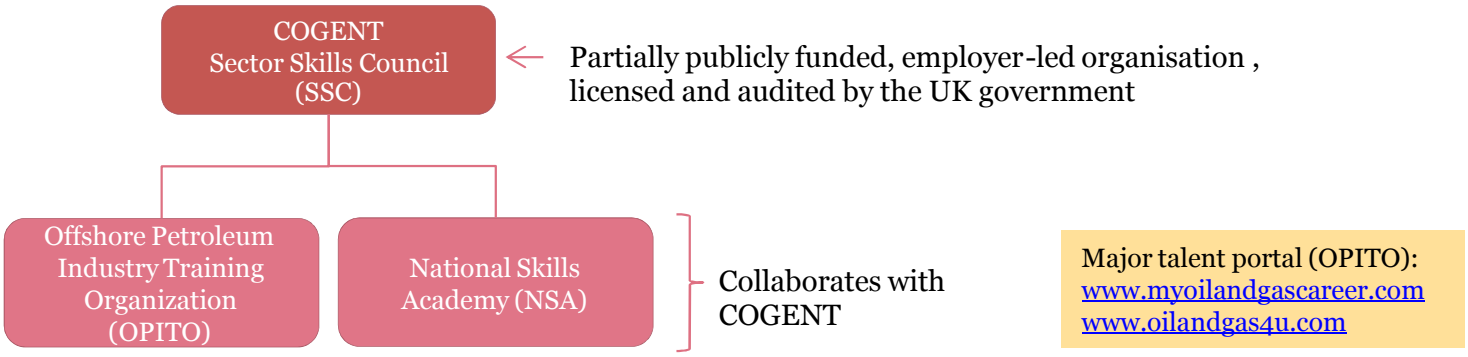
v) The average age of oil and gas professionals is increasing globally. The sector needs appropriate mechanisms for transfer of knowledge and skills from highly experienced professionals to talent entering the industry

vi) To ensure talent availability over the long term, the most effective option for oil and gas players to bridge the talent gap is to expedite individual capability development through various modes of training

## 2. Key entities driving the sectoral agenda

This section involved us analysing the key entities in the selected countries that are appointed the responsibility of driving the sectoral agenda of the industry from a talent perspective.

**Country:** United Kingdom



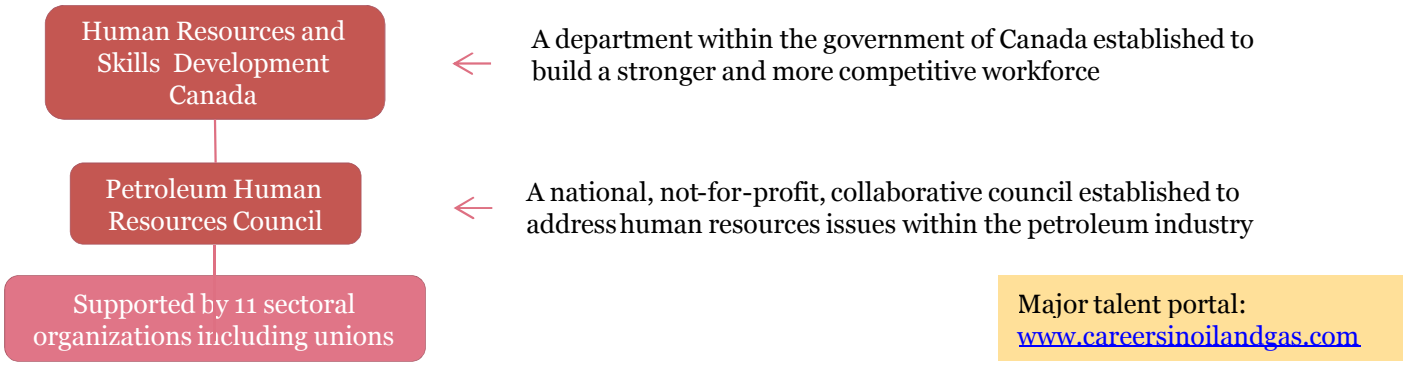

| Entities | Description |
|---|---|
| COGENT | One of the **25** Sectoral skills councils, licensed by the government , covering the following industries:<br>• Chemicals<br>• Nuclear<br>• Pharmaceuticals<br>• Petroleum (Downstream)<br>• Oil and Gas (Upstream)<br>• Polymers<br>Cogent seeks to identify skills needs and help develop suitable training courses to boost skills, productivity and business performance. |
| Offshore Petroleum Industry Training Organisation (OPITO) | OPITO is a globally industry owned organization built on a self sustaining business plan. In the UK, it serves as a sector's skills, learning and workforce development body that collaborates closely with COGENT. A not for profit body, it reinvests any additional funds to further meet skills shortages and potential further demands of the O&G sector. |
| National Skills Academy | The National Skills Academy for Process Industries is a government licensed and employer led organization that exists to increase skills and competence across the UK Process Industry Sector. Working closely with COGENT, it helps employers drive organizational performance and deliver a return on investment . |

We have identified 3 main entities in the United Kingdom that oversee the oil and gas industry from a talent perspective. COGENT, a Sectoral Skill Council (SSC) is the industry skills body setup to oversee and work together with the industry to address talent requirements of the oil and gas industry in the UK. OPITO and the National Skills Academies are the two main entities that work in collaboration with COGENT to address talent needs in the industry. This showcases a government – industry partnership that is driven by industry players and thriving on the support of one another.

*Source: http://www.cogent-ssc.com/*

## 2. Key entities driving the sectoral agenda (cont'd)

**Country:** Canada



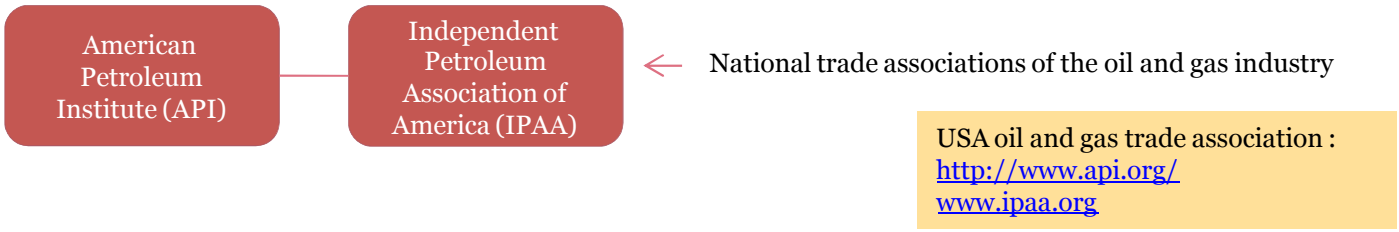

| Entities | Description |
|---|---|
| Human Resources and Skills Development Canada | Human Resources and Skills Development Canada (HRSDC) is a department of the Government of Canada. HRSDC's mission is to build a stronger and more competitive Canada, through policies and programs that assist in the human capital development across all industries |
| Petroleum HR council | A national, not-for-profit, collaborative forum that addresses human resources issues within the petroleum industry. The council is supported by 11 oil and gas national and regional industry organizations, including one union, and represents the key sectors of the petroleum industry in Canada. It is funded by the Government of Canada's Council Programme. |

We have identified 2 main entities in Canada that oversee the oil and gas industry from a talent perspective. The Petroleum HR council, was formed as a result of a sectoral partnership initiative by the Human Resources and Skills Development Canada (HRSDC) serve as a collaborative forum that addresses talent related issues in the industry. Many of the stakeholders in Petroleum HR council consist of industry players to ensure there is collaboration between government and industry. This is a showcase of a government – industry partnership drive by the government.

*Source: www.petrohrsc.ca, www.hrsdc.gc.ca/eng/home.shtml*

## 2. Key entities driving the sectoral agenda (cont'd)

**Country:** United States




| Entities | Description |
|---|---|
| American Petroleum Institute (API) | A national trade association for the American oil and gas industry with over 490 corporate members . They are producers, refiners, suppliers, pipeline operators and marine transporters, as well as service and supply companies that support all segments of the industry. API's core activities include advocacy, labour market information, research and statistics, standards, certification and education. The membership company dues are volumetrically based, so it depends on the size of the company and its involvement in the API segments. |
| Independent Petroleum Association of America (IPAA) | Represented independent oil and natural gas producers for three-quarters of a century. IPAA's core activities include advocacy, economic and statistical information, and developing investment opportunities for its members. |

We have identified 2 main entities in the United States that oversee the oil and gas industry from a talent perspective. The API and IPAA are two national trade associations that represent the industry and independent oil producers respectively. The US system differs slightly from the UK and Canada in a sense that there are no entities that are specifically allocated the task of addressing talent issues in the industry. Both entities are structured according to the business needs of the industry and are tasked with resolving issues in accordance with the requirements of the industry. This is also a showcase of a government-industry partnership driven by the industry.

*Source: http://www.api.org & http://www.ipaa.org*

## 2. Key entities driving the sectoral agenda (cont'd)

**Key takeaways**: Through our benchmarking of the three countries oil and gas industries, we have derived the following key points which may govern the success of sectoral talent management initiatives:

i) Sectoral agencies are successful because they have the requisite support and adequate membership from industry players.

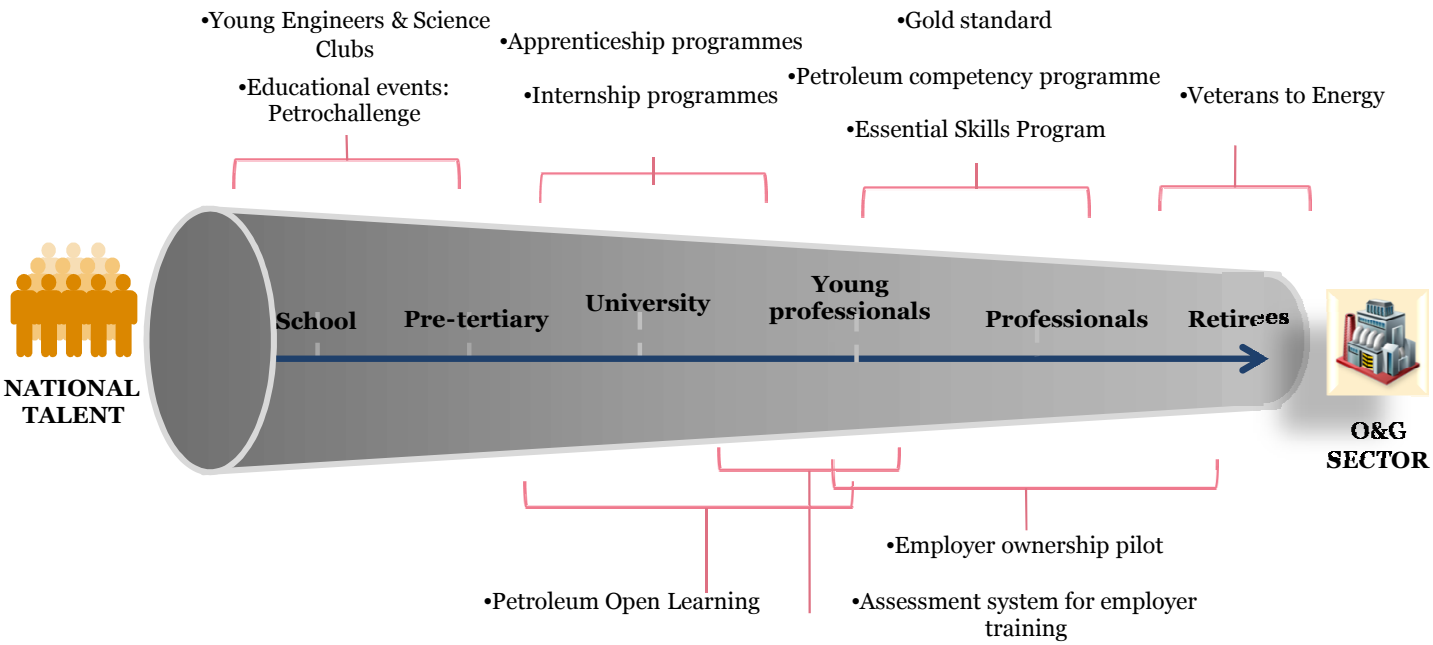
ii) Sectoral agencies, whether driven by the industry or by the government, are heavily dependent on industry inputs and opinions to succeed

iii) Initiatives are more successful when industry players invest in them and play a major role in ensuring implementation

iv) Sectoral agencies are the owners for defining, reviewing, maintaining and enforcing industry standards (certifications, skills standards, competency frameworks) to address industry issues.

## 3. Key Interventions

The following diagram provides a snapshot of the various interventions collectively available in the 3 countries considered for benchmarking. The interventions / practices thus identified have been plotted on a pipeline representing the various life and career stages of individuals.




In the USA,UK and Canada, interventions have been developed to:

1. Generate interest and awareness of the oil and gas industry among potential and aspiring members of the national workforce,
2. Provide development opportunities and create infrastructure for learning
3. Maximise the utilisation of skills of professionals
4. Engage national citizens at early age

The benchmarking exercise reveals a multipronged strategy to address the talent agenda by addressing all life and career stages of an individual. The strategy is based on the principle that 'talent' at each stage must be nurtured to ensure the availability of a robust and continuous talent pipeline for the industry. We have examined the concepts behind the above mentioned interventions and applied our learnings for developing the recommendations in this engagement.

In the following section we have chosen 3 key interventions identified through the benchmarking exercise, which can significantly impact the availability and quality of talent in Malaysia. The full list of interventions and their brief descriptions gathered during the benchmarking exercise can be referred to in the subsequent section titled '**Full list of interventions identified in the benchmarking track**'.

### 3. Key Interventions (cont'd)

Through our analysis, we have identified 3 key talent interventions to elaborate on:

## 1 PETROCHALLENGE

**What is it about?**

The 'Petrochallenge' is a dynamic online education event organised to encourage seconday schoolstudents interest in the oil and gas industry. Participants act as energy companies looking for oil and gas in a fictitious province, opened up for exploration. Participants are grouped into teams of 4 with each team representing a virtual oil and gas exploration company. They are then 'sent' out to a 'virtual' remote province with a budget of funds to find commercially viable volumes of oil and gas

**How does it contribute ?**

PetroChallenge encourages students to take an interest in the industry and possibly a career in the future. It provides all the challenges, opportunities and dilemmas that a real exploration team would face. It is during this process that students gain an effective insight into the risks and challenges of oil and gas exploration. It also serves as exposure to real oil and gas technical processes and terminology such as magnetic, gravimetric, seismic surveys, and net present value calculations

**Who is involved**

Simpretis, a learning provider to the global oil and gas industry organises this established event on a yearly basis. Among countries that have collaborated with Simpretis to organise the PetroChallenge include, Denmark, United States, United Kingdom and Norway. To date, Simpretis has had over 13,000 students participate in the competition

*Source: http:// www.simprentis.com/education/petrochallenges*

**3. Key Interventions (cont'd)**

## 2 UK Commission for Employment & Skills (UKCES) Employer Ownership Program

### What is it about?

The Employer Ownership pilot offers all employers in England direct access to up to £250 million of public investment over the next two years to design and deliver their own training solutions. Minimum investment from Government will be £250,000 for collaborative proposals involving SMEs, and £1 million for individual or consortia bids involving large employers (defined as employing 250 employees or above). All interested industry parties, need to submit a proposal bid meeting criteria's set forth by UKCES to ensure alignment to the overall objectives of the program

### How does it contribute ?

The program increases the impact of work readiness, workforce development and apprenticeships activity among industry players. Industry players are better able to secure the training they need by having the influence they require over quality and content of required training. Due to the nature of the scheme wanting to address industry needs of skills, it encourages industry players to come together and identify skills that the industry require in a certain point in time.

### Who is involved

The program is in its pilot stage as is anchored by UKCES, the Department for Business, Innovation and Skills and the Department for Education. To ensure industry is aware of this programme, seminars are being organised nationwide to brief interested industry players about the objectives, criteria of proposals to be submitted and to address additional questions from industry.

*Source: http:// www.ukces.org.uk*

**3. Key Interventions (cont'd)**

## 3 Petroleum Competency Program (PCP)

### What is it about?

The PCP standards of competence are intended to set a base for professionalism and performance within the industry, while respecting specific performance criteria of individual companies. These competencies will identify a standard list of competencies, tasks and skills involved in doing a particular job, describe their safe and effective application in typical working conditions, and specifies the criteria that should be used to judge a worker's performance on that job.

### How does it contribute ?

It creates a national skilled workforce with industry standardised and identifiable skills. This leads to efficiency of staff recruitment, hiring, deployment, promotion and training. The program consists of 3 parts, which follow in the sequence of industry training, PCP application & assessment and PCP certification.

### Who is involved

This program is managed by the Petroleum HR Council of Canada but works in collaboration with Enform, Canada's upstream safety association who trains the PCP assessors and oversees candidate assessment and certification. Industry players have to contribute in the process of developing the standard set of competencies by providing required feedback.

## 4. Full list of interventions identified in the benchmarking track

(UK, Canada, USA, Australia, Netherlands)

### Key Interventions

Summary of key interventions identified through our benchmarking analysis.

| Life Stage | Intervention |
|---|---|
| School & Pre-tertiary | **Petro challenge**<br>• Organising a 'Petrochallenge' nationwide competition to encourage students interest in the industry where using a web-based learning tool participants act as energy companies looking for oil and gas in a fictitious provinces<br>**Young Engineers and Science Clubs**<br>• Setup a national Young Engineers and Science clubs that engage young people through practical, hands-on science and engineering activities to enthuse them to pursue a career in the field<br>**Classroom - Energy**<br>• Providing an interactive online classroom tool that enables students to learn about the cutting-edge technologies practices, processes in the industry through http://www.classroom-energy.org |
| University | **Education Alignment Strategy**<br>• Through a education alignment strategy, align oil and gas related education institution programmes with industry needs resulting in better prepared talent entering the industry<br>**Internship Programs**<br>• Structured internship programs are incorporated as a undergraduate degree requirements to increase students knowledge of the industry and better prepare them for the working world.<br>'**Making It Count'**<br>• Through the 'Making it Count' programme reach out to 1.5 million 11th and 12th graders and an additional 35,000 college freshman with information about careers in the industry. |
| Young Professionals & Professionals | **UKCES Employer Ownership Scheme**<br>• Providing businesses with direct access to over £250 million of public investment to boost apprenticeships and other vocational training through the UKCES Employer Ownership Scheme<br>**Petroleum Competency Program (PCP)**<br>• Through a Petroleum Competency Program (PCP), provide certification based on industry standard competencies involved in doing a job, allowing the industry to gauge performances based on industry wide standardised competencies |

## 4. Full list of interventions identified in the benchmarking track

(UK, Canada, USA, Australia, Netherlands)

**Key Interventions (cont'd)**

| Life Stage | Intervention |
|---|---|
| Young Professionals & Professionals (cont'd) | **Assessment System for Employee Training (ASET)**<br>• Provide industry recognised accreditation training centers through an Assessment System for Employer Training (ASET): for reviewing training capabilities of industry players<br>**Petroleum Open Learning**<br>• Providing a flexible self-learning qualification through a Petroleum Open Learning (POL)course for the upstream oil & gas industry which enhances technical knowledge and skills<br>**Essential Skills Program**<br>• To identify essential skill gaps in the upstream petroleum industry through an Essential Skills Program and discover interventions required. Through this awareness of these skills will increase and an Employer Toolkit will be developed to address the needs of the industry<br>**Transformation Program**<br>• Through a 12-week transformation program, provide a fast-track avenue for skilled workers with established knowledge base/experience of other industries to switch to oil and gas (e.g. accelerated courses)<br>**Immigration Facilitation**<br>• Facilitating permanent residency passes for individuals with a selected list of occupations. This is a scheme based on job offers. |
| Retirees | **Veterans to Energy**<br>• Targeting United States military veterans, a job search portal site was developed dedicated to helping these veterans find careers in the oil and gas industry. |
| Across all life stages | **Online Portals**<br>• Providing an online portal that contains integrated and structured information on careers, key skill requirements , training resources and job opportunities in the industry through www.mycareerinoilandgas.com,<br>• Providing up-to-date and accurate Labour Market Information (LMI)through www.careersinoilandgas.com, the Petroleum HR Council helps stakeholders plan their attraction, retention and workforce development strategies<br>• Encouraging industry collaboration by providing an online platform that brings industry workers together to voice their opinions and share their knowledge on the industry through http://energytomorrow.org |

**Key takeaways**: Through our benchmarking of the three countries oil and gas industries, we have derived the following key points which may govern the success of sectoral talent management initiatives:

i) Initiatives are more successful when industry players invest in them and play a major role in ensuring implementation

ii) Sectoral agencies are the owners for defining, reviewing, maintaining and enforcing industry standards (certifications, skills standards, competency frameworks) to address industry issues.

iii) Interventions need to be developed with clear vision and ultimate goals to ensure the industry will benefit from it .

iv) Labor market information plays a key part in driving a significant amount of interventions as industry and key entities are dependant on the information to develop suitable talent interventions according to the industry;s needs.

Additional sources used for this section:

http://www.ukpia.com/, http://www.cogent-ssc.com/, http://www.sscalliance.org/, http://www.bis.gov.uk/, http://www.ukces.org.uk/, http://www.opito.com/uk/, http://www.yecscotland.co.uk/, http://www.stemdirectories.org.uk/, http://www.petrolearn.com/mist/, http://www.myoilandgascareer.com, http://www.petroleumopenlearning.com/, http://www.api.org, http://www.ipaa.org, http://www.classroom-energy.org/, http://energynation.org/, http://www.petrohrsc.ca/, http://www.hrsdc.gc.ca, http://www.mycareerinoilandgas.com, http://www.careersinoilandgas.com, http://energytomorrow.org, http://www.ogfj.com, http://www.simprentis.com/education/petrochallenges, http://ww2.enform.ca, http://energycitizens.org, 'Tracing the Brain Drain Trend, 'Skills Shortage in the Global Oil and Gas Industry, How to close the gap' accessed on February and March 2012

# *Phase 3: Developing recommendations*

# 5

# 5. Phase 3: Developing recommendations

## 5.1 Overview

In phase 3, our aim was to develop and prioritise key interventions to support the Malaysian O&G sector meet its talent needs over the near to medium term (2012 -2014).

In achieving this, we first identified key talent issues currently faced by Malaysian O&G companies based on input gathered during the industry engagement. These issues were subsequently categorised into logical groupings called "improvement areas".

For each improvement area, we identified a preliminary set of interventions with the potential to enhance talent availability in the O&G sector. Additional input was also obtained during the Oversight Committee Meeting no. 3, which was attended by EPU, ILMIA, PEMANDU, MPRC and selected O&G players.

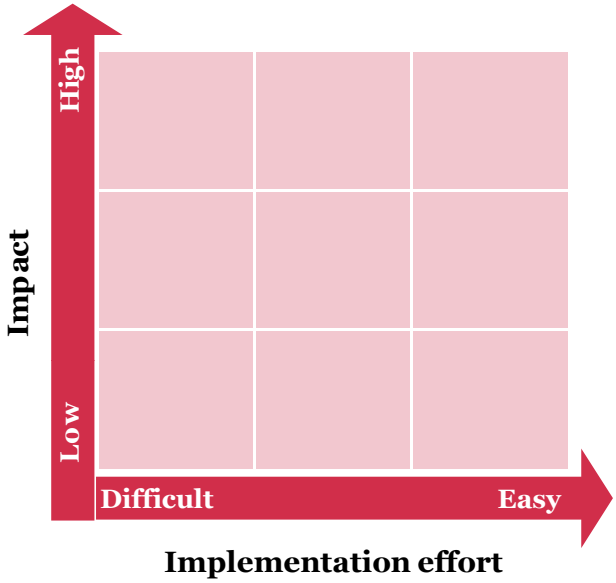
These interventions were then reviewed, refined and prioritised in discussion with TalentCorp.

A summary of the approach taken is provided below:

1. Identified key talent issues currently faced by the O&G sector and developed a set of preliminary interventions

2. Reviewed and refined the preliminary interventions

3. Prioritised each intervention based on its impact on talent availability over the next 3 years and implementation effort




**Assessment criteria**

| Axis | Criteria |
|---|---|
| Impact | • Talent availability over the next 3 years |
| Implementa -tion effort | • Number of stakeholders involved<br>• Complexity, i.e. time required<br>• Organisation's capacity and capabilities |

## 5.2 Summary of talent issues and improvement areas

The key talent issues affecting the talent availability in the Malaysian O&G sector are summarised below:

| # | Issue description | Improvement areas |
|---|---|---|
| 1. | Absence of a single coordinating body which tracks, collates and disseminates talent related information at the sectoral level and initiates and drives talent interventions across the sector | **Coordinating industry body** |
| 2. | Local O&G companies in Malaysia face financial constraints when investing in employee development | **Capability development** |
| 3. | Local O&G companies do not possess the same level of talent management capabilities and processes that MNCs have to attract, develop, engage and retain talent | |
| 4. | Employability skills of a significant proportion of local graduates do not match the expectations of O&G companies | **Employability skills and career awareness** |
| 5. | Lack of awareness among school students on professions in the O&G sector | |
| 6. | Students entering universities /colleges may not be fully aware of career opportunities in the O&G sector | |
| 7. | Students entering universities/colleges are not fully aware of the courses /qualifications required to join the O&G sector | |
| 8. | Immigration Department may have limited visibility on skills that are presently in demand and therefore require the participation of foreign talent (e.g. geoscientists is classified as position not authorised by the Department of Labour)[1] | **Policy development** |
| 9. | Time taken to gather documentation required by the Immigration Department for granting work permits to foreign talent is long | |
| 10. | Documentation required by the Immigration Department for granting wok permits to foreign talent is not standardised | |
| 11. | Information on Malaysian O&G professionals leaving the country for better opportunities is not available for future talent attraction initiatives | **Information management** |
| 12. | Lack of information on the career choices of local graduates | |
| 13. | Limited visibility among O&G companies on the number and profile of Malaysians studying/working abroad | |
| 14. | Experienced O&G professionals outside Malaysia who want to return, do not have visibility on the specific job types and the number of opportunities | **Talent outreach** |

Source: 1. Malaysian Immigration Department website accessed on March 2012

## 5.3 Details and prioritisation of key interventions (cont'd)

Key interventions were developed for each of the improvement areas identified. The list of interventions are as follows:

| Opportunities | Ref. no. | Interventions |
|---|---|---|
| **Coordinating industry body** | | |
| **Promote industry collaboration on talent related matters** | B1 | • Identify a suitable platform for driving collaboration among O&G players to address talent issues and determine the critical success factors for such a platform to work |
| | B2 | • Develop and agree on a process to collate, track and disseminate talent demand-supply data and skills requirements at the sectoral level and subsequently use it for developing suitable action plans |
| **Capability development** | | |
| **Encourage collaboration among O&G companies around employee capability development** | C1 | • Develop mechanisms to generate training funds/incentives either through:<br>– Government and private sector collaboration; or<br>– Private sector involvement only<br>• Optimise training spend:<br>**E.g.** define a competitive bidding process for allocating training funds based on a predefined set of criteria,<br>**E.g.** incentivise collaboration between MNCs and local companies operating within the same segment of the value chain for developing critical capabilities |
| **Ensure working professionals have options to enhance their skills to pursue specific career tracks in O&G** | C2 | • Develop career transformation programmes for young/ working professionals to switch sectors by defining training/certification requirements and available career paths<br>• Facilitate the development of self paced learning options for aspiring candidates |

*Table 5.3.1: Key interventions for addressing talent gaps*

## 5.3 Details and prioritisation of key interventions (cont'd)

| Opportunities | Ref. no. | Interventions |
|---|---|---|
| **Capability development (cont'd)** | | |
| **Ensure that O&G training providers have the necessary capabilities to train aspiring candidates** | C3 | • Develop mechanisms for training bodies to get accredited on their training capabilities through an accreditation process defined by the sector |
| **Employability skills and career awareness** | | |
| **Ensure that employability skills imparted in academic institutions are aligned to the requirements of the O&G sector** | E1 | • Identify the skills requirements for key job areas/positions in the O&G sector and make it available to academic institutions |
| **Improve English language proficiency and communication skills of the existing and prospective workforce** | E2 | • Develop self learning options for developing proficiency in English language and communication skills |
| **Ensure awareness of career and job opportunities in the O&G sector through structured programmes** | E3 | • Organise O&G career awareness campaigns at the school and college /university levels |
| | E4 | • Hold national competitions, games and events to drive interest in O&G careers |
| | E5 | • Enhance capabilities of university career centres and counsellors to guide and coach aspirants on suitable career tracks and relevant skill requirements |

*Table 5.3.1: Key interventions for addressing talent gaps*

## 5.3 Details and prioritisation of key interventions (cont'd)

| Opportunities | Ref. no. | Interventions |
|---|---|---|
| **Employability skills and career awareness (cont'd)** | | |
| **Ensure awareness of career and job opportunities in the O&G sector at various life stages of the Malaysian population** | E6 | • Provide organised information (jobs, earning potential, career paths etc.) on oil and gas career opportunities to career counsellors at the school and university levels |
| **Policy development** | | |
| **Optimise participation of the global O&G talent pool in Malaysia** | P1 | • Develop a periodic list of key skills/positions in demand and work with relevant stakeholders to facilitate a need based inflow of O&G talent in the sector |
| | P2 | • Streamline the supporting documentation requirement for granting work permits to foreign talent |
| **Information management** | | |
| **Ensure O&G companies are aware of skilled Malaysian O&G professionals working abroad to facilitate talent attraction** | I1 | • Develop a mechanism to track and update the number and profile of Malaysian professionals working abroad and make this information available to O&G companies on a regular basis |
| **Ensure O&G companies are aware of Malaysians studying abroad to facilitate talent attraction** | I2 | • Develop a mechanism to track and update the number and profile of government-sponsored and self-sponsored Malaysians studying abroad (particularly those based in America) and make this information available to O&G companies on a regular basis |

*Table 5.3.1: Key interventions for addressing talent gaps*

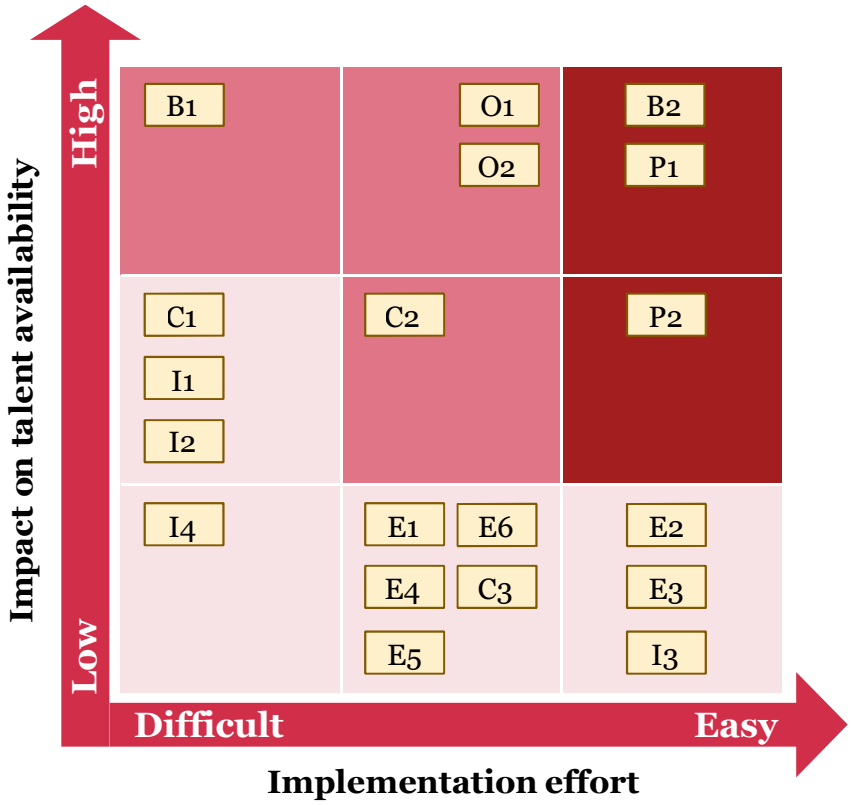
## 5.3 Details and prioritisation of key Interventions (cont'd)

| Opportunities | Ref. no. | Interventions |
|---|---|---|
| **Information management** | | |
| **Develop visibility on local graduates' career choices to facilitate better workforce planning** | I3 | • Track the employment of fresh graduates by industry across all universities in Malaysia in the Tracer Study |
| **Ensure that talent data collated by government bodies for the O&G sector matches the level of granularity commonly required by industry players** | I4 | • Review and refine the standard industry (MSIC) and occupation classification (MASCO) to ensure that talent data is collated for oil and gas sector as a whole and at a level of granuality that is widely recognised by industry players |
| **Talent outreach** | | |
| **Ensure promotion of additional job opportunities to latent O&G talent (e.g. large pools of retiring O&G professionals abroad)** | O1 | • Publish opportunities in advisory/ contract/ teaching roles available in a web-based portal and promote it to latent talent based in and outside of Malaysia |
| **Ensure Malaysians abroad have adequate information on job opportunities in Malaysia** | O2 | • Publish aggregated job opportunities by specific job areas /positions to the Malaysian diaspora abroad |

*Table 5.3.1: Key interventions for addressing talent gaps*

## 5.3 Details and prioritisation of key interventions

The interventions identified were subsequently mapped to TalentCorp's product roadmap and finally prioritised using the matrix below:




Interpretation of the prioritisation matrix:

**Quick wins**

- These interventions are termed Quick Wins because they require the least amount of effort to implement while providing a medium to high impact on talent availability and can therefore, be targeted to commence immediately

**Primary interventions**

- These interventions should be given first priority as they have relatively high impact on the availability of talent in the O&G sector over the next 3 years

**Secondary interventions**

- Interventions in this category should be given second priority as the immediate impact on talent availability is not high for the implementation effort required

# *Moving Forward*

# 6

# 6. Moving forward

**Laying the foundation for addressing the oil and gas talent agenda**

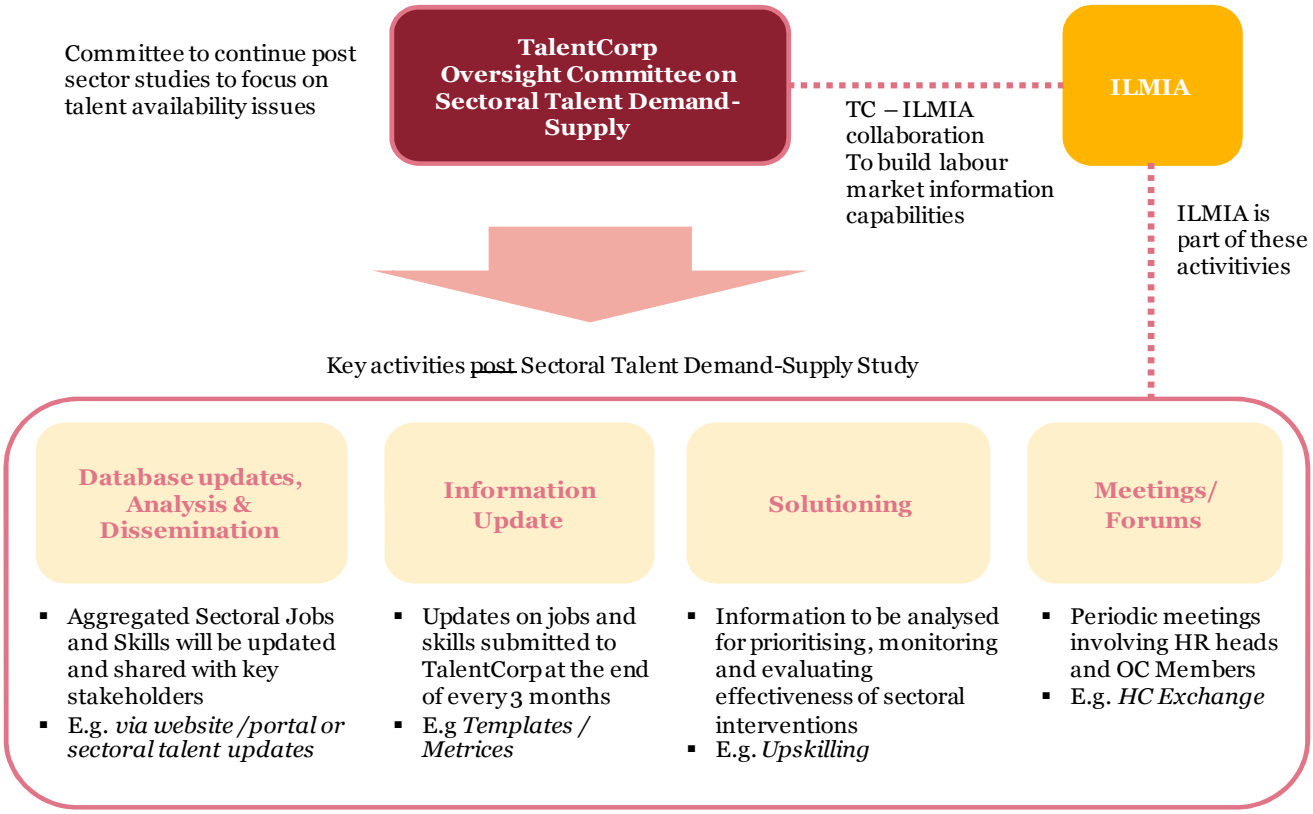
The findings in the study clearly demonstrate the need for better management and reporting of information on sectoral talent issues, requirements and priorities. This calls for a structured approach to collation and reporting of data and information on oil and gas talent in Malaysia.

To address this need, TalentCorp will partner with ILMIA to anchor and facilitate the labour information management initiative for the oil and gas sector.

The labour market information management initiative will provide a strong foundation for 'evidence based' action planning to address the talent agenda in the oil and gas sector. Some of the key benefits are highlighted below:

1. Application of a common framework of job areas and positions for which requirements and priorities can be regularly tracked
2. Collation of information on specific areas of demand and identification of priorities by sub sectors of the oil and gas sector
3. Development of mechanisms to track and monitor trends in supply of talent from universities, academic institutions in Malaysia as well as from multiple foreign sources

**The following overview of the labour information management initiative has been developed in discussions with the TalentCorp project management team:**



# 6. Moving forward (cont'd)

**The key activities depicted in the overview have been explained below:**

**Database updates, analysis and dissemination**: TalentCorp and ILMIA will anchor this activity to deploy a standard template(s) for collating information on talent availability and future requirements on a periodic basis. Since it is important to maintain such information on a regular basis, the information gathering activities will be conducted electronically using user friendly templates and frameworks. This information will be collected electronically every 6 months from oil and gas companies with adequate safeguards to maintain the confidentiality of information.

The key objective of this exercise is to develop insights on talent requirements and priorities and develop action plans at the sectoral level to bridge any anticipated gaps over the short, medium and long term. The consolidated findings will be shared with a pre-defined and approved group of government agencies, policymakers and stakeholders for facilitating joint action planning.

Industry players will also receive consolidated findings which will allow them to optimise their talent management strategies.

**Information updates**: TalentCorp and ILMIA will supplement the 6 monthly database updation activity with a quarterly information updation exercise. This activity will be conducted electronically and will track the changing perspectives of industry players on key talent requirements, issues faced and support required. This activity will be designed to ensure that the information update does not place heavy demands on the

**Solutioning:** The interventioins identified as a part of this engagement as well as any further action plans identified as a result of evolving talent requirements in the oil and gas sector will be addressed through this track. TalentCorp and ILMIA, along with the oversight committee members will finalise periodic action plans (e.g. 6 monthly) and monitor progress on identified interventions. All solutioning activity will be based on the data and information being collated periodically as a part of the labour information management initiative.

**Meetings/Forums:** TalentCorp and ILMIA also plan to facilitate regular meetings between the oversight committee members and HR leaders across oil and gas companies to discuss recurring/ complex issues faced by companies in managing talent. Such meetings will be need based and will be held for addressing specific issues identified during the database updation and infromation updation activity.

# *6. Moving forward (cont'd)*

In order to ensure that the talent challenges facing the oil and gas sector are addressed in a focused manner, TalentCorp will need to adopt a two pronged approach:

1. Drive the labour information management initiative as discussed in the previous section
2. Address the following critical levers for successful implementation of initiatives

1. **Get a comprehensive buy-in from sectoral stakeholders including companies, associations and related bodies to support the action plan over the short to medium term.**
   - Obtain agreement from all the groups highlighted in the governance structure.
2. **Define the governance structure and the role of team members for governance as well as project implementation**
   - Identify project team and define the roles & responsibilities of the various groups involved.
3. **Define implementation plans and support requirements from all the key stakeholders.**
   - Define timelines for implementation of selected interventions and initiatives with clear indication of milestones.

# *Appendices*

7

# *Appendix 1 : Baseline of positions in the O&G sector in Malaysia*

Please refer separate A3 pullout:

Baseline of positions in the O&G sector in Malaysia

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage**

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Petroleum Engineer | Completions engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and make decision under pressure<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment | **Completions Engineer:**<br>• Knowledge of performing stimulation technologies (for example, acidizing, fracturing, water shutoff) based on well and reservoir diagnostics<br>• Knowledge of optimizing completion and workover designs and operations<br>• Knowledge of designing and installing control applications (gravel packing & consolidation) |
| Engineer | Petroleum Engineer | Drilling Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and make decision under pressure<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment | **Drilling Engineer :**<br>• Knowledge of design drilling/completion, including casing, directional, fluids, cementing, bits and hydraulics programming<br>• Knowledge of the preparation, execution and reporting on well operations<br>• Knowledge of well engineering software packages |

* The skills identified throughout Appendix 2, are based on secondary research to provide a broad understanding of the nature of skills involved. It is not meant to define the full set of skills or competencies as defined for each job by the human resource department of an organization.

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Petroleum Engineer | Gas Processing Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment | **Gas Processing Engineer:**<br>• Knowledge of gas processing techniques and processes including $CO_2$ removal, dehydration, compression, and dew point control<br>• Knowledge of process design, piping design, mechanical design and other engineering work<br>• Knowledge on brownfield facility upgrades and new greenfield facilities |
| Engineer | Petroleum Engineer | Production Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Production Engineer:**<br>• Knowledge of production equipment design, monitoring and evaluation<br>• Knowledge of analyzing, interpreting and optimizing the performance of individual wells<br>• Knowledge of Workover programs including stimulation and other performance improvement opportunities |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Petroleum Engineer | Recovery (EOR) Engineer | • Like to build new things, or improve the way things work<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Like to understand the fundamental physical principles regarding the behavior of materials<br>• Are good at math and science<br>• Are detail oriented<br>• Can handle responsibility and pressure | **Recovery (EOR) Engineer**<br>• Knowledge of production performance and reserves recovery techniques<br>• Knowledge of IOR and EOR solutions<br>• Knowledge in the are of recovery methods (chemical, thermal, miscible) |
| Engineer | Petroleum Engineer | Reservoir Engineers | • Like to build new things, or improve the way things work<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Like to understand the fundamental physical principles regarding the behavior of materials<br>• Are good at math and science<br>• Are detail oriented<br>• Can handle responsibility and pressure | **Reservoir Engineer:**<br>• Knowledge of field development and reservoir management related processes, reservoir simulation screening studies, chemicals screening, wells and facility requirements, pilot execution, and effectiveness monitoring<br>• Knowledge of production performance and reserves recovery techniques<br>• Knowledge of IOR and EOR solutions |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Petroleum Engineer | Wellsite (Planning) Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Wellsite (Planning) Engineer:**<br>• Knowledge of technical planning and execution of the drilling, completion and work over programs<br>• Knowledge of monitoring and evaluating well conditions in conjunction with suitable policies<br>• Knowledge of leading, developing and maintaining contingency plans for potential problems that could occur during execution of the drilling program |
| Engineer | Petroleum Engineer | Production Technologist | • Like to improve the way things work<br>• Participate in making management decisions affecting the work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Good statistical background<br>• Can work in a team environment | **Production Technologist:**<br>• Knowledge on how to operate machinery and heavy equipment<br>• Knowledge on how to maintain production equipment and machinery<br>• Ability to perform all process steps of upstream or downstream production operations |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Petroleum Engineer | Petroleum Economist | • Like to improve the way things work<br>• Ability to multitask<br>• Can handle responsibility and pressure<br>• Detail oriented<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment | **Petroleum Economist:**<br>• Knowledge of the Upstream energy sector, in particular upstream economics<br>• Knowledge of upstream valuation techniques/ economics<br>• Knowledge on how to run economic models, create and maintain databases, assist in the analysis of various economic questions, and perform independent research |
| Engineer | Mechanical Engineer | Facilities Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Facilities Engineer:**<br>• Knowledge of offshore operations to address safety, integrity and reliability related problems and proposes / implements system upgrades.<br>• Knowledge of process facilities design as well as the start-up of new facilities such as platforms and assist in operating performance analysis<br>• Knowledge of optimising processes and troubleshooting problems in facilities (safety systems, drain systems) |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Petroleum Engineer | Petroleum Economist | • Like to improve the way things work<br>• Ability to multitask<br>• Can handle responsibility and pressure<br>• Detail oriented<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment | **Petroleum Economist:**<br>• Knowledge of the Upstream energy sector, in particular upstream economics<br>• Knowledge of upstream valuation techniques/ economics<br>• Knowledge on how to run economic models, create and maintain databases, assist in the analysis of various economic questions, and perform independent research |
| Engineer | Mechanical Engineer | Facilities Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Facilities Engineer:**<br>• Knowledge of offshore operations to address safety, integrity and reliability related problems and proposes / implements system upgrades.<br>• Knowledge of process facilities design as well as the start-up of new facilities such as platforms and assist in operating performance analysis<br>• Knowledge of optimising processes and troubleshooting problems in facilities (safety systems, drain systems) |

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## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Mechanical Engineer | Mechanical Design Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Mechanical Design Engineer:**<br>• Knowledge of construction involved in platform installation / decommissioning and pipelay vessels.<br>• Knowledge of system design and infrastructure (Heavy Lift Systems, Pipelay Systems, Mechanical Handling Systems)<br>• Knowledge of monitoring mechanical design, calculations and drawings |
| Engineer | Mechanical Engineer | Mechanical Maintenance Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Mechanical Maintenance Engineer:**<br>• Knowledge of process equipment, engineering materials and contract services<br>• Knowledge of review ing effectiveness of working practices and systems with a view to continuously improving systems and Reliability / Availability performance of assets<br>• Knowledge of providing support on mechanical maintenance and certification activities, advising on proposed modifications |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Mechanical Engineer | Project Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Project Engineer:**<br>• Knowledge of overall planning, coordination and supervision of all activities within the project<br>• Knowledge of managing the execution and delivery of an entire project<br>• Knowledge of reporting and monitoring progress across all areas of work on a project (drilling, process control, costing) |
| Engineer | Mechanical Engineer | Reliability and Safety Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Reliability and Safety Engineer**<br>• Knowledge of reliability and maintenance processes (RCM, RBI)<br>• Knowledge of theory and application of relevant reliability tools, techniques, and statistical methods<br>• Knowledge of feasibility and front end design studies through to debottlenecking and troubleshooting of operational assets for offshore platforms, pipelines, gas processing terminals and LNG facilities |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Mechanical Engineer | Rotating Equipment Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Rotating Equipment Engineer**:<br>• Knowledge of mechanical and rotating equipment designing, procurement, construction, testing, installation, and commissioning<br>• Knowledge of mechanical discipline for various multi-discipline deliverables, such as cost estimates and schedule preparation<br>• Knowledge of vendor selection based onthe specification, evaluation of and documentation of rotating equipment packages |
| Engineer | Mechanical Engineer | Operations Manager | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Manages projects and conducts project review.<br>• Can prioritise and delegate daily work load<br>• Can work in a team environment | **Operations Manager:**<br>• Utilizes Lean and Six Sigma methodology and tools in analyzing business and manufacturing processes and procedures<br>• Knowledge to prepare and control operational budgets, and control inventory |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Mechanical Engineer | Operations Engineer | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can work in a team environment<br>• Possess good communication skills<br>• Good in mathematical acumen<br>• Ability to apply deductive reasoning in decision-making processes | **Operations Engineer:**<br>• Knowledge of maintenance and troubleshooting assistance in manufacturing processes<br>• Knowledge of scripting experience to produce solutions and perform troubleshooting<br>• Strong grasp of relational databases and SQL.<br>• Knowledge in installation, configuration and administration experience with operations management tool |
| Engineer | Mechanical Engineer | Platform Superint-endent | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Can priorities and delegate daily work load<br>• Can work in a team environment | **Platform Superintendent:**<br>• Knowledge on safety compliance, environmental and regulatory policies<br>• Knowledge on mechanical, electrical and instrumentation maintenance work offshore<br>• Knowledge of implementation and control of a planned maintenance system |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Chemical Engineer | Corrosion Engineer | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can work in a team environment<br>• Possess good communication skills<br>• Good in mathematical acumen<br>• Ability to apply deductive reasoning in decision-making processes | **Corrosion Engineer:**<br>• Knowledge of technical specifications for the design of process equipment, taking into account the features of technological processes, chemical compositions of fluids and climate data fields.<br>• Knowledge of facilities risk assessments, corrosion monitoring data gathering and analysis programmes to ensure pipe work, vessels and structures are properly managed<br>• Knowledge on corporate technical standards in order to create a uniform set of requirements and methods in the design of process equipment and piping |
| Engineer | Chemical Engineer | Project Engineer/ Manager | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Can priorities and delegate daily work load<br>• Can work in a team environment | **Project Engineer / Manager:**<br>• Knowledge of overall planning, coordination and supervision of all activities within the project<br>• Knowledge of managing the execution and delivery of an entire project<br>• Knowledge of reporting and monitoring progress across all areas of work on a project (drilling, process control, costing) |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Chemical Engineer | Product quality control / assurance | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can work in a team environment<br>• Possess good communication skills<br>• Good in mathematical acumen<br>• Ability to apply deductive reasoning in decision-making processes | **Product quality control / assurance:**<br>• Knowledge of creating comprehensive test plans with well defined, reusable test cases according to business requirements and functional specifications<br>• Knowledge of ensuring efficient product testing through identifying and reporting risks on quality and proposing new methods to mitigate risks<br>• Knowledge of regulations on related products and developing compliance assurance tools |
| Engineer | Chemical Engineer | Process Control Engineer | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can work in a team environment<br>• Possess good communication skills<br>• Good in mathematical acumen<br>• Ability to apply deductive reasoning in decision-making processes | **Process Control Engineer:**<br>• Knowledge on the implementation of new process control applications functions and modification of similar applications<br>• Knowledge of preparing calculations, specifications and drawings that conform with operational and regulatory standards on related processes<br>• Knowledge of developing heat and material balances, process flow diagrams , piping and instrument diagrams |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Chemical Engineer | Terminal Manager | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Can priorities and delegate daily work load<br>• Can work in a team environment | **Terminal Manager:**<br>• Knowledge of managing all phases of terminal operation such as, tanker receiving, storing, and delivery of petroleum products<br>• Knowledge of compliance with local laws and corporate safety and environmental standards as well as ensuring efficiency of the facility<br>• Knowledge of incident investigations, and root cause analysis on finance, operations and management related matters |
| Engineer | Civil & Structural Engineer | Civil / Structural / Structural Design Engineer | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Can priorities and delegate daily work load<br>• Can work in a team environment | **Civil / Structural / Structural Design Engineer:**<br>• Knowledge on the preparation of preliminary and detailed design of relevant structures, development of contract drawings and specifications<br>• Knowledge of managing co-ordination between the Structural/Civil design and other discipline groups within development projects<br>• Knowledge of HSE standards, procedures and best practice application to civil engineering design and construction plans |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Civil & Structural Engineer | Drainage Design Engineer | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Can priorities and delegate daily work load<br>• Can work in a team environment | **Drainage Design Manager:**<br>• Knowledge of managing the drainage design process including value management and value engineering<br>• Knowledge of the design and drafting services for preliminary and detailed design phases<br>• Knowledge of implementing new technology drainage processes and systems and aligning initiatives to improve operational results |
| Engineer | Civil & Structural Engineer | Facilities Planning Specialist | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Can priorities and delegate daily work load<br>• Can work in a team environment | **Facilities Planning Specialist:**<br>• Knowledge on conducting feasibility studies on facilities and long-term business strategies related to these facilities<br>• Knowledge of performing process/system and economic evaluations of existing and potential new facilities<br>• Knowledge of preparing scoping papers to and ensuring all aspects of the facilities requirements are aligned to project objectives |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Civil & Structural Engineer | Facilities (equip-ment design) Engineer | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Can priorities and delegate daily work load<br>• Can work in a team environment | **Facilities (equipment design) Manager:**<br>• Knowledge of managing engineers and designers for the development of project specifications, calculations, design documents, drawings, system studies, and construction drawings<br>• Knowledge of leading within a project environment , communicating effectively with all levels, and ensuring work is executed in accordance with approved processes<br>• Knowledge of establishing data gathering and testing programs for facilities design testing |
| Engineer | Civil & Structural Engineer | Facilities Project Manager | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Can priorities and delegate daily work load<br>• Can work in a team environment | **Facilities Project Manager:**<br>• Knowledge of overseeing establishment of Project Execution Plan, Health and Safety Plan, Quality Plan and other plans of the facility<br>• Knowledge of managing project development through defining and monitoring project scope, goals, and key milestones<br>• Knowledge of coordinating efforts and resource allocation of the related functional departments through direct communication with management |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Civil & Structural Engineer | Foundation Engineer | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Can priorities and delegate daily work load<br>• Can work in a team environment | **Foundation Engineer:**<br>• Knowledge of coordinating foundation logistics according to schedule of planning and construction of the facility<br>• Knowledge of coordinating and supervising the foundation installation process also complying with regulatory and HSE standards<br>• Knowledge of technical leadership in foundation development and implementation of geotechnical field and laboratory programs |
| Engineer | Civil & Structural Engineer | Inspection (QA/QC) Engineer | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Can priorities and delegate daily work load<br>• Can work in a team environment | **Inspection (QA/QC) Engineer:**<br>• Knowledge on coordinating regular inspection of facilities, worksites, equipment, work practices, and report the findings<br>• Knowledge of identifying construction safety risks and the appropriate mitigation and management of such risks<br>• Knowledge of necessary construction and HSE regulations and performing testing to ensure compliance of project operations |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Civil & Structural Engineer | Reliability and Safety Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Reliability and Safety Engineer:**<br>• Knowledge of reliability and maintenance processes (RCM, RBI)<br>• Knowledge of theory and application of relevant reliability tools, techniques, and statistical methods<br>• Knowledge of feasibility and front end design studies through to debottlenecking and troubleshooting of operational assets for offshore platforms, pipelines, gas processing terminals and LNG facilities |
| Engineer | Civil & Structural Engineer | Constructions Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment | **Constructions Engineer:**<br>• Knowledge of StaadPro or equivalent finite element analysis software for structural design<br>• Knowledge of structural design and analysis calculations using governing codes and standards, engineering formulas, skills, and experience |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Pipeline Engineer | Pipeline Corrosion Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Pipeline Corrosion Engineer:**<br>• Knowledge of the design, implementation and management of Corrosion Risk Assessments and Corrosion Management Systems<br>• Knowledge of assessing and planning the corrosion needs on the existing facilities<br>• Knowledge of troubleshooting, and technical support for corrosion and materials issues in operations |
| Engineer | Pipeline Engineer | Pipeline Mechanical Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Pipeline Mechanical Engineer:**<br>• Knowledge of pipeline construction and installations.<br>• Knowledge of industry pipeline regulations to ensure that the certification of pipeline engineering design and construction activities are compliant<br>• Knowledge of plot plans, piping layouts, piping specifications, valve specifications, stress analysis and vendor quote evaluations |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Pipeline Engineer | Pipeline Project Engineer | • Like to improve the way things work<br>• Perform bid reviews and technical evaluations.<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science<br>• Must understand engineering principles, design and construction | **Pipeline Project Engineer:**<br>• Knowledge of pipeline inspection, maintenance and repair technology<br>• Knowledge of relevant standards and good industry practices in the field of pipeline engineering, construction, commissioning, pipeline repair and maintenance technology<br>• Provide pipeline engineering knowledge and expertise during all project phases from prefeasibility to execution, commissioning & start up |
| Engineer | Pipeline Engineer | Pipeline SCADA and Simulations Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Pipeline SCADA and Simulations Engineer:**<br>• Knowledge of SCADA capabilities to add value to operations and optimize the Pipeline Control System<br>• Knowledge of SCADA modifications to support system changes<br>• Knowledge of developing simulation based solutions for planning and testing |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Pipeline Engineer | Pipeline Project Engineer | • Like to improve the way things work<br>• Perform bid reviews and technical evaluations.<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science<br>• Must understand engineering principles, design and construction | **Pipeline Project Engineer:**<br>• Knowledge of pipeline inspection, maintenance and repair technology<br>• Knowledge of relevant standards and good industry practices in the field of pipeline engineering, construction, commissioning, pipeline repair and maintenance technology<br>• Provide pipeline engineering knowledge and expertise during all project phases from prefeasibility to execution, commissioning & start up |
| Engineer | Pipeline Engineer | Pipeline SCADA and Simulations Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Pipeline SCADA and Simulations Engineer:**<br>• Knowledge of SCADA capabilities to add value to operations and optimize the Pipeline Control System<br>• Knowledge of SCADA modifications to support system changes<br>• Knowledge of developing simulation based solutions for planning and testing |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Cost Control Engineer | Project Engineer or Manager | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Contributes to team effort by accomplishing related results as needed.<br>• Can priorities and delegate daily work load | **Project Engineer/Manager:**<br>• Knowledge on Total Quality Management or Six Sigma<br>• Knowledge on the product design, customer requirements, and performance standards; completing technical studies; preparing cost estimates.<br>• Knowledge in writing computer programs; entering and backing up data. |
| Geosciences | Geologist | Geologist | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data<br>• Likes to work in teams | **Geologist:**<br>• Knowledge of production and development geology to maintain production and seek opportunities for growth<br>• Knowledge on the composition, structure and history of Earth's crust to help locate and estimate probable natural gas, oil and mineral ore deposits<br>• Knowledge of field operations to assist in developing geological understanding of the field |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Geosciences | Geologist | Mudlogger | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data<br>• Likes to work in teams | **Mudlogger:**<br>• Knowledge of drilling parameters, drilling fluid properties and pumping parameters<br>• Knowledge of collecting, processing, logging and analyzing geological samples<br>• Knowledge of primary health and safety of critical drilling operations to predict dangerous situations such as, over-pressured formations |
| Geosciences | Geologist | Oceano-grapher | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data<br>• Likes to work in teams | **Oceanographer:**<br>• Knowledge of the topographic features and physical make up of the ocean floor to help find oil and gas at the bottom of the ocean<br>• Knowledge on sediment to help determine the movement of the ocean<br>• Knowledge on the composition, structure and history of Earth's crust to collect, examine, measure and classify rocks and minerals |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Geosciences | Geologist | Well Site Geologist | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data<br>• Likes to work in teams | **Well Site Geologist:**<br>• Knowledge on rock cuttings from oil and gas wells to determine what rock formations are being drilled into and how drilling should proceed<br>• Knowledge on identifying critical strata from core samples based on the well objectives<br>• Knowledge on well site and offshore safety procedures and requirements |
| Geosciences | Geologist | Operation Geologist | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Excellent communication and interpersonal skills are essential<br>• Able to work with sophisticated computer programs for analyzing data | **Operation Geologist:**<br>• Experience in the development of operations involving landing of horizontal wells and geosteering drain hole sections<br>• Knowledge on LWD technology with an evident high level of proficiency in quick look petrophysical log interpretation and analysis of RFT data.<br>• Knowledge on workstation-based well log correlation, seismic data and well trajectory planning |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Geosciences | Geologist | Reservoir Geologist | • Understands the detail of physical surroundings, the Earth and its composition<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data<br>• Likes to work in teams | **Reservoir Geologist:**<br>• Knowledge on calculating hydrocarbons in place and analyzing all parameters which affect the results and their uncertainties<br>• Knowledge on reservoir mapping (structural, petrophysical & facies) that make up the geological model<br>• Knowledge on identifying further development opportunities to improve reservoir management |
| Geosciences | Geologist | Sedimento-logist | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data<br>• Likes to work in teams | **Sedimentologist:**<br>• Knowledge on the nature, origin, distribution, and alteration of sediments, such as sand, silt, and mud which may contain oil, gas, coal, and many other mineral deposits<br>• Knowledge on developping regional sequence stratigraphic models as a framework for predicting reservoir facies and rock quality distribution<br>• Knowledge on interpreting petrophysical logs and calibrating to rock data (drill cuttings, core, and outcrop) |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Geosciences | Geologist | Structural Geologist | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data<br>• Likes to work in teams | **Structural Geologist:**<br>• Knowledge of design and execution of structural geology projects<br>• Knowledge of mechanical stratigraphy and fracture architecture<br>• Knowledge on conventional and unconventional petroleum systems |
| Geosciences | Geologist | Subsurface Manager | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data<br>• Likes to work in teams | **Subsurface Manager:**<br>• Developing workover and drilling plans, and improved production and recompletion strategies aimed at maintaining the field production target and optimizing reserves<br>• Knowledge in geoscience and petrophysics work planning<br>• Knowledge of workover and drilling plans, and improved production and recompletion strategies aimed at maintaining the field production target and optimizing reserves. |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Geosciences | Geologist | Geomodeller | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Interest in innovative technology detection, development and implementation<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data | **Geomodeller:**<br>• Knowledge of logging technology with understanding of oil and gas geology<br>• Knowledge of seismic interpretation with geology data (electofacies, core)<br>• Knowledge to construct and maintain 3D static and dynamic geological models and o take responsibility of drafting and presentation of final deliverables |
| Geosciences | Geophysicist | Geophysicist | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data<br>• Likes to work in teams | **Geophysicist:**<br>• Knowledge of interpretation uncertainties, risk analysis, geology and reservoir engineering fundamentals<br>• Knowledge on evaluating prospects/fields with available seismic data to tight deadlines<br>• Knowledge on generating maps on key horizons, structural and stratigraphic components |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Geosciences | Geophysicist | Petro-physicist | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data<br>• Likes to work in teams | **Petrophysicist:**<br>• Knowledge on log analysis and interpretation<br>• Knowledge on evaluation, statistical analysis techniques, full-cycle model construction & optimisation<br>• Knowledge on troubleshooting particular problems such as over-pressure, variable log evaluation parameters, or exotic minerals |
| Geosciences | Geophysicist | Physical Oceano-grapher | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data<br>• Likes to work in teams | **Physical Oceanographer:**<br>• Knowledge of the topographic features and physical make up of the ocean floor to help find oil and gas at the bottom of the ocean<br>• Knowledge on sediment to help determine the movement of the ocean<br>• Knowledge on the composition, structure and history of Earth's crust to collect, examine, measure and classify rocks and minerals |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Business Operation& Support | Finance & Asset Management | Operations Accountant | • Ability to work independently<br>• Strong mentoring or supervisory skills<br>• Outstanding interpersonal skills are required to develop both internal and external relationships<br>• Work well under pressure;<br>• Are inclined to be detail-oriented | **Operations Accountant:**<br>• Knowledge in monitor ing the acounting bottom line which includes operations and production costs, overhead rates, and penalty/payout interests.<br>• Knowledge of gathering and analyzing field production and pipeline delivery data to calculate royalties, revenues and costs of doing business<br>• Knowledge of accounting compliance with contractual obligations and regulatory requirements |
| Business Operation& Support | Finance & Asset Management | Production Accountant | • Ability to work independently<br>• Strong mentoring or supervisory skills<br>• Outstanding interpersonal skills are required to develop both internal and external relationships<br>• Work well under pressure;<br>• Are inclined to be detail-oriented | **Production Accountant:**<br>• Knowledge on calculating production volumes and rates, gas/oil ratios, and associated royalties<br>• Knowledge of gathering and analyzing field production and pipeline delivery data to calculate royalties, revenues and costs of doing business<br>• Knowledge of acounting compliance with contractual obligations and regulatory requirements |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Business Operation& Support | Finance & Asset Management | Well & facility asset analyst | • Ability to work independently<br>• Strong mentoring or supervisory skills<br>• Outstanding interpersonal skills are required to develop both internal and external relationships<br>• Work well under pressure;<br>• Are inclined to be detail-oriented | **Well and facility asset analyst**:<br>• Knowledge on analyzing well data, and ensuring the well and facility asset management system accurately reflects the operations<br>• Knowledge on Identifying when well operations do not meet regulatory guidelines<br>• Knowledge on liaising with internal staff regarding reporting issues and interfaces between the well and facility asset management system |
| Business Operation& Support | Finance & Asset management | Finance Manager/ Chief Accountant | • Are inclined to be detail-oriented<br>• Ability to work independently<br>• Strong mentoring or supervisory skills<br>• Are comfortable following very specific processes and guidelines. | **Finance Manager/Chief Accountant:**<br>• Knowledge on supervising and handling financial reports, investment portfolios, accounting, and all kinds of financial analysis for an organization.<br>• Knowledge on cash management strategies and financial legislation and regulation.<br>• Knowledge on manages the cash flow for an organization by supervising balance sheets, income statements, and the costs and revenue model. |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Business Operation& Support | Finance & Asset management | Project Accountant | • Ability to work independently<br>• Strong mentoring or supervisory skills<br>• Outstanding interpersonal skills are required to develop both internal and external relationships<br>• Work well under pressure;<br>• Are inclined to be detail-oriented<br>• . | **Project Accountant:**<br>• Knowledge on analyzing accounting records, financial statements or other financial reports to assess accuracy, completeness and conformance to reporting and procedural performance.<br>• Knowledge on establish tables of accounts and assign entries to proper accountants.<br>• Knowledge on analyzing business operations, trends, cost, revenues, financial commitments to ensure appropriate advice can be provided. |
| Business Operation& Support | Finance & Asset management | Drilling Accountant | • Are inclined to be detail-oriented<br>• Ability to work independently<br>• Strong mentoring or supervisory skills<br>• Are comfortable following very specific processes and guidelines and<br>• Work well under pressure;<br>• Are inclined to be detail-oriented | **Drilling Accountant:**<br>• Knowledge on providing cost accounting, reporting and control.<br>• Knowledge of oil and gas accounting and technical accounting background advantageous.<br>• Knowledge on providing cost accounting, reporting and control. |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Business Operation& Support | Health & Safety | Health & Safety Inspector | • Are inclined to be detail-oriented<br>• Ability to work independently<br>• Are comfortable following very specific processes and guidelines; and<br>• Good health and physical fitness | **Health and Safety Inspector:**<br>• Knowledge on on safe and healthy work practices and ensure compliance with legislation<br>• Knowledge on the use of risk assessment and job hazard analysis to identify hazards, evaluate risk and propose elimination and/or control measures<br>• Knowledge on setting HSE objectives, KPIs and carry out analysis through frequent monitoring |
| Business Operation& Support | Health & Safety | Industrial Safety Officer | • Are inclined to be detail-oriented<br>• Ability to work independently<br>• Are comfortable following very specific processes and guidelines; and<br>• Good health and physical fitness | **Industrial Safety Officer:**<br>• Knowledge on inspecting workplaces to ensure equipment, materials and production processes do not present a safety and health hazard<br>• Knowledge on safe and healthy work practices and ensure compliance with legislation |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Business Operation& Support | Health & Safety | Quality, health and safety environ-ment coordinator | • Are inclined to be detail-oriented<br>• Ability to work independently<br>• Are comfortable following very specific processes and guidelines; and<br>• Good health and physical fitness | **Quality, health and safety environment coordinator:**<br>• Knowledge on safe and healthy work practices and ensure compliance with legislation<br>• Knowledge on arranging and coordinating on-site and classroom training to staff on safety practices and policies, accident prevention techniques and accident reporting<br>• Knowledge on coordinating regular safety audits of departments including the inspection of facilities, worksites, equipment, work practices, and reports findings |
| Business Operation& Support | Health and Safety | HSE Manager | • Are inclined to be detail-oriented<br>• Ability to work independently<br>• Strong mentoring or supervisory skills<br>• Are comfortable following very specific processes and guidelines. | **HSE Manager:**<br>• Knowledge on how to lead and facilitate the development of corporate HSE policies to support the companies HSE management system.<br>• Knowledge on conducting risk assessment and risk mitigation measures on-site and before commencement of projects.<br>• Knowledge on corrective and preventive measures to help ensure proper environment and health is maintained for the organization and its stakeholders. |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Marine Related Engineer | Marine Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Marine Engineer:**<br>• Knowledge on analytical, environmental, operational, or performance studies in order to develop designs for products, such as marine engines, equipment, and structures.<br>• Knowledge on testing, installation, and repair of marine apparatus and equipment.<br>• Knowledge on inspecting marine equipment and machinery in order to draw up work requests and job specifications. |
| Engineer | Marine Related Engineer | Naval Architect/ Ocean Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Naval Architect/ Ocean Engineer:**<br>• Knowledge on designing ships and boats and related components and specialist equipment, using complex mathematical and physical models to ensure that the ship's design is satisfactory technically and that it complies with safety regulations.<br>• Knowledge on the building process of a vessel and the ability to manage everything from concept through to delivery of the final product. |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Material & Metallurgical Engineer | Facilities (equipment design) Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks | **Facilities (equipment design) Engineer:**<br>• Knowledge on planning and designing equipment and supervising its construction.<br>• Knowledge on drawing blueprints and foundational diagrams with the assistance of computer aided drafting programs<br>• Knowledge on the functionality of equipment which encompasses proper installation ensuring efficiency<br>• Knowledge on calculation of costs such as materials and labour in manufacturing of equipment |
| Engineer | Material & Metallurgical Engineer | Inspection (QA/QC) Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks | **Inspection (QA/QC) Engineer:**<br>• Knowledge on carrying out technical inspections against defined specifications that include budget constraints and contractual requirements<br>• Knowledge on producing reports to an agreed format within an agreed timescale<br>• Knowledge on conducting activities in line with predefined procedures, accreditation schemes, legislation and industry standards<br>• Knowledge on data collection,<br>with relevant analysis and presentation |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Material & Metallurgical Engineer | Loss Control Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks | **Loss Control Engineer:**<br>• Knowledge on conducting and reporting on-site risk surveys<br>• Knowledge on completing site visits and documentation of findings, utilising company report formats to detail a variety of risk characteristics<br>• Knowledge on preparing, delivering, evaluating and reviewing annual engineering reports and prospects<br>• Knowledge on completing special projects if required |
| Engineer | Material & Metallurgical Engineer | Pipeline Corrosion Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks | **Pipeline Corrosion Engineer:**<br>• Knowledge on pipeline and other asses protection against corrosion of materials /alloys/compositions<br>• Knowledge on enhanced pipeline protection systems and coatings<br>• Knowledge on codes/standards applicable to pipeline corrosion and inspection<br>• Knowledge on deterioration mechanisms, cathode protection systems and non destructive testing |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Material & Metallurgical Engineer | Wellsite Corrosion Engineer | • improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment | **Wellsite Corrosion Engineer:**<br>• Knowledge on providing corrosion and metallurgical expertise<br>• Knowledge on developing risk based inspection maintenance methodologies<br>• Knowledge on codes/standards applicable to wellsite corrosion and inspection<br>• Knowledge on deterioration mechanisms, cathode protection systems and non destructive testing |
| Engineer | Material & Metallurgical Engineer | Material (and NDT Engineer) | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Material (and NDT Engineer):**<br>• Knowledge on analyzing product failure data and laboratory test results in order to determine causes of problems and develop solutions.<br>• Knowledge on evaluating technical specifications and economic factors relating to process or product design objectives.<br>• Knowledge on monitor material performance and evaluate material deterioration. |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Material & Metallurgical Engineer | Welding Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **Welding Engineer:**<br>• Knowledge on conducting research and development investigations to develop and test new fabrication processes.<br>• Knowledge on materials science, along with the process technology used to shape joints including arc welding, lasers, resistance welding, brazing and soldering.<br>• Knowledge on utilizing production specifications, properties and characteristics of metals and metal alloys, and engineering principles |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Electrical, instrumentation & process control engineer | Cathodic Protection (Corrosion) Engineer | • Enthusiasm and curiosity for science<br>• Posses excellent communication skills<br>• Ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Like to improve the way things work<br>• Are detail oriented<br>• Ability to work independently with little supervision and in a team environment | **Cathodic Protection (Corrosion) Engineer:**<br>• Knowledge of assessing and planning the corrosion needs on the existing facilities<br>• Knowledge of AutoCAD and/or Microstation for 2- and 3-dimensional design and drafting processing plant and equipment<br>• Knowledge of corrosion and cathodic protection problem solving skills |
| Engineer | Electrical, instrumentation & process control engineer | Control Systems / Electrical Process Control Engineer | • Posses excellent oral and written communication skills<br>• Posses strong human relations skills<br>• Are detail oriented<br>• Ability to work independently with little supervision and in a team environment | **Control Systems / Electrical Process Control Engineer:**<br>• Knowledge of electrical and instrumentation aspects of plant operation<br>• Knowledge in utility service and installation<br>• Knowledge of control theory and common instrumentation and wiring practices |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Electrical, instrumentation & process control engineer | Electrical / Electrical Design Engineer | • Ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Like to improve the way things work<br>• Are detail oriented<br>• Organized, focused and detail oriented while successfully managing multiple projects | **Electrical / Electrical Design Engineer:**<br>• Knowledge of site specific detailed design covering all aspects of high voltage substation design (single line diagrams, secondary protection and control schematics, layout drawings)<br>• Knowledge of the design, operation and management of distribution assets at all voltage levels<br>• Knowledge of physical asset management best practice and regulatory requirements |
| Engineer | Electrical, instrumentation & process control engineer | Instrumentation Engineer | • Possess excellent command over verbal and written communications<br>• Ability to troubleshoot, repair and maintain instruments and instrumentation systems<br>• Ensures safe and efficient production and maintenance activities are delivered in line with company policy | **Instrumentation Engineer:**<br>• Knowledge of data sheets, instrument drawings, I/O wiring diagrams, P&IDs, calculation and specifications<br>• Knowledge of Instrumentation Design & Control Design Process<br>• Knowledge of ISA standards and AutoCAD |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Electrical, instrumenta-tion & process control engineer | Meter Engineer | • Posses strong written communication skill s<br>• Ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Are detail oriented<br>• Can handle responsibility and pressure | **Meter Engineer:**<br>• Knowledge of computer skills and drawing skills for producing models of multifaceted devices<br>• Knowledge of computer-aided drafting technologies |
| Engineer | Electrical, instrumenta-tion & process control engineer | SCADA & Stimulations Engineer | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Possess quick problem solving and decision making skills<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment<br>• Are good at math and science | **SCADA & Stimulations Engineer:**<br>• Knowledge of SCADA capabilities to add value to operations and to optimize the Pipeline Control System<br>• Knowledge of SCADA modifications to support system changes<br>• Knowledge of developing simulation based solutions for planning and testing |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Electrical, instrument a-tion & process control engineer | Telecommu -nications Engineer | • Like working with computers<br>• Can synthesize data from various sources in a way that makes sense to those who will use the information<br>• Can work in a team environment | **Telecommunications Engineer:**<br>• Knowledge of all telecommunication devices<br>• Knowledge of testing & measurement technique with various test equipments with various brands in order to get appropriate and correct result to support testing, performance optimization and maintenance telecommunication network system<br>• Knowledge of designing and installation of telecommunications equipment and facilities (complex electronic switching systems) |
| Engineer | Electrical, instrument a-tion & process control engineer | Operations Manager | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• Manages projects and conducts project review.<br>• Can prioritise and delegate daily work load<br>• Can work in a team environment | **Operations Manager:**<br>• Utilizes Lean and Six Sigma methodology and tools in analyzing business and manufacturing processes and procedures<br>• Knowledge to prepare and control operational budgets, and control inventory |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Engineer | Electrical, instrument a-tion & process control engineer | Project Engineer / Manager | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Contributes to team effort by accomplishing related results as needed.<br>• Can priorities and delegate daily work load | **Project Engineer / Manager:**<br>• Knowledge of overall planning, coordination and supervision of all activities within the project<br>• Knowledge of managing the execution and delivery of an entire project<br>• Knowledge of reporting and monitoring progress across all areas of work on a project |
| Engineer | Electrical, instrument a-tion & process control engineer | Project Engineer / Manager | • Like to improve the way things work<br>• Are detail oriented<br>• Can handle responsibility and pressure<br>• ensures safe and efficient production and maintenance activities are delivered in line with company policy<br>• Contributes to team effort by accomplishing related results as needed.<br>• Can priorities and delegate daily work load | **Project Engineer / Manager:**<br>• Knowledge of overall planning, coordination and supervision of all activities within the project<br>• Knowledge of managing the execution and delivery of an entire project<br>• Knowledge of reporting and monitoring progress across all areas of work on a project |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 1. Degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Business Operation& Support | Supply Chain Management | Material Expeditor | • Are inclined to be detail-oriented<br>• Ability to work independently<br>• Strong mentoring or supervisory skills<br>• Are comfortable following very specific processes and guidelines. | **Material expeditor:**<br>• Knowledge on compiling and maintaining material, inventory and status information to expedite movement of material and parts between production areas, according to predetermined production schedules and order priorities.<br>• Knowledge on production schedules, inventory reports, and work orders to determine type and quantity of materials required, availability of stock, and order priority. |
| Business Operation& Support | Supply Chain Management | Logistics coordina-tor | • Are inclined to be detail-oriented<br>• Outstanding interpersonal skills are required to develop both internal and external relationships<br>• Are comfortable following very specific processes and guidelines. | **Logistics coordinator:**<br>• Knowledge on preparing and updating monthly logistics, schedule to assure deliveries to production locations. Coordinate product delivery schedules with customers.<br>• Knowledge on utilizing various transportation provider software systems, to facilitate material movement planning and scheduling.<br>• Knowledge on coordinating daily activity to track location and movement of inventory finished goods and raw materials |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Technician | Electrical Technician | Electrical Engineering Technician | • Like working with computers<br>• Can analyze information and using logic to address work-related issues and problems<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Are detail oriented | **Electrical Engineering Technician:**<br>• Knowledge of circuit boards, processors, chips, electronic equipment<br>• Assemble electrical and electronic systems and prototypes according to engineering data and knowledge of electrical principles, using hand tools and measuring instruments<br>• Knowledge of the practical application of electrical engineering science and technology |
| Technician | Electrical Technician | Electrical Technician | • Like working with computers<br>• Can analyze information and using logic to address work-related issues and problems<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Are detail oriented | **Electrical Technician:**<br>• Knowledge of circuit boards, processors, chips, electronic equipment<br>• Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications<br>• Assemble, install, test, and maintain electrical or electronic wiring, equipment, appliances, apparatus, and fixtures, using hand tools and power tools |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Technician | Electrical Technician | Electronics Technician | • Like working with computers<br>• Can analyze information and using logic to address work-related issues and problems<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Are detail oriented | **Electronics Technician:**<br>• Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming<br>• Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications<br>• Knowledge of the practical application of electronic engineering science and technology |
| Technician | Electrical Technician | Supervisory Control and Data Acquisition (SCADA) Technician | • Like working with computers<br>• Can analyze information and using logic to address work-related issues and problems<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Are detail oriented | **Supervisory Control and Data Acquisition (SCADA) Technician:**<br>• Knowledge of configuring and programming SCADA system<br>• Knowledge of installation and commissioning of the SCADA system on site<br>• Understanding of SCADA system setup and maintenance with regard to administration, programming, database administration, telemetry, and RTU input management |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Technician | Electrical Technician | Instrument Technician | • Like working with computers<br>• Likes complex problem solving<br>• Can analyze information and using logic to address work-related issues and problems<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Are detail oriented | **Instrument Technician:**<br>• Knowledge of installation, maintenance, repair and overhauling, calibration and testing of wide variety of industrial instrumentations<br>• Knowledge of troubleshooting of telemetry and process controller hardware<br>• Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models |
| Technician | Electrical Technician | Mechanical Technician | • Like working with computers<br>• Can analyze information and using logic to address work-related issues and problems<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Are detail oriented | **Mechanical Technician:**<br>• Knowledge of the tools, equipment, materials, methods, and practices of several of the mechanical or related trades<br>• Knowledge of project instructions and blueprints review to ascertain test specifications, procedures, objectives, test equipment, and nature of technical problem |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Technician | Geological, Seismic & Mineral Technician | Petroleum Technician | • Like earth sciences<br>• Like working with computers and maps<br>• Have an eye for visual presentation in order to display complex, diverse characteristics on various maps<br>• Can synthesize data from various sources in a way that makes sense to those who will use the information<br>• Can work in a team environment | **Petroleum Technician:**<br>• Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations<br>• Knowledge of the practical application of engineering science and technology<br>• Knowledge of performing stimulation technologies (for example, acidizing, fracturing, water shutoff) based on well and reservoir diagnostics |
| Technician | Geological, Seismic & Mineral Technician | Reservoir Engineering Technician | • Like to build new things, or improve the way things work<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Like to understand the fundamental physical principles regarding the behavior of materials<br>• Are good at math and science<br>• Are detail oriented<br>• Can handle responsibility and pressure | **Reservoir Engineering Technician:**<br>• Knowledge of field development and reservoir management related processes, reservoir simulation screening studies, chemicals screening, wells and facility requirements, pilot execution, and effectiveness monitoring<br>• Knowledge of production performance and reserves recovery techniques<br>• Knowledge of IOR and EOR solutions |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Technician | Geological, Seismic & Mineral Technician | Seismic Observer and Technician | • Like earth sciences<br>• Like working with computers and maps<br>• Have an eye for visual presentation in order to display complex, diverse characteristics on various maps<br>• Can synthesize data from various sources in a way that makes sense to those who will use the information<br>• Can work in a team environment | **Seismic Observer and Technician:**<br>• Knowledge of the practical application of engineering science and technology<br>• Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications<br>• Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo |
| Technician | Geological, Seismic & Mineral Technician | Radio-grapher | • Like earth sciences<br>• Like working with computers and maps<br>• Have an eye for visual presentation in order to display complex, diverse characteristics on various maps<br>• Can synthesize data from various sources in a way that makes sense to those who will use the information<br>• Can work in a team environment | **Radiographer:**<br>• Knowledge of the practical application of engineering science and technology<br>• Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications<br>• Knowledge of industrial radiography |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Technician | Well Testing Supervisor | Well Testing Supervisor | • Like earth sciences<br>• Like working with computers and maps<br>• Have an eye for visual presentation in order to display complex, diverse characteristics on various maps<br>• Can synthesize data from various sources in a way that makes sense to those who will use the information<br>• Can work in a team environment | **Well Testing Supervisor:**<br>• Knowledge of surface well testing, downhole tools, perforating, stimulation and coiled tubing<br>• Knowledge of maintenance of well-testing equipment, mobilization and de-mobilization of well-testing equipment |
| Technician | Marine Technician | Marine Technician | • Like marine sciences<br>• Like working with computers and maps<br>• Have an eye for visual presentation in order to display complex, diverse characteristics on various maps<br>• Can synthesize data from various sources in a way that makes sense to those who will use the information<br>• Can work in a team environment<br>• Can understand technical plans and drawings<br>• Can ravel and be able to work at sea for extended period of time | **Marine Technician:**<br>• Knowledge of mechanical, electrical, hull, fluid power and electronics<br>• Knowledge of operating, monitoring and maintaining equipment in a wide and diverse range of platforms both in a seagoing and shore-based environment<br>• Knowledge of performing routine maintenance on equipment and determining when and what kind of maintenance is needed |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Technician | Marine Technician | Marine Maintenance Technician | • Like marine sciences<br>• Like working with computers and maps<br>• Have an eye for visual presentation in order to display complex, diverse characteristics on various maps<br>• Can synthesize data from various sources in a way that makes sense to those who will use the information<br>• Can work in a team environment<br>• Can understand technical plans and drawings<br>• Can ravel and be able to work at sea for extended period of time | **Marine Maintenance Technician:**<br>• Knowledge of mechanical, electrical, hull, fluid power and electronics<br>• operating, monitoring and maintaining equipment in a wide and diverse range of platforms both in a seagoing and shore-based environment<br>• Knowledge of performing routine maintenance on equipment and determining when and what kind of maintenance is needed |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Field Production Operators | Battery Operator | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Battery Operator:**<br>• Knowledge of operating specialized equipments used to separate, measure and store product coming from the well , for example, separators, treaters, dehydrators, storage tanks, pumps and compressors |
| Operators | Field Production Operators | Field Operator | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Field Operator:**<br>• Knowledge of operating and maintaining oil well and/or gas well sites with water disposal, gas compression and associated pumps and equipment<br>• Knowledge of operation and maintenance of compressor stations with dehydration, field boosters, low pressure gas wells, and oil wells |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Field Production Operators | Production Operator | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Production Operator:**<br>• Knowledge of mechanical principles and applications in the implementation, operation, and maintenance of instrumentation and process control systems<br>• Knowledge of TOW / Wellview<br>• Knowledge of safety and environment and operational compliance |
| Operators | Field Production Operators | Production Coordinator | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Production Coordinator:**<br>• Knowledge of mechanical principles and applications in the implementation, operation, and maintenance of instrumentation and process control systems<br>• Knowledge of TOW / Wellview<br>• Knowledge of safety and environment and operational compliance |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Plant & Facility Operators | Drilling Fluids Bulk Plant Operator | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Drilling Fluids Bulk Plant Operator:**<br>• Knowledge of drilling parameters, drilling fluid properties and pumping parameters<br>• Knowledge of primary health and safety of critical drilling operations to predict dangerous situations such as, over-pressured formations<br>• Knowledge of maintenance on bulk plant equipment<br>• Knowledge of completion fluids |
| Operators | Plant & Facility Operators | Cementing Plant Operator | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Cementing Plant Operator:**<br>• Knowledge of controlling the loading and unloading of material or the operation of continuous feeding equipment such as pumps and conveyors<br>• Knowledge of equipment operations by observing instruments such as temperature and pressure gauges or physical indicators such as oil levels |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Plant & Facility Operators | Gas Compressor Operator | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Gas Compressor Operator:**<br>• Knowledge of equipment operations (control transmission of natural gas through pipelines)<br>• Meters, gauges, and recording instrument charts reading to ensure specified temperature, pressure, and flow of gas through system<br>• Knowledge of gas, chemicals, and air processing (assess purity and moisture content) |
| Operators | Plant & Facility Operators | Gas Plant Operator | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Gas Plant Operator:**<br>• Knowledge of equipment operations (control transmission of natural gas through pipelines)<br>• Gas ratio calculation to detect deviation from specifications, using testing apparatus<br>• Knowledge of gas, chemicals, and air processing (assess purity and moisture content) |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Plant & Facility Operators | Gas Processing Compressor Operator | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Gas Processing Compressor Operator:**<br>• Knowledge of gas, chemicals, and air processing (assess purity and moisture content)<br>• Knowledge of equipment operations (control transmission of natural gas through pipelines)<br>• Meters, gauges, and recording instrument charts reading to ensure specified temperature, pressure, and flow of gas through system |
| Operators | Plant & Facility Operators | Gas Recovery Operator | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Gas Recovery Operator:**<br>• Knowledge of gas, chemicals, and air processing (assess purity and moisture content)<br>• Knowledge of equipment operations (control transmission of natural gas through pipelines)<br>• Meters, gauges, and recording instrument charts reading to ensure specified temperature, pressure, and flow of gas through system |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Seismic Operator | Seismic Driller | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards | **Seismic Driller:**<br>• Knowledge of drill rigs engineering & equipments maintenance<br>• Knowledge of seismic drilling<br>• Knowledge of completion fluids & fluids testing – chemical contamination, NAF (Non-Aques Fluids)<br>• Knowledge of hydraulics and mechanics |
| Operators | Seismic Operator | Seismic Helper | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards | **Seismic Helper:**<br>• Knowledge of global positioning systems and conventional survey equipment (to create maps and route designs where seismic activities will be conducted)<br>• Knowledge of drill rigs engineering & equipments maintenance |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Seismic Operator | Seismic Navigator (Marine) | • Like earth sciences<br>• Like working with computers and maps<br>• Can work in remote locations, and/or to be relocated<br>• Able to follow set procedures, routines and standards<br>• Able to work in a deadline driven work environment | **Seismic Navigator (Marine):**<br>• Knowledge of Concept Orca Navigation System<br>• Knowledge of critical H2S designs, operating procedures, horizontal wells and drilling design<br>• Knowledge of casing design software programs, hydraulics |
| Operators | Seismic Operator | Seismic Shooter (Blaster) | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on<br>• Able to work in a deadline driven work environment | **Seismic Shooter (Blaster):**<br>• Knowledge of explosive and radio controlled blasting devices<br>• Knowledge of service electric wiring and other shooting equipments<br>• Knowledge of hydraulics and mechanics |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Drilling Rig Operator | Directional Driller | • Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Have an inquiring and analytical mind<br>• Can work in a team environment<br>• Able to take control of operations of equipment or systems | **Directional Driller:**<br>• Knowledge of horizontal and directional well<br>• Knowledge of onshore drilling<br>• Knowledge of machines and tools, including their designs, uses, repair, and maintenance |
| Operators | Drilling Rig Operator | Driller (Rig Technician) | • Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Have an inquiring and analytical mind<br>• Can work in a team environment<br>• Able to take control of operations of equipment or systems | **Driller (Rig Technician):**<br>• Knowledge of machines and tools, including their designs, uses, repair, and maintenance<br>• Knowledge of onshore drilling<br>• Knowledge of engineering analyses on rig site |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Drilling Rig Operator | Drilling and Completions Operators (Tool Pusher) | • Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Have an inquiring and analytical mind<br>• Can work in a team environment<br>• Able to take control of operations of equipment or systems | **Drilling and Completions Operator (Tool Pusher):**<br>• Knowledge of drilling and completion conceptual design<br>• Knowledge of design drilling/completion, including casing, directional, fluids, cementing, bits and hydraulics programming<br>• Knowledge of the preparation, execution and reporting on well operations |
| Operators | Drilling Rig Operator | Motorhand (Rig Technician) | • Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Have an inquiring and analytical mind<br>• Can work in a team environment<br>• Able to take control of operations of equipment or systems | **Motorhand (Rig Technician):**<br>• Knowledge of rig engines, transmissions, heating systems, electric generators and motor, hydraulic system and other mechanical equipment |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Drilling Rig Operator | Mud Logger (Drilling Fluids) | • Understands the detail of physical surroundings, the Earth and its composition<br>• Good at math and science<br>• Have an inquiring and analytical mind<br>• Good at solving complex scientific problems<br>• Understands scientific principles quickly and easily<br>• Detail oriented<br>• Able to work with sophisticated computer programs for analyzing data<br>• Likes to work in teams | **Mud Logger (Drilling Fluids):**<br>• Knowledge of design drilling/completion, including casing, directional, fluids, cementing, bits and hydraulics programming<br>• Knowledge of the preparation, execution and reporting on well operations<br>• Knowledge of drilling parameters, drilling fluid properties and pumping parameters |
| Operators | Drilling Rig Operator | Measurement While Drilling Specialist | • Like to improve the way things work<br>• Like to work with ideas, to apply critical thinking and figure out practical solutions to problems<br>• Are detail oriented<br>• Can handle responsibility and make decision under pressure<br>• Can prioritise and assess risks of allocated tasks<br>• Can work in a team environment | **Measurement While Drilling Specialist:**<br>• Knowledge of Measurement While Drilling (MWD) and Logging While Drilling (LWD) equipment and application<br>• Knowledge of true vertical depth, bottom-hole location, and orientation of directional drilling systems |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Control Centre Operator | Control Centre and Control Room Operator | • Can work in remote locations, and/or to be relocated<br>• Able to work shift<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards | **Control Centre and Control Room Operator:**<br>• Knowledge of auxiliary equipment (pumps, compressors, filters)<br>• Utilize knowledge in controlling and monitoring pipeline flow rates, system pressures, temperatures, product quality – deviations, pressure losses, product blending and batch logistics |
| Operators | Control Centre Operator | Gas Control Operator | • Can work in remote locations, and/or to be relocated<br>• Able to work shift<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards | **Gas Control Operator:**<br>• Knowledge of gas measurement principles and gas hydraulics<br>• Knowledge of combined cycle or gas plant operations<br>• Knowledge of Digital Control Systems (DCS) operations |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Control Centre Operator | Gas Processing and Oil Movement Controller | • Can work in remote locations, and/or to be relocated<br>• Able to work shift<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards | **Gas Processing and Oil Movement Controller:**<br>• Knowledge of gas processing techniques and processes including CO2 removal, dehydration, compression, and dew point control<br>• Knowledge of process design, piping design, mechanical design and other engineering work<br>• Knowledge on pipeline/station pressures controls, set points, and monitor the hydraulic |
| Operators | Control Centre Operator | Offshore Production Operator | • Can work in remote locations, and/or to be relocated<br>• Able to work shift<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards | **Offshore Production Operator:**<br>• Knowledge of mechanical principles and applications in the implementation, operation, and maintenance of instrumentation and process control systems<br>• Knowledge of offshore operations<br>• Knowledge of TOW / Wellview |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Control Centre Operator | Vessel Control Systems Operator | • Can work in remote locations, and/or to be relocated<br>• Able to work shift<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards | **Vessel Control Systems Operator:**<br>• Knowledge of controlling and monitoring dynamic positioning system<br>• Knowledge of gauge and flow meters and equipment s to ensure that tank levels, temperatures, chemical amounts, and pressure are at specified levels<br>• Knowledge of operations control of equipment or systems |
| Operators | Well Services Operators (Cementing to Production) | Nitrogen Operator | • Can work in remote locations, and/or to be relocated<br>• Able to work shift<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards | **Nitrogen Operator:**<br>• Knowledge of chemical processes or systems of machine, using panelboards, control boards, or semi-automatic equipment<br>• Knowledge of chemical reaction interpretation and laboratory test report review for adjustment<br>• Knowledge of the chemical composition, structure, and properties of substances |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Operators | Well Services Operators (Cementing to Production) | Senior Technician and Supervisor (e.g. Acidizing, Cementing, Coil Tubing, Fracturing, Nitrogen, Snubbing) | • Can work in remote locations, and/or to be relocated<br>• Able to work shift<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards | **Senior Technician and Supervisor:**<br>• Knowledge of equipment operations to increase oil flow from producing wells or to remove stuck pipe, casing, tools, or other obstructions from drilling wells<br>• Knowledge of controlling the loading and unloading of material or the operation of continuous feeding equipment such as pumps and conveyors<br>• Knowledge of equipment operations by observing instruments such as temperature and pressure gauges or physical indicators such as oil levels |
| Operators | Well Services Operators (Production and Enhancement Phases) | Senior Technician and Supervisor | • Can work in remote locations, and/or to be relocated<br>• Able to work shift<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards | **Senior Technician and Supervisor:**<br>• Knowledge of machines and tools, including their designs, uses, repair, and maintenance<br>• Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Trades | Pipefitters | Heating System Installer / Tubefitter | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Heating System Installer / Tubefitter:**<br>• Knowledge of design, install, and test industrial and commercial piping systems and automatic fire and exposure protection systems<br>• Knowledge of adjustment of system controls to setting recommended by manufacturer to balance system, using hand tools<br>• Knowledge of specification blueprints and design and manufacturers' recommendations to ascertain the configuration of heating or cooling equipment components and to ensure the proper installation of components |
| Trades | Welders | Duplex | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work and long hours<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Duplex**<br>• Knowledge of materials, methods, and the tools involved in the construction or repair of pipe and structural sites for Duplex material<br>• Knowledge of health and safety<br>• Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Trades | Welders | Stainless Steel | • Can work in remote locations, and/or to be relocated<br>• Comfortable with shift work and long hours<br>• Like practical, hands-on problem solving and solution identification<br>• Like to work with physical materials such as tools and machinery<br>• Able to follow set procedures, routines and standards<br>• Has an eye for detail<br>• Like doing a variety of tasks | **Stainless Steel:**<br>• Knowledge of materials, methods, and the tools involved in the construction or repair of pipe and structural sites for stainless steal<br>• Knowledge of health and safety<br>• Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models |

# *Appendix 2 : Skills Definition for Positions with Anticipated Shortage*

## 2. Non-degree holders

| Career Discipline | Job Area | Position | General Skills | Knowledge Areas |
|---|---|---|---|---|
| Marine & Nautical | Deck Officer | Marine Captain | • Like marine sciences<br>• Like working with computers and maps<br>• Can synthesize data from various sources in a way that makes sense to those who will use the information<br>• Can work in a team environment<br>• Can ravel and be able to work at sea for extended period of time | **Marine Captain:**<br>• Knowledge of controlling and monitoring dynamic positioning system<br>• Knowledge of principles and methods for describing the features of sea including their physical characteristics, locations and its interrelationships<br>• Knowledge of health and safety on vessels |
| Marine & Nautical | Offshore Specialties | Commercial / Deepsea Divers | • Like marine sciences<br>• Like working with computers and maps<br>• Can synthesize data from various sources in a way that makes sense to those who will use the information<br>• Can work in a team environment<br>• Can ravel and be able to work at sea for extended period of time | **Commercial / Deepsea Divers**<br>• Knowledge of performing underwater inspection, repair, removal and installation of equipment and structures<br>• Knowledge of principles and methods for describing the features of sea including their physical characteristics, locations and its interrelationships |

# *Appendix 3 : Survey Questionnaire*

## TalentCorp Survey on Talent Demand and Supply in the Malaysian Oil & Gas Sector

**A: Introduction**

**About the survey**

**Welcome to this survey on talent demand and supply in the oil and gas sector in Malaysia!**

**Overview of this survey:**

**This survey has been commissioned by Talent Corporation Malaysia Berhad (TalentCorp), a government agency under the Prime Minister's office, in order to understand your specific challenges, priorities and assistance required in meeting your future talent requirements.**

**The results of this survey will allow TalentCorp to develop industry specific interventions which can address your talent needs and further the cause of nation building for Malaysia. We encourage you to support this initiative by participating in this survey and giving us your valuable feedback.**

**We would like to assure you that the survey results will be analysed at an aggregated sectoral level and treated in strict confidence. Please complete this survey by 29th February 2012.**

**Please note the following when providing your responses:**

**The survey aims to generate insights on talent demand and supply over the short to medium term (**2012 - 2014**).**

**The survey is not designed to collect census data (entire workforce information). It focuses only on the critical and potential areas of shortages in talent.**

**Kindly do not refresh the survey pages. Please use the 'back' and 'next' buttons in the survey to move between pages.**

**We understand the time constraints faced by you. Hence our aim has been to make the survey as '**user friendly**' as possible through selection options and drop down menus. If data inputs are readily available in your organization, the survey will take** 30-45 minutes **to complete.**

**To complete the survey in multiple sessions, use the '**Save and continue survey later**' option on the top of each page. A unique link will be sent to your email id for continuing your survey. The responses provided by you in previous sessions will be secure.**

# *Appendix 3 : Survey Questionnaire*

## B: Company Profile

**Please provide the following details for your organization.**

**1) Please state the name of your organization***

_____

**2) With regards to Oil & Gas (O&G) activity, what is the extent of your core business operations?***

Note: Please state your response for the entity registered in Malaysia.

( ) Within Malaysia only

( ) Within and outside Malaysia

**3) Please indicate the sub-sector(s) and the nature of services offered by your organization.***

**Brief description:**

- **Exploration:** Conducting Geological and seismic surveys to search for oil and gas reservoirs within acreage licensed by host government
- **Development:** Further exploration and assessment to develop the most economical option to monetize the oil and gas reserves
- **Production:** Bringing crude oil and natural gas of a specific grade to the surface and preparing product for transportation
- **Transportation:** Physical movement of oil and natural gas between 2 given locations
- **Gas Processing:** Separation of gas components which are further used as fuel or in the manufacturing of organic compounds
- **Refining:** Process of refining crude oil in to more useful petroleum products
- **Petrochemicals:** Derivation of chemical products from petroleum
- **Storage/distribution terminals:** Actual locations where petroleum / gas / other petrochemicals are stored for refining or distribution to end users
- **Retail:** Sale of petroleum / petrochemical products to consumer
- **Trading:** Trading of crude oil and natural gas

# *Appendix 3 : Survey Questionnaire*

| | Design | Fabrication | Installation | Operation | Maintenance | Other Services (e.g. Audit) |
|---|---|---|---|---|---|---|
| Exploration * | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Development * | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Production * | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Transportation (incl. Marine) * | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Gas Processing * | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Refining * | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Petrochemicals * | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Storage / Distribution Terminals * | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Retail * | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Trading * | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**4) Which of the following upstream projects is your company involved in or scheduled to be involved in? (Select all applicable). The following list includes projects which have been recently announced, commenced or scheduled for implementation. Please also include any other project in your company which may require additional manpower over the next 3 years in 'other'.***

[ ] Not Applicable
[ ] Balai marginal field
[ ] Baram Delta EOR Development (BOKOR)
[ ] Berantai marginal field
[ ] Cendor Phase 2 project
[ ] Gumusut
[ ] Kebabangan Northern Hub Development project
[ ] Kumang Cluster Development project
[ ] Malikai oil field
[ ] North Sabah EOR Development
[ ] Rejuvenation of Tapis oil field
[ ] Samarang oil field
[ ] Sarawak NC3 & SPAOH-1 well discovery
[ ] Sepat oil field
[ ] Telok project
[ ] Other (Please specify) _____

# *Appendix 3 : Survey Questionnaire*

**5) Which of the following downstream projects is your company involved in or scheduled to be involved in? (Select all applicable). he following list includes projects which have been recently announced, commenced or scheduled for implementation. Please also include any other project in your company which may require additional manpower over the next 3 years in 'other'.***

[ ] Not Applicable
[ ] Labuan's Oil and Gas Hub (Pulau Daat)
[ ] LNG regassification terminal (Lahad Datu)
[ ] Melaka regassification plant
[ ] Mitsui Ammonia Sabah and Gas industrial park
[ ] Pengerang Deepwater storage terminal
[ ] Port Dickson diesel processing refinery
[ ] Tanjung Agas O&G and Maritime industrial park
[ ] Tanjung Bin development project
[ ] Tanjung Langsat industrial park and port
[ ] Refinery and Petrochemicals integrated development (RAPID)
[ ] Sabah Ammonia Urea (Samur) project
[ ] Sabah Gas separation plant (GSP 50)
[ ] Shall MDS Wax plant
[ ] Sabah O&G termial (SOGT)
[ ] Sabah Sarawak Gas pipeline (SSGP)
[ ] Other (Please specify) _____

## C: Profile of Current Workforce

**This section aims to gather information on the characteristics and size of your current workforce. Quick Tip: Use the 'tab' key to move between options for each question.**

**6) What is the size of your workforce as on 31st Dec 2011? (Please include permanent employees and employees on direct contract with your organization. Please exclude any headcount provided by a sub-contractor)***

( ) < 50
( ) 50-499
( ) 500-1999
( ) 2000-4999
( ) > 5000

# *Appendix 3 : Survey Questionnaire*

**7) Please select the job areas for which you are likely to face shortages over the next 3 years (2012-2014).***

Note: **Job areas** refer to the area of specialisation and do not refer to specific positions. Job areas are also referred to as 'job families' by many organizations. For this survey, information is being collected at the 'job area' level and not at the 'position' level.

E.g. The job area '**Petroleum engineer**' refers to all positions within this area like ***'drilling engineer', 'project engineer', 'completions engineer'*** etc. The specific positions are a function of the job area and specific 'on the job' exposure, training and experience.

| | |
|---|---|
| Job Area 1 | Petroleum Engineer |
| Job Area 2 | Chemical Engineer |
| Job Area 3 | Electrical & Instrumentation Engineer |
| Job Area 4 | Civil & Structural Engineer |
| Job Area 5 | Materials & Metallurgical Engineer |
| Job Area 6 | Geologist |
| Job Area 7 | Geophysicist |
| Job Area 8 | Well Testing Supervisor |
| Job Area 9 | Cost Control Engineer |
| Job Area 10 | Welders |
| Job Area 11 | Geological, Seismic & Mineral Technician |
| Job Area 12 | Electrical Technician |
| Job Area 13 | Supply Chain Management |
| Job Area 14 | Health, Safety & Environment |
| Job Area 15 | Finance & Asset Management |

# *Appendix 3 : Survey Questionnaire*

**8) Please indicate the following details for the job areas of shortage indicated by you. If a column (percentages) does not apply to your organization, please insert '0' for that column.***

**Total headcount** refers to overall headcount for the job area including fresh / inexperienced staff. Please include permanent and directly contracted employees only.

**Experienced headcount** refers to the employees who are '**ready to execute**', **take decisions autonomously** and **provide guidance** to other team members. (Include permanent and directly contracted employees. Please exclude headcount available from subcontractors)

**Contracted headcount** refers to those individuals who have **direct** fixed term contracts with your organization. Please **exclude** the headcount provided by **subcontractors**.

| | Total headcount (as at 31st December 2011) | % of 'experienced' headcount | % of experienced headcount on contract | % of experienced headcount who are expatriates | % of permanent Malaysian nationals working overseas |
|---|---|---|---|---|---|
| Petroleum Engineer * | | | | | |
| Chemical Engineer * | | | | | |
| Electrical & Instrumentation Engineer * | | | | | |
| Civil & Structural Engineer * | | | | | |
| Materials & Metallurgical Engineer * | | | | | |
| Geologist * | | | | | |
| Geophysicist * | | | | | |
| Well Testing Supervisor * | | | | | |
| Cost Control Engineer * | | | | | |
| Welders * | | | | | |
| Geological, Seismic & Mineral Technician * | | | | | |
| Electrical Technician * | | | | | |
| Supply Chain Management * | | | | | |
| Health & Safety * | | | | | |
| Finance & Asset Management * | | | | | |

# *Appendix 3 : Survey Questionnaire*

**9) What is the overall attrition rate in your organization? Please provide the average attrition rate for the last 3 years (2009 - 2011).***

( ) <5%

( ) 5-10%

( ) 11-20%

( ) 21-30%

( ) 31-50%

( ) 51-75%

( ) >75%

## D: Workforce Requirements (2012-2014) - Experienced Category

**Please note that this section deals only with 'experienced' employees in your organization.**

**Employees who are 'ready to execute', can take decisions autonomously and can provide guidance to other team members are deemed to be 'experienced'. Please report information and data only for employees in the grade levels requiring such experience.**

**10) Over the next 3 to 5 years, do you expect oil prices to...?***

( ) Increase over current levels

( ) Decrease below current levels

( ) Stay at the current levels

**11) Please indicate the requirements by job areas based on the work volume / projects that you plan to execute between 2012 and 2014.***

When indicating your requirement for 'experienced headcount' for the year, please provide the total requirement for **permanent** and **directly contracted** employees. Please **exclude** headcount available from subcontractors.

'**Internal promotions to 'experienced' levels:** Please only state the number of **permanent** employees who will be added to the 'experienced' pool because of promotions or role changes.

E.g. 2 petroleum engineers may be considered to take on responsibilities independently in 2012 after promotions or role changes. Please state '2' without adding the existing experienced petroleum engineer to the relevant column.

# *Appendix 3 : Survey Questionnaire*

| | Total experienced headcount required for 2012 | Internal promotions to 'experienced' levels in 2012 | Total experienced headcount required for 2013 | Internal promotions to 'experienced' levels in 2013 | Total experienced headcount required for 2014 | Internal promotions to 'experienced' levels in 2014 |
|---|---|---|---|---|---|---|
| Petroleum Engineer * | | | | | | |
| Chemical Engineer * | | | | | | |
| Electrical & Instrumentation Engineer * | | | | | | |
| Civil & Structural Engineer * | | | | | | |
| Materials & Metallurgical Engineer * | | | | | | |
| Geologist * | | | | | | |
| Geophysicist * | | | | | | |
| Well Testing Supervisor * | | | | | | |
| Cost Control Engineer * | | | | | | |
| Welders * | | | | | | |
| Geological, Seismic & Mineral Technician * | | | | | | |
| Electrical Technician * | | | | | | |
| Supply Chain Management * | | | | | | |
| Health & Safety * | | | | | | |
| Finance & Asset Management * | | | | | | |

# *Appendix 3 : Survey Questionnaire*

**12) Please provide the** 'average time to fill positions' **for the job areas of shortage indicated by you.***

| | Average time to fill position (days) |
|---|---|
| Petroleum Engineer * | --Please Select-- |
| Chemical Engineer * | --Please Select-- |
| Electrical & Instrumentation Engineer * | --Please Select-- |
| Civil & Structural Engineer * | --Please Select-- |
| Materials & Metallurgical Engineer * | --Please Select-- |
| Geologist * | --Please Select-- |
| Geophysicist * | --Please Select-- |
| Well Testing Supervisor * | --Please Select-- |
| Cost Control Engineer * | --Please Select-- |
| Welders * | --Please Select-- |
| Geological, Seismic & Mineral Technician * | --Please Select-- |
| Electrical Technician * | --Please Select-- |
| Supply Chain Management * | --Please Select-- |
| Health & Safety * | --Please Select-- |
| Finance & Asset Management * | --Please Select-- |

# *Appendix 3 : Survey Questionnaire*

**13) Please indicate the main sources of talent when filling shortages***

| | Malaysian talent in Malaysia | Malaysian talent outside Malaysia | Foreign talent outside Malaysia |
|---|---|---|---|
| Petroleum Engineer * | ☐ | ☐ | ☐ |
| Chemical Engineer * | ☐ | ☐ | ☐ |
| Electrical & Instrumentation Engineer * | ☐ | ☐ | ☐ |
| Civil & Structural Engineer * | ☐ | ☐ | ☐ |
| Materials & Metallurgical Engineer * | ☐ | ☐ | ☐ |
| Geologist * | ☐ | ☐ | ☐ |
| Geophysicist * | ☐ | ☐ | ☐ |
| Well Testing Supervisor * | ☐ | ☐ | ☐ |
| Cost Control Engineer * | ☐ | ☐ | ☐ |
| Welders * | ☐ | ☐ | ☐ |
| Geological, Seismic & Mineral Technician * | ☐ | ☐ | ☐ |
| Electrical Technician * | ☐ | ☐ | ☐ |
| Supply Chain Management * | ☐ | ☐ | ☐ |
| Health & Safety * | ☐ | ☐ | ☐ |
| Finance & Asset Management * | ☐ | ☐ | ☐ |

**14) If foreign talent is a supply source for your organization, which countries do you typically hire from?**

[ ] Australia

[ ] Canada

[ ] India

[ ] Indonesia

[ ] Philippines

[ ] Russia

[ ] Saudi Arabia

[ ] United Kingdom

[ ] United States of America

[ ] Vietnam

[ ] Other (Please specify) _____

# *Appendix 3 : Survey Questionnaire*

## E: Workforce Requirements (2012-2014) - Fresh / Inexperienced Category

**15) Please provide details of your hiring plans or the 'fresh / inexperienced' category.***

For '**Hiring plan for 2012**', please indicate the number of fresh graduates or inexperienced personnel who are **not yet ready to execute independently**, which you plan to hire in 2012.

| | Hiring plan for 2012 | Hiring plan for 2013 | Hiring plan for 2014 |
|---|---|---|---|
| Petroleum Engineer * | | | |
| Chemical Engineer * | | | |
| Electrical & Instrumentation Engineer * | | | |
| Civil & Structural Engineer * | | | |
| Materials & Metallurgical Engineer * | | | |
| Geologist * | | | |
| Geophysicist * | | | |
| Well Testing Supervisor * | | | |
| Cost Control Engineer * | | | |
| Welders * | | | |
| Geological, Seismic & Mineral Technician * | | | |
| Electrical Technician * | | | |
| Supply Chain Management * | | | |
| Health & Safety * | | | |
| Finance & Asset Management * | | | |

# *Appendix 3 : Survey Questionnaire*

**16) In your opinion, what additional skills would employees in your organization require to manage the future growth in the oil and gas sector in Malaysia?**
Note: Please include technical as well as soft skills, as applicable.

| | Skills |
|---|---|
| Petroleum Engineer * | |
| Chemical Engineer * | |
| Electrical & Instrumentation Engineer * | |
| Civil & Structural Engineer * | |
| Materials & Metallurgical Engineer * | |
| Geologist * | |
| Geophysicist * | |
| Well Testing Supervisor * | |
| Cost Control Engineer * | |
| Welders * | |
| Geological, Seismic & Mineral Technician * | |
| Electrical Technician * | |
| Supply Chain Management * | |
| Health & Safety * | |
| Finance & Asset Management * | |

# *Appendix 3 : Survey Questionnaire*

**17) Please indicate your preference when hiring** fresh graduates**.***

( ) Graduates from foreign universities outside Malaysia

( ) Graduates from private universities in Malaysia

( ) Graduates from public universities in Malaysia

( ) No preference

**18) Please select the local academic institutions from which you typically source fresh graduates. (Please select a maximum of 5)**

( ) Petronas University of Technology (UTP)

( ) Curtin University of Technology, Sarawak

( ) Institute of Technology Petronas (INSTEP)

( ) International Islamic University Malaysia (UIA)

( ) Malaysian Maritime Academy (ALAM)

( ) UCSI University

( ) University of Malaya (UM)

( ) University of Nottingham Malaysia Campus

( ) University of Technology Malaysia (UTM)

( ) University Kebangsaan Malaysia (UKM)

( ) University Malaysia Pahang

( ) University Malaysia Sarawak

( ) University Malaysia Sabah

( ) University Putra Malaysia (UPM)

( ) University Technology Mara (UiTM)

**19) In your opinion, have the courses / programmes offered by the above academic institutions met your expectations when hiring fresh graduates?***

( ) Yes

( ) No

# *Appendix 3 : Survey Questionnaire*

**20) If given a choice, which academic institutions would you prefer to hire from?**

[ ] Same as the above

[ ] Other (Please specify)

[ ] Other (Please specify)

[ ] Other (Please specify)

**21) What improvements would you like to see at the university / institution level to better meet your expectations from fresh graduates? Select all applicable. ***

[ ] Updated course content that is aligned to industry needs

[ ] Longer internship programmes with industry players

[ ] Increased interaction with industry professionals for 'practical' learning during the course

[ ] Greater focus on project based learning

[ ] Availability of interpersonal / communications training courses to students

[ ] Greater focus on management and leadership concepts

[ ] Other (Please specify)

## F: Your Talent Management Practices & Challenges

**22) Which of the following challenges does your organization face in** recruiting local **talent?***

Please select all that apply. If you wish to state additional challenges or provide specific feedback on listed items, please use the 'other' option.

[ ] Greater competition from the global marketplace

[ ] Increasing remuneration costs

[ ] Restrictive labour regulations or policies

[ ] Physically demanding nature of jobs

[ ] Gender bias (activities not suited to one gender)

[ ] Remote location of workplace

[ ] Lack of adequately skilled graduates for entry level jobs

[ ] Other (Please specify)

# *Appendix 3 : Survey Questionnaire*

**23) Which of the following challenges does your organization face in** recruiting foreign **talent?***

Please select all that apply. If you wish to state additional challenges or provide specific feedback on listed items, please use the 'other' option.

[ ] Greater competition from the global marketplace

[ ] Increasing remuneration costs

[ ] Level of crime and concerns on security

[ ] Restrictive labour regulations or policies

[ ] Getting approval for work permit from authorities

[ ] Physically demanding nature of jobs

[ ] Gender bias (activities not suited to one gender)

[ ] Remote location of workplace

[ ] Lack of adequately skilled graduates for entry level jobs

[ ] Inability to match international standards of living

[ ] Arranging work permit for spouse

[ ] Inadequate international schooling facilities

[ ] Inability to provide quality healthcare services / facilities

[ ] Other (Please specify)

**24) Which of the following challenges does your organization typically face in** retaining talent**?**

Please select all that apply. If you wish to state additional challenges or provide specific feedback on listed items, please use the 'other' option.

[ ] Resistance among employees to accept global assignments

[ ] Greater competition from the global marketplace

[ ] Increasing remuneration costs

[ ] Job insecurity caused by the project based nature of work

[ ] Physically demanding nature of jobs

[ ] Relatively slow career progression rate

[ ] Other (Please specify)

# *Appendix 3 : Survey Questionnaire*

**25) Please select the sectors against which your organization competes, in hiring talent. (Select a maximum of 3 sectors)**

[ ] Not Applicable

[ ] Aviation

[ ] Automotive

[ ] Chemical

[ ] Electrical and Electronics

[ ] Energy

[ ] Information, Communication & Technology

[ ] Infrastructure

[ ] Manufacturing

[ ] Shipping

**26) Please indicate the effectiveness of the following strategies for your organization in attracting and retaining talent. (Please select only one option per statement)***

| | Highly effective | Effective | Somewhat effective | Ineffective | Not sure |
|---|---|---|---|---|---|
| Broaden search outside your geography / country * | ○ | ○ | ○ | ○ | ○ |
| Broaden search outside the sector * | ○ | ○ | ○ | ○ | ○ |
| Partner with academic institutions to meet talent needs and specifications * | ○ | ○ | ○ | ○ | ○ |
| Provide assistance in building industry specific qualifications * | ○ | ○ | ○ | ○ | ○ |
| Offer sign-on bonuses to employees joining from competing organizations * | ○ | ○ | ○ | ○ | ○ |
| Provide attractive benefits schemes * | ○ | ○ | ○ | ○ | ○ |
| Offer tenure based reward schemes * | ○ | ○ | ○ | ○ | ○ |
| Offer performance based reward schemes * | ○ | ○ | ○ | ○ | ○ |
| Share clear career paths during the hiring process * | ○ | ○ | ○ | ○ | ○ |
| Provide fast track careers * | ○ | ○ | ○ | ○ | ○ |
| Offer international assignments to employees * | ○ | ○ | ○ | ○ | ○ |

# *Appendix 3 : Survey Questionnaire*

## G: Talent Interventions

**27) For the support options provided below, please state the following:**

**a) The level of importance you attach to each option for addressing your talent needs**
**b) The entity who should be responsible for providing the support in your opinion*`**

| | Level of importance * | Responsibility entity * |
|---|---|---|
| Set up a private sector funded training centre for developing employees | -- Please Select -- | -- Please Select -- |
| Provide support to individuals for pursuing post-graduation studies through scholarships or grants | -- Please Select -- | -- Please Select -- |
| Align course content offered by universities in Malaysia with industry needs | -- Please Select -- | -- Please Select -- |
| Define process for accreditation of courses run by existing O&G training houses | -- Please Select -- | -- Please Select -- |
| Conduct bridging programmes to equip fresh graduates with relevant skills required for professional careers in the O&G sector | -- Please Select -- | -- Please Select -- |
| Provide regular updates on availability of the talent pool in Malaysia | -- Please Select -- | -- Please Select -- |
| Liberalise of participation of foreign talent in the Malaysian O&G sector | -- Please Select -- | -- Please Select -- |
| Reduce processing time of work permits in Malaysia for foreign talent | -- Please Select -- | -- Please Select -- |
| Standardise labour regulations and practices across Malaysia | -- Please Select -- | -- Please Select -- |
| Build awareness of career prospects and earning potential in the O&G sector | -- Please Select -- | -- Please Select -- |

**28) Please state below any other support that you need, to manage your future talent requirements.**

# *Appendix 3 : Survey Questionnaire*

**29) Please indicate whether your are aware of the following upskilling/employability programmes and whether you participate in these programmes***

| | Are you aware? | Do you participate? |
|---|---|---|
| Technology Specialist in Specific Domain Expertise (TESSDE) * | --Please Select-- | --Please Select-- |
| High Income Talent Research Scientist Engineer (HITRSE) * | --Please Select-- | --Please Select-- |
| Industrial Skills Enhancement Programme (INSEP) * | --Please Select-- | --Please Select-- |

**30) If you participate in the above programmes, please provide your feedback on the adequacy and effectiveness of the programmes in meeting your expectations.**

_____

**31) Please provide any other feedback that you may wish to highlight.**

_____

## Thank You!

**Thank you for taking our survey. Your response is very important to us.**

# *Appendix 4 : List of organisations engaged through focused interviews*

*Key industry players*

| No | Company | No | Company |
|---|---|---|---|
| 1 | Baker Hughes | 15 | Petra Energy |
| 2 | BC Petroleum | 16 | Petronas |
| 3 | BP Asia Pacific | 17 | Petronas Carigali |
| 4 | Bumi Armada | 18 | Petronas Chemicals |
| 5 | Deleum Berhad | 19 | Petronas Dagangan |
| 6 | Dialog Group | 20 | Petronas Gas Berhad |
| 7 | Exxon Mobil | 21 | SapuraCrest |
| 8 | Gas Malaysia | 22 | Schlumberger |
| 9 | GE Oil & Gas | 23 | Shapadu Energy & Engineering |
| 10 | Halliburton | 24 | Shell Malaysia |
| 11 | Kencana Petroleum | 25 | Talisman |
| 12 | MISC Berhad | 26 | Technip |
| 13 | Murphy Oil | 27 | UMW Oil & Gas |
| 14 | Perdana Petroleum | 28 | WASCO Energy |

*Others (Industries associations, government agencies, higher learning institution)*

| No | Company |
|---|---|
| 29 | ILMIA |
| 30 | MOGSC |
| 31 | MPRC |
| 32 | PEMANDU |
| 33 | UTP |

# *Appendix 5 : List of target companies for talent demand & supply survey*

| No | Company |
|---|---|
| 1 | ABB Malaysia Sdn. Bhd. |
| 2 | Aker Engineering Malaysia Sdn. Bhd. |
| 3 | Aker Solutions Malaysia Sdn. Bhd. |
| 4 | Alam Maritim Resources Berhad |
| 5 | Alam Sekitar Malaysia Sdn. Bhd. |
| 6 | Allied Marine and Equipment Sdn. Bhd. |
| 7 | Alpha Perisai Sdn. Bhd. |
| 8 | Amsito Oilwell Services (Malaysia) Sdn. Bhd. |
| 9 | Anjur Ekar Sdn. Bhd. |
| 10 | Apex Energy Sdn. Bhd. |
| 11 | Aramis Management Sdn. Bhd. |
| 12 | Armada Marine Contractors Caspian Pte Ltd |
| 13 | Aromatics Malaysia Sdn. Bhd. |
| 14 | Asean Bintulu Fertilizer Sdn. Bhd. |
| 15 | Atlas Oil and Gas Malaysia Sdn. Bhd. |
| 16 | ATT Tanjung Bin Sdn. Bhd. |
| 17 | Aveva Sdn. Bhd. |
| 18 | Awan Inspirasi |
| 19 | Baker Hughes Inteq (M) Sdn. Bhd. |
| 20 | BC Petroleum Sdn. Bhd. |
| 21 | Berlian McDermott Sdn. Bhd. |

| No | Company |
|---|---|
| 22 | Boustead Heavy Industries Corporation Bhd (BHIC) |
| 23 | Boustead Petroleum Marketing Sdn. Bhd. (BHPetrol) |
| 24 | BP Asia Pacific (Malaysia) |
| 25 | BP PETRONAS Acetyls Sdn. Bhd. |
| 26 | Bpe Engineering & Services Sdn. Bhd. |
| 27 | Brooke Dockyard and Engineering Works Corporation |
| 28 | Bumi Armada (Singapore) Pte Ltd |
| 29 | Bumi Armada Berhad |
| 30 | Bumi Armada Engineering Sdn. Bhd. |
| 31 | Bumi Armada Navigation Sdn. Bhd. |
| 32 | BUMI WANGSA Sdn. Bhd. |
| 33 | Bumiflow Technologies (M) Sdn. Bhd. |
| 34 | Bureau Veritas (M) Sdn. Bhd. |
| 35 | Cameron International Malaysia Systems Sdn. Bhd. |
| 36 | Carigali Hess Operating Company Sdn. Bhd. |
| 37 | Carigali-Pttepi Operating Company Sdn. Bhd. |
| 38 | Carimin Sdn. Bhd. |
| 39 | Cendana Sutera Sdn. Bhd. |
| 40 | Cendor MOPU Producer Ltd |
| 41 | Centralised Terminals Sdn. Bhd. |
| 42 | Chalpoint (M) Sdn. Bhd. |

# *Appendix 5 : List of target companies for talent demand & supply survey*

| No | Company |
|---|---|
| 43 | Chevron Malaysia Limited |
| 44 | Chiyoda Malaysia Sdn. Bhd. |
| 45 | Conoco Asia Pacific Sdn. Bhd. |
| 46 | Corro Shield (SEA) Sdn. Bhd. |
| 47 | Crest Marine Engineering Sdn. Bhd. |
| 48 | Daya Secadyme Sdn. Bhd. |
| 49 | Dayang Enterprise Holdings Berhad |
| 50 | Delcom Oilfield Services Sdn. Bhd. |
| 51 | Deleum Berhad |
| 52 | Deleum Chemicals Sdn. Bhd. |
| 53 | Deleum Oilfield Services Sdn. Bhd. |
| 54 | Deleum Services Sdn. Bhd. |
| 55 | Dialog Catalyst |
| 56 | Dialog Construction |
| 57 | Dialog E & C Sdn. Bhd. |
| 58 | Dialog E&I |
| 59 | Dialog Energy |
| 60 | Dialog Fabrication |
| 61 | Dialog Group Berhad |
| 62 | Dialog Petroleum Sdn. Bhd. |
| 63 | Dialog Plant |

| No | Company |
|---|---|
| 64 | Dialog Systems Sdn. Bhd. |
| 65 | DPS Consultant Malaysia Sdn. Bhd. |
| 66 | Dugeo (M) Sdn. Bhd. |
| 67 | Duta Marine Sdn. Bhd. |
| 68 | E&P Business Division of PETRONAS |
| 69 | Eastern Pacific Industrial Corporation Berhad (EPIC) |
| 70 | EJ JV Sdn. Bhd. |
| 71 | Emas Merdu Sdn. Bhd. |
| 72 | Energy Workforce Sdn. Bhd. |
| 73 | EPC Oil & Gas Sdn. Bhd. |
| 74 | EPIC Mushtari Engineering Sdn. Bhd. |
| 75 | Ethylene Malaysia Sdn. Bhd. |
| 76 | Ethylene/Polythylene (M) Sdn. Bhd. |
| 77 | Expro Oilfield Services Sdn. Bhd. |
| 78 | Exxon Mobil Berhad |
| 79 | Exxon Mobil Borneo |
| 80 | Exxon Mobil Business Services Centre |
| 81 | Exxon Mobil Chemical |
| 82 | Exxon Mobil Malaysia Sdn. Bhd. |
| 83 | Exxon Mobil Production |
| 84 | Far Frontier Energy Services Sdn. Bhd. |

# *Appendix 5 : List of target companies for talent demand & supply survey*

| No | Company |
|---|---|
| 85 | First Marine Services (M) Sdn. Bhd. |
| 86 | Flowco (Malaysia) Sdn. Bhd. |
| 87 | FMC Technologies |
| 88 | Foster Wheeler E & C (M) Sdn. Bhd. |
| 89 | FPSO Ventures Sdn. Bhd. |
| 90 | Gas Business Division in PETRONAS |
| 91 | Gas Generators (M) Sdn. Bhd. |
| 92 | Gas Malaysia Berhad |
| 93 | GE Oil and Gas Sdn. Bhd. |
| 94 | Geomark Sdn. Bhd. |
| 95 | Geowell Sdn. Bhd. |
| 96 | Germanischer Lloyd GLM Sdn. Bhd. |
| 97 | Gpetro Services Sdn. Bhd. |
| 98 | Halliburton Energy Services (Malaysia) Sdn. Bhd. |
| 99 | Haven Automation Industries (S) Pte Ltd |
| 100 | Hibiscus Petroleum Berhad |
| 101 | Hyrax Oil Sdn. Bhd. |
| 102 | Idaman Tropikal Sdn. Bhd. |
| 103 | Idemitsu SM Malaysia Sdn. Bhd. |
| 104 | Innovative Fluid Process Sdn. Bhd. |
| 105 | Intecsea Malaysia |

| No | Company |
|---|---|
| 106 | IOT Management Sdn. Bhd. |
| 107 | Jasa Merin |
| 108 | Johor Port |
| 109 | JP Kenny Sdn. Bhd. |
| 110 | JP Kenny Wood Group Sdn. Bhd. |
| 111 | Jurutera Perunding Akal Sdn. Bhd. |
| 112 | JX Nippon Oil & Gas Exploration (Malaysia) Ltd |
| 113 | Kencana Bestwide |
| 114 | Kencana Energy |
| 115 | Kencana HL |
| 116 | Kencana Petroleum Berhad |
| 117 | Kencana Petroleum Ventures |
| 118 | Kencana Pinewell |
| 119 | Kertih Terminals Sdn. Bhd. |
| 120 | KIC Oil Terminals Sdn. Bhd. |
| 121 | KNM Group Berhad |
| 122 | KNM Petrosab Engineering Sdn. Bhd. |
| 123 | KNM Process System Sdn. Bhd. |
| 124 | Kompakar Inc Bhd |
| 125 | Konsortium Pelabuhan Kemaman Sdn. Bhd. |
| 126 | Labuan Shipyard and Engineering Sdn. Bhd. |

# *Appendix 5 : List of target companies for talent demand & supply survey*

| No | Company |
|---|---|
| 127 | Labuan Supply Base |
| 128 | Langsat Marine Base Sdn. Bhd. |
| 129 | Langsat Terminal (One) Sdn. Bhd. |
| 130 | M3NERGY Berhad |
| 131 | Maju Integrated Engineers Sdn. Bhd. |
| 132 | Malaysia LNG Sdn. Bhd. |
| 133 | Malaysia Marine and Heavy Engineering Sdn. Bhd. (MMHE) |
| 134 | MASER (M) Sdn. Bhd. |
| 135 | MATCO (M) Sdn. Bhd. |
| 136 | MCADSKILL Solutions Sdn. Bhd. |
| 137 | MEP Engineering Sdn. Bhd. |
| 138 | MHS Aviation |
| 139 | MIR Valve Sdn. Bhd. |
| 140 | MISC Berhad |
| 141 | Mitsubishi Heavy Industries |
| 142 | Mitsui Chemicals |
| 143 | MMC Oil and Gas Engineering |
| 144 | MRCB Technologies Sdn. Bhd. |
| 145 | MTBE Malaysia Sdn. Bhd. |
| 146 | Muhibbah Engineering (M) Sdn. Bhd. |
| 147 | Muhibbah Petrochemical Engineering Sdn. Bhd. |

| No | Company |
|---|---|
| 148 | Multi-CAD Engineering Sdn. Bhd. |
| 149 | Murphy Oil Co. Ltd. |
| 150 | Murphy Sarawak Oil Company Ltd |
| 151 | Nautical Essence Sdn. Bhd. |
| 152 | O&G Works Sdn. Bhd. |
| 153 | Offshore Works Sdn. Bhd. |
| 154 | Olio Resources Sdn. Bhd. |
| 155 | OPR Pipeline & Riser Sdn. Bhd. |
| 156 | OPTIMAL Group |
| 157 | Oriental Valley Sdn. Bhd. |
| 158 | Pacific Advance Composites Sdn. Bhd. |
| 159 | Pangkalan Bekalan Kemaman Sdn. Bhd. |
| 160 | Panglima Aces Sdn. Bhd. |
| 161 | PBJV Group Sdn. Bhd. |
| 162 | Pengerang Terminals Sdn. Bhd. |
| 163 | Perdana Petroleum Berhad |
| 164 | Perisai Petroleum Teknologi Berhad |
| 165 | Perunding Padureka Sdn. Bhd. |
| 166 | Petcon (M) Sdn. Bhd. |
| 167 | Petlin (Malaysia) Sdn. Bhd. |
| 168 | Petra AWT Sdn. Bhd. |

# *Appendix 5 : List of target companies for talent demand & supply survey*

| No | Company |
|---|---|
| 169 | Petra Energy Berhad |
| 170 | Petra Fabricators Sdn. Bhd. |
| 171 | Petra Marine Sdn. Bhd. |
| 172 | Petra Resources Sdn. Bhd. |
| 173 | Petra Services Sdn. Bhd |
| 174 | Petrofac (Malaysia-Pm 304) Limited |
| 175 | Petroleum Energy Integrated Services Sdn. Bhd. |
| 176 | Petroliam Nasional Berhad (PETRONAS) |
| 177 | PETRONAS Ammonia Sdn. Bhd. |
| 178 | Petronas Carigali Sdn. Bhd. |
| 179 | Petronas Chemicals Group Bhd. |
| 180 | PETRONAS Fertilizer Kedah Sdn. Bhd. |
| 181 | Petronas Gas Berhad |
| 182 | PETRONAS LNG Limited |
| 183 | PETRONAS LNG Sdn. Bhd. |
| 184 | PETRONAS Management Training Sdn. Bhd. |
| 185 | PETRONAS Methanol (Labuan) Sdn. Bhd. |
| 186 | Petronas Penapisan (Melaka) Sdn. Bhd. |
| 187 | Petronas Penapisan (Terengganu) Sdn. Bhd. |
| 188 | PETRONAS Research Sdn. Bhd. |
| 189 | PETRONAS Technical Services Sdn. Bhd. |

| No | Company |
|---|---|
| 190 | Petrosab Logistik Sdn. Bhd. |
| 191 | PLC International Sdn. Bhd. |
| 192 | Polyethylene Malaysia Sdn. Bhd. |
| 193 | Polyplastics Asia Pacific Sdn. Bhd. |
| 194 | Polypropylene Malaysia Sdn. Bhd. |
| 195 | Powertium Engineering Sdn. Bhd. |
| 196 | Pöyry Energy (Kuala Lumpur) Sdn. Bhd. |
| 197 | PPES Works (Sarawak) Sdn. Bhd. |
| 198 | Prime Sourcing International Sdn. Bhd. |
| 199 | Proeight Offshore Engineering Sdn. Bhd. |
| 200 | Proserv Offshore Malaysia Sdn. Bhd. |
| 201 | Protek Engineers Sdn. Bhd. |
| 202 | PS Pipeline Sendirian Berhad |
| 203 | PS Terminal Sdn. Bhd. |
| 204 | PT Tanjung Nusantara |
| 205 | Puncak Oil and Gas Sdn. Bhd. |
| 206 | Punj Lloyd Oil & Gas (M) Sdn. Bhd. |
| 207 | Ramunia Fabricators Sdn. Bhd. |
| 208 | Ramunia Holdings Berhad |
| 209 | RG Gas and Chemicals |
| 210 | RM Leopad Sdn. Bhd. |

# *Appendix 5 : List of target companies for talent demand & supply survey*

| No | Company |
|---|---|
| 211 | RNZ Integrated (M) Sdn. Bhd. |
| 212 | ROC Oil Malaysia Holdings Sdn. Bhd. |
| 213 | Romilly (M) Sdn. Bhd. |
| 214 | Romstar Sdn. Bhd. |
| 215 | Rotary Technical Services Sdn. Bhd. |
| 216 | Sabah Shell Petroleum Co. Ltd. |
| 217 | Saga Dialog Sdn. Bhd. |
| 218 | San Miguel Corporation |
| 219 | Sapura Corporate Services |
| 220 | Sapura Energy Sdn. Bhd. |
| 221 | Sapura Energy Ventures Sdn. Bhd. |
| 222 | SapuraCrest Petroleum |
| 223 | Sarawak Shell Bhd |
| 224 | Sarku Engineering |
| 225 | SBM Malaysia Sdn. Bhd. |
| 226 | Schlumberger |
| 227 | Scomi Group |
| 228 | Scopus (M) Sdn. Bhd. |
| 229 | Senyum Bestari Sdn. Bhd. |
| 230 | Shapadu Corporation Sdn. Bhd. |
| 231 | Shell Malaysia Limited |

| No | Company |
|---|---|
| 232 | Shell MDS |
| 233 | Shell Refining Company Berhad |
| 234 | Siemens Malaysia Sdn. Bhd. |
| 235 | Sime Engineering Sdn. Bhd. |
| 236 | SKF Malaysia Sdn. Bhd. |
| 237 | Sri Takada Industries (Malaysia) Sdn. Bhd. |
| 238 | Stolthaven (Westport) Sdn. Bhd. |
| 239 | Subsea 7 Malaysia Sdn. Bhd. |
| 240 | Sumatec Resources Berhad |
| 241 | Synergy Oil and Gas Engineering Sdn. Bhd. |
| 242 | Talisman |
| 243 | Tanjung Citech Sdn. Bhd. |
| 244 | Tanjung CSI Sdn. Bhd. |
| 245 | Tanjung Kapal Sdn. Bhd. |
| 246 | Tanjung Langsat Port Sdn. Bhd. |
| 247 | Tanjung Offshore Berhad |
| 248 | Tanjung Offshore Marine Services Sdn. Bhd. |
| 249 | Tanjung Offshore Services Sdn. Bhd. |
| 250 | Technip |
| 251 | Technip Far East Sdn. Bhd. |
| 252 | Titan Petchem (M) Sdn. Bhd. |

# *Appendix 5 : List of target companies for talent demand & supply survey*

| No | Company |
|---|---|
| 253 | TL GeoSciences Sdn. Bhd. |
| 254 | TL Offshore Sdn. Bhd. |
| 255 | Toyo Engineering and Constructions Sdn. Bhd. |
| 256 | Transocean Drilling Sdn. Bhd. |
| 257 | Transwater API Sdn. Bhd. |
| 258 | Trisystems Engineering Sdn. Bhd. |
| 259 | Tubex Sdn. Bhd. |
| 260 | UMW Oil and Gas |
| 261 | Urban Environmental Industries Sdn. Bhd. |
| 262 | Usaha Rawang Sdn. Bhd |
| 263 | Usatech Marine (M) Sdn. Bhd. |
| 264 | VIEUS Engineering Sdn. Bhd. |
| 265 | Vinyl Chloride (M) Sdn. Bhd. |
| 266 | Vopak Terminals Pasir Gudang Sdn. Bhd. |
| 267 | WASCO Energy Limited |
| 268 | Weatherford Solutions Sdn. Bhd. |
| 269 | Welltec Oilfield Services (Malaysia) Sdn. Bhd. |
| 270 | Weststar Aviation Services Sdn. Bhd. |
| 271 | WR Grace Speciality Chemicals (M) Sdn. Bhd. |

# *Appendix 6 : List of respondents to the talent demand & supply survey*

| No | Company |
|---|---|
| 1 | Aromatics Malaysia Sdn. Bhd. |
| 2 | Asean Bintulu Fertilizer Sdn. Bhd. |
| 3 | Baker Huges Malaysia |
| 4 | BC Petroleum |
| 5 | BP Asia Pacific |
| 6 | BP Asia Pacific |
| 7 | Bumi Armada Engineering Sdn. Bhd. |
| 8 | Bumi Armada Navigation Sdn. Bhd. |
| 9 | Carigali Hess Operating Company Sdn. Bhd. |
| 10 | Chalpoint (M) Sdn. Bhd. |
| 11 | Deleum Berhad |
| 12 | Dialog Catalyst |
| 13 | Dialog Construction |
| 14 | Dialog E&C |
| 15 | Dialog E&I |
| 16 | Dialog Energy |
| 17 | Dialog Fabrication |
| 18 | Dialog Plant |
| 19 | Dialog Systems |
| 20 | E&P Business Division of PETRONAS |
| 21 | Ethylene/Polythylene (M) Sdn. Bhd. |

| No | Company |
|---|---|
| 22 | Exxon Mobil Berhad |
| 23 | Exxon Mobil Borneo |
| 24 | Exxon Mobil Business Services Centre |
| 25 | Exxon Mobil Chemical |
| 26 | Exxon Mobil Malaysia Sdn. Bhd. |
| 27 | Exxon Mobil Production |
| 28 | FPSO Ventures Sdn. Bhd. |
| 29 | Gas Business Division in PETRONAS |
| 30 | Gas Malaysia Berhad |
| 31 | Halliburton Energy Services (M) Sdn. Bhd. |
| 32 | Jurutera Perunding Akal Sdn. Bhd. |
| 33 | JX Nippon Oil & Gas Exploration (Malaysia) Limited |
| 34 | Labuan Shipyard & Engineering Sdn. Bhd. |
| 35 | Langsat Terminal (One) Sdn. Bhd. |
| 36 | Malaysia LNG Sdn. Bhd. |
| 37 | MISC Berhad |
| 38 | MMC Oil & Gas Engineering |
| 39 | MTBE Malaysia Sdn. Bhd. |
| 40 | Murphy Oil |
| 41 | OPTIMAL Group |
| 42 | Petlin (Malaysia) Sdn. Bhd. |

# *Appendix 6 : List of respondents to the talent demand & supply survey*

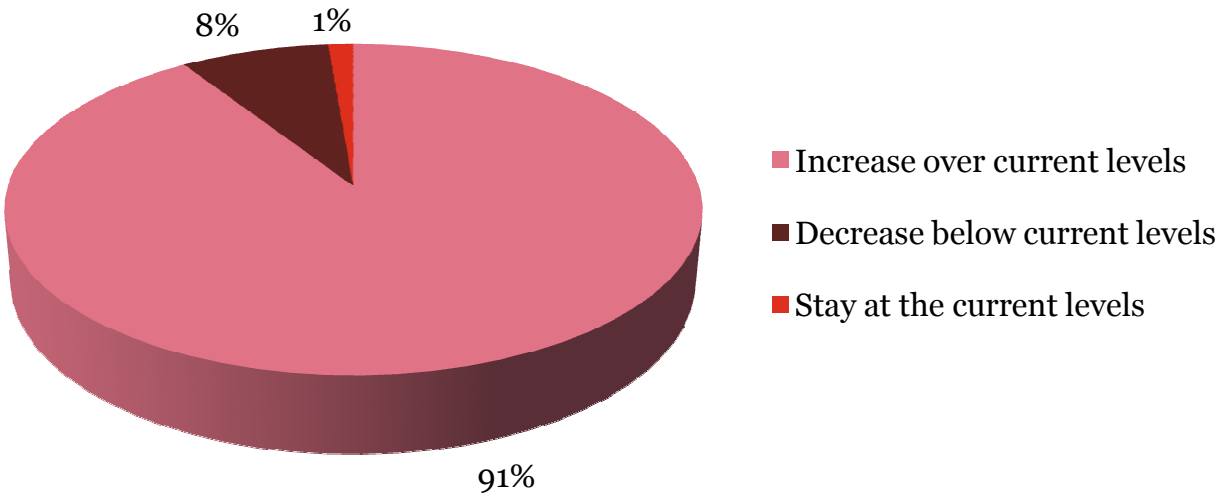
| No | Company |
|---|---|
| 43 | Petra AWT Sdn. Bhd. |
| 44 | Petra Energy Berhad |
| 45 | Petra Fabricators Sdn. Bhd. |
| 46 | Petra Marine Sdn. Bhd. |
| 47 | Petra Resources Sdn. Bhd. |
| 48 | Petra Services Sdn. Bhd |
| 49 | Petroliam Nasional Berhad (PETRONAS) |
| 50 | PETRONAS Ammonia Sdn. Bhd. |
| 51 | PETRONAS Carigali Sdn. Bhd. |
| 52 | Petronas Chemicals Group Bhd. |
| 53 | PETRONAS Fertilizer Kedah Sdn. Bhd. |
| 54 | PETRONAS Gas Berhad |
| 55 | PETRONAS LNG Limited |
| 56 | PETRONAS LNG Sdn. Bhd. |
| 57 | PETRONAS Management Training Sdn. Bhd. |
| 58 | PETRONAS Methanol (Labuan) Sdn. Bhd. |
| 59 | PETRONAS Research Sdn. Bhd. |
| 60 | PETRONAS Technical Services Sdn. Bhd. |
| 61 | Prime Sourcing International Sdn. Bhd. |
| 62 | Sabah Shell Petroleum Co. Ltd. |
| 63 | Saga Dialog: HSE/Planning/QA&QC |
| 64 | Sapura Corporate Services |
| 65 | Sapura Energy Sdn. Bhd. |
| 66 | Sapura Energy Ventures Sdn. Bhd. |
| 67 | SapuraCrest Petroluem Berhad |
| 68 | Sarawak Shell Bhd |
| 69 | Sarku Engineering |
| 70 | Schlumberger |
| 71 | Shell MDS |
| 72 | Shell Refining Company Berhad |
| 73 | Talisman |
| 74 | Technip |
| 75 | TL GeoSciences Sdn. Bhd. |
| 76 | TL Offshore Sdn. Bhd. |
| 77 | UMW Oil & Gas |
| 78 | Vinyl Chloride (M) Sdn. Bhd. |
| 79 | Weststar Aviation Services Sdn. Bhd. |

# *Appendix 7 : Survey Findings*

The following results depict responses from survey respondents to questions which are not included in the main body of the report

**Over the next 3 - 5 years, do you expect oil prices to?**

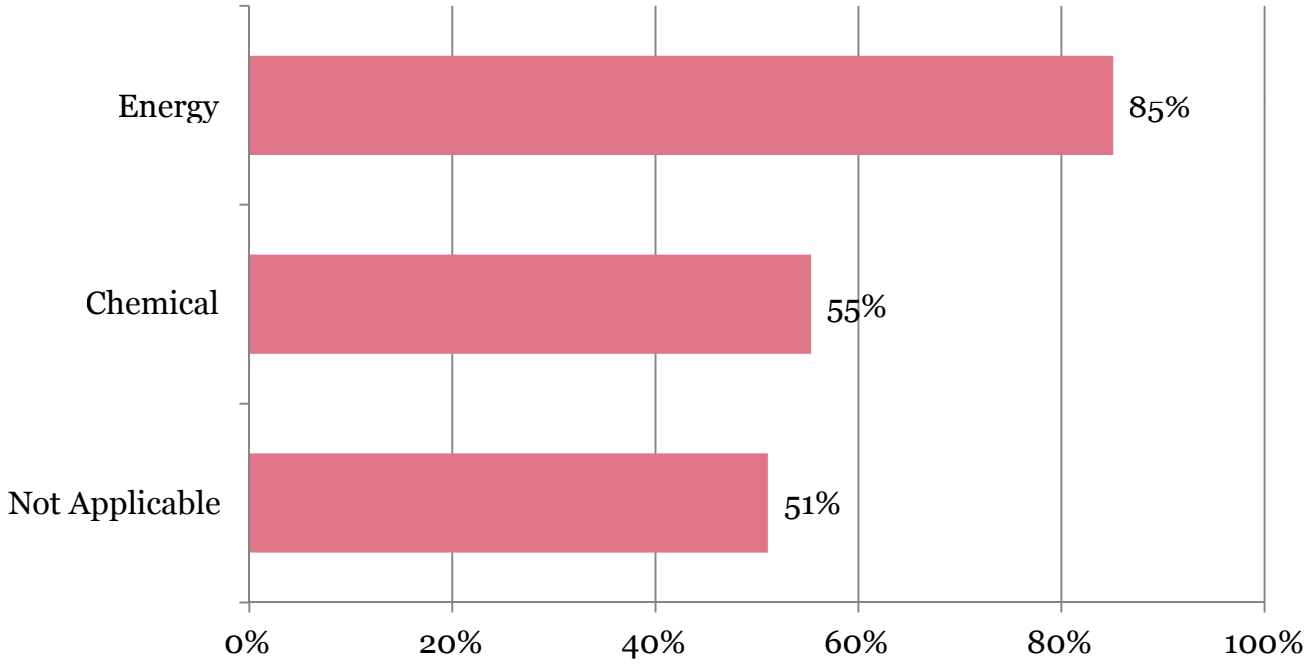
n = 76




**Please select the sectors against which your organization competes, in hiring talent.**

n = 79

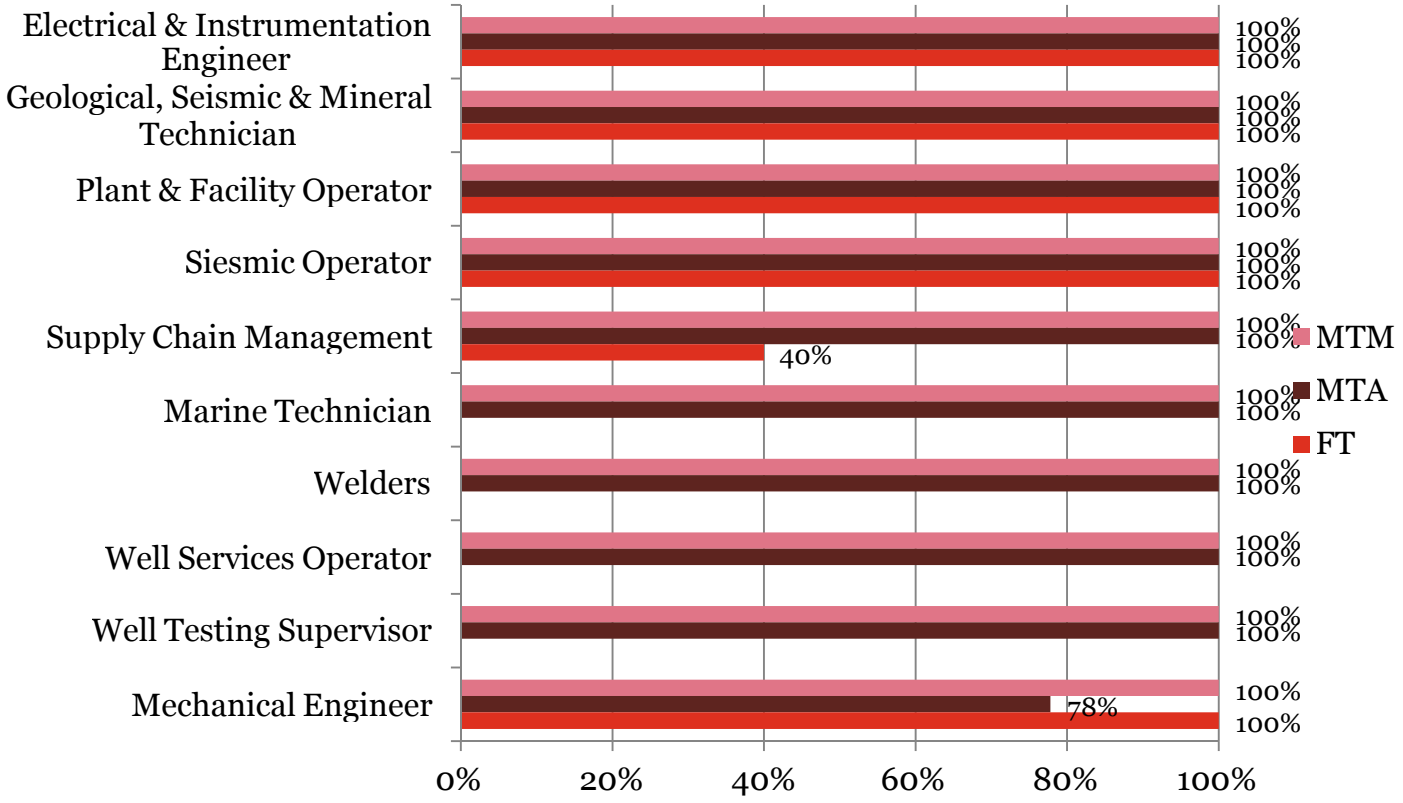
**Sector (Top 3)**



# *Appendix 7 : Survey Findings*

The following results depict responses from survey respondents to questions which are not included in the main body of the report

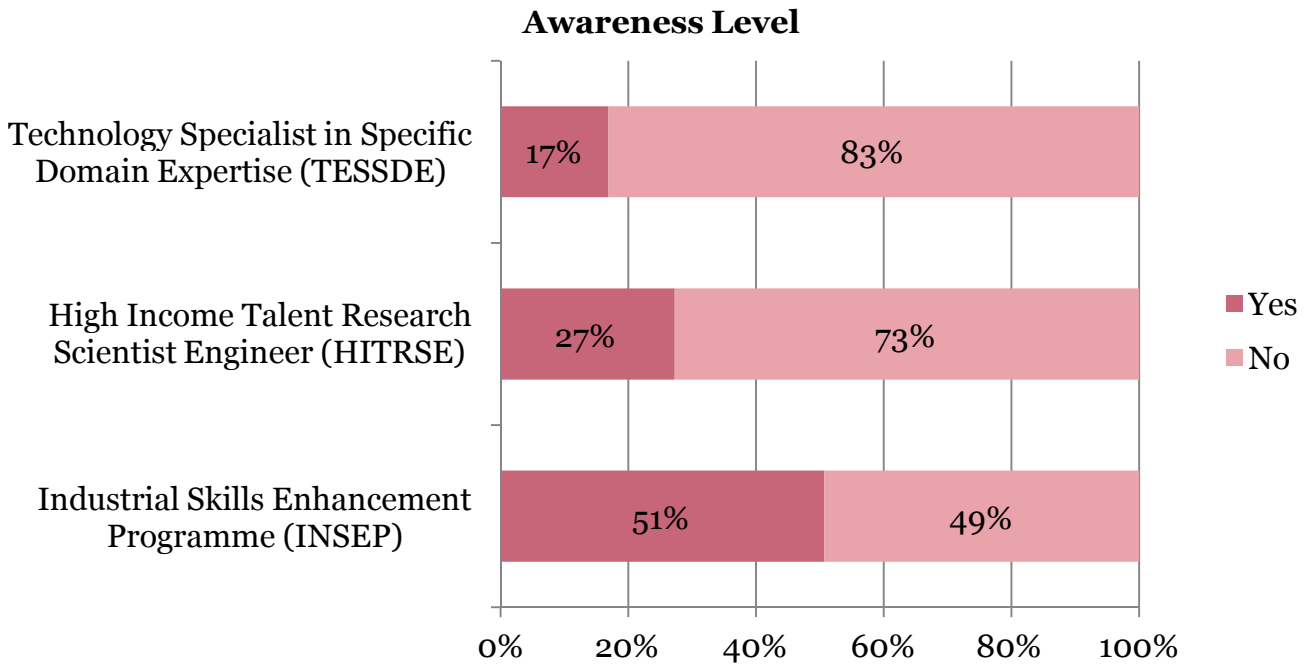
***Please indicate the main sources of talent when filling shortages***

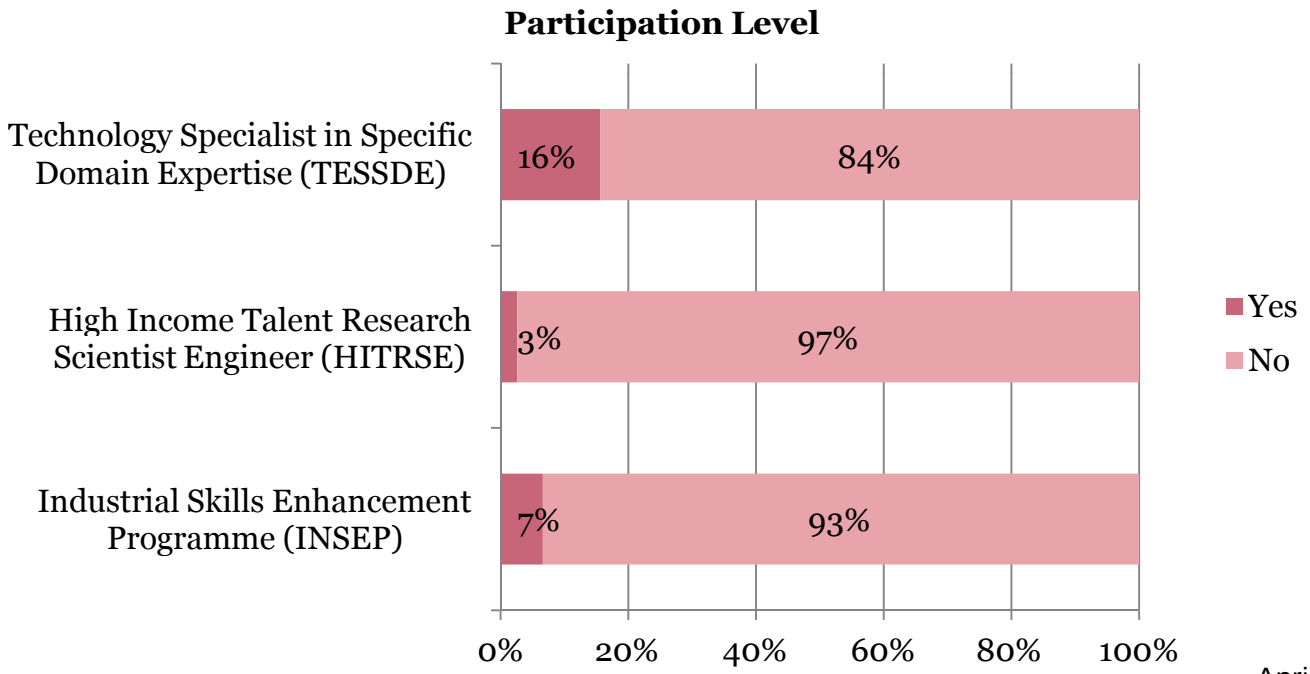


# *Appendix 7 : Survey Findings*

**Please indicate whether you are aware of the following upskilling/employability programmes and whether you participate in these programmes**

n = 77



# *Appendix 7 : Survey Findings*

## Additional skill requirements for top 5 job areas of shortage

### Additional skills requirement highlighted for electrical & instrumentation engineer

- Hook up and commissioning
- Electrical equipment sizing calculation
- Distributed Control System
- LNG design capabilities

### Additional skills requirement highlighted for geoscientist

- Communication, leadership and technical presentation skills

### Additional skills requirement highlighted for civil & structural engineer

- Project management
- Hook up and commissioning
- Design, calculation and modeling of civil foundations and structural steel
- Communication, leadership and technical presentation skills

### Additional skills requirement highlighted for mechanical engineer

- Rotating & static equipment,
- Heating, ventilation and air conditioning (HVAC)
- International codes (API, ASME / ANSI, NFPA, NACE, EN and ISO)
- Technical audit

### Additional skills requirement highlighted for petroleum engineer

- Communication, leadership and technical presentation skills
- Project management
- Negotiation skills
- Auto CAD software,
- Report writing
- Deepwater techniques

### Common skills requirement highlighted across all job areas of shortage

- Communication, leadership and technical presentation skills
- Project management

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