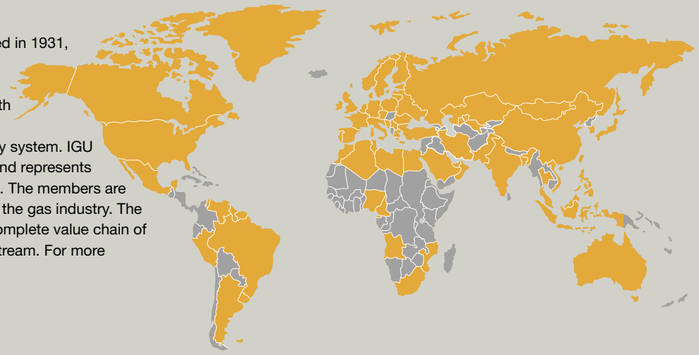
IGU

The International Gas Union (IGU), founded in 1931, is a worldwide non-profit organisation promoting the political, technical and economic progress of the gas industry with the mission to advocate for gas as an integral part of a sustainable global energy system. IGU has more than 110 members worldwide and represents more than 95% of the world's gas market. The members are national associations and corporations of the gas industry. The working organization of IGU covers the complete value chain of the gas industry from upstream to downstream. For more information, please visit www.igu.org.



BUILDING STRATEGIC HUMAN CAPITAL

25TH WORLD GAS CONFERENCE

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KUALA LUMPUR 2012 WORLD GAS CONFERENCE

25th world gas conference
"Gas: Sustaining Future Global Growth"
Kuala Lumpur, Malaysia
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building strategic human capital

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KUALA LUMPUR 2012 WORLD GAS CONFERENCE

2009–2012 Triennium Work Report

June 2012

Building Strategic Human Capital

Produced by:

TASK FORCE 1

International Gas Union

Chair: Ieda Gomes, United Kingdom

Project Sponsors:

This document contains strictly technical information to be distributed during the 25th World Gas Conference in Kuala Lumpur, Malaysia, and has no commercial intent.

Table of Contents

Abstract

The International Gas Union's (IGU) Malaysian Triennium (2009-2012) focused its special projects on two key themes impacting the outlook of the gas industry; human resources and geopolitics.

Task Force 1 (TF1) "Building Strategic Human Capital in the Gas Industry" concentrated its Triennium work on understanding the demographics of the industry, key issues relating to the attraction, retention and development of critical talent, priorities and challenges across regions, sharing of best practices and how energy professionals see the future and attractiveness of the industry.

In order to deliver the Triennium objectives, TF1 assembled 68 members and collaborators from 27 countries. The Triennium work was organised around six international meetings, two regional workshops and a series of surveys and interviews with energy experts and young professionals.

The Triennium report highlights the following themes:

- Ageing and diversity of the workforce
- Technical skills as a critical business issue particularly in Engineering, Construction and Operations
- National targets and programmes aimed at increasing the share of local employees, companies' response to address the talent gap and actions required to improve the image of the industry among young people

Executive Summary

According to projections from leading energy bodies, natural gas will continue to play a vital role in the future world energy mix. The International Energy Agency (IEA)'s World Energy Outlook 2011 study "Are We Entering a Golden Age of Gas?" predicts that by 2035 gas demand will grow by 30% led by non-OECD countries. This will put gas companies under pressure to meet the growth in demand. Companies will need to increase efforts into exploration and production to find new gas fields; to push the frontiers of technology to explore for unconventional gas; to develop new Liquefied Natural Gas (LNG) projects and gas transportation; and to negotiate commercial arrangements and gas contracts to market and trade gas. ***People are a key element to deliver this growth.*** Several surveys with top international oil and gas companies ranked the shortage of talent as one of the most important challenges facing the industry.

According to The Economist Intelligence Unit/GL Noble Denton survey "The outlook for the oil and gas industry in 2012" which interviewed 185 industry leaders, skills shortage is one of the major barriers for growth over the next 12 months and it is the second on the list of top issues impacting the industry after the main issue of rising operating costs. Similarly, the 2011 oil and gas Human Resources (HR) Benchmark led by Schlumberger Business Consulting (SBC) reveals that human resources (HR) is the limiting factor for growth in the exploration and production industry, with more than 60% of the respondents acknowledging that staffing difficulties due to talent shortage generate delays in projects.

Demand has outstripped supply with the rapid growth of new projects, the emergence of new markets and the development of new gas technologies. The ageing demographics tend to exacerbate the issue, with the retirement of many experts compounded by the reducing number of young people interested in technical careers.

The IGU Malaysian Triennium created Task Force 1(TF1), "Building Strategic Human Capital" to produce an overview of the key human talent issues impacting the gas industry and to address its future.

To deliver its objectives, TF1 put in place a comprehensive programme of surveys and interviews with energy industry experts and young professionals, complemented by collating case studies on best practice and regional workshops with participation of companies from Asia, Europe, Middle East and Latin America. TF1 assembled 68members and collaborators from 27 countries (listed in Appendix 1). In addition, TF1 also developed a partnership with Schlumberger Business Consulting to interpret jointly-developed demographics and detailed surveys.

TF1 was sponsored by Oman LNG and Total. Six TF1 meetings and two workshops were hosted by BP, RWE Transgas, National Grid, the French Gas Association, Qatargas and Naturgas Energia. TF1 also received special support from the Energy Delta Institute of the Netherlands.

Key findings

In 2010 and 2011, TF1undertook two surveys with international and local gas companies to capture key challenges related to human resources along the gas value chain. The analysis of the demographic profiles, manpower planning priorities, recruitment challenges, training and career practices and attrition trends, revealed how gas companies are being impacted by human resources issues and their response to address this challenge.

TF1's interviews with 19energy experts and 14young professionals and graduates provided a qualitative overview of the future of the gas industry, the energy mix of the future and key selling points to attract talent in the face of competition from other industries.

Regional workshops held in Doha (2010) and Paris (2011) provided the opportunity for TF1 to understand regional issues and gather examples of companies' responses to attract, develop and retain people.

The key findings from the surveys, interviews and workshops are summarised below:

Demographics of the Gas Industry

- The average age of the technical workforce in gas companies is more than 40 years. However, this average hides different profiles from region to region. Western companies have an older technical workforce (45+) whereas Latin American and Middle Eastern companies have a younger base of technical staff. Asia seems more balanced, with an equal proportion of technical staff from 30 to 50 years-old
- In terms of segments of the gas value chain, Distribution companies appear to have older workforces when compared with Upstream or Midstream players. This may reflect the recent efforts from exploration and production focused companies to recruit an increasing number of subsurface and surface technical staff. The same applies for LNG focused Midstream companies which have put in place a considerable amount of new projects in the last few years

Gender Diversity

- The proportion of female staff is low in most regions. No more than 8% of females are present in core business functions at the senior management level in Europe and North America, 15% for core middle management positions in the same regions. This proportion is especially low in the Middle-East with less than 3% and 9% women in core business functions at the senior and middle management functions respectively
- Gender diversity is low in all segments of the gas value chain (Upstream, Midstream and Downstream)
- Most companies do not set targets in terms of gender diversity, in the Upstream segment, less than 25% of the respondents reported having objectives in terms of gender diversity. However, up to 40% of the companies involved in Distribution activities do have such internal objectives. This illustrates the relatively strong conservatism of the exploration and production environment when compared to the Downstream and Midstream segments
- Upstream gas is lagging behind other segments in terms of diversity and inclusion programmes, confirming the picture given on female participation at management levels

Attrition

- European and North American companies report the highest attrition rates, with almost 5% per year in Operation and Production activities
- To combat attrition, companies resort to training and development, career development programmes and accelerated career path programmes
- Most people leaving gas companies remain within the energy sector

Retirement

- Technical staff retirement severely affects European companies
- Asian companies show the youngest retirement age when compared to other regions, with a range between 56 and 58 maximum on average depending on the functions. On the other hand, the average retirement age for technical functions in Europe and North America exceeds 60 in many companies

Supply and Demand of Key Staff

- Gas companies suffer from a shortage in technical and projects skills, with national companies suffering more than international companies
- The most acute technical shortages are in Engineering, Construction and Operation
- Over the next ten years, gas companies do not expect to reduce the technical talent gap
- Critical capabilities and local talent are key elements driving manpower plans
- LNG and Marketing and Trading are the key capabilities companies seek to develop in the whole value chain
- LNG capability is critical for Asia and Middle East; Marketing and Trading is essential in most regions
- Companies with large exposure to gas value chain seek to develop more capabilities

Recruitment Challenges

- In the Middle East, Africa and South America it appears more difficult to find talent
- Marketing and Trading is a critical priority in graduate recruitment, while for mid-careers LNG skills are also a priority
- Technical and commercial profiles will remain prevalent in future graduate and mid-career recruitment
- Career development and company image are attractive factors for fresh graduates
- Good compensation is important for mid-careers but it is not sufficient, mid-careers also look for responsibilities, career perspectives and are sensitive to company image

Competency Development

- Training needs reflect the booming activities of each segment of the gas value chain;
- The development of LNG projects generates strong training needs, especially in Asia and the Middle East
- Upstream companies use more “on the job” training and coaching and less classroom training than Distribution companies, more than 50% of the time allocated to training for young technical staff is held on the job versus 15% in classic classroom training. This proportion reaches 65% for experienced staff, versus less than 30% for Midstream companies
- Most companies conduct technical competency assessment, especially in Upstream gas
- Training effectiveness is mainly measured by individual performance, though Upstream companies tend to resort to technical tests more than other segments of the value chain
- Half of the respondents have a coaching programme for their technical staff, with Upstream more involved than Midstream and Downstream players (60% of Upstream respondents versus 40% and 50% for Midstream and Downstream)

Career Management Practices

- Technical career ladders are common among Upstream companies, less for Distribution. However, only half of Midstream and Distribution respondents align technical and managerial career ladders in terms of recognition and compensation versus 80% of Upstream respondents

- Job rotation and high potential programmes are approaches used largely to accelerate career development
- Rotation across functions and disciplines is common within Upstream and Midstream companies, less for Distribution companies
- Upstream companies rotate junior staff faster than other segments, with 75 of the Upstream respondents reporting a rotation frequency of one to two years for junior staff;
- In most companies, the typical rotation frequency is two to four years for experienced staff
- Mobility constraints and scarcity of resources are the main difficulties to maintaining staff on projects
- The Distribution segment seems to face more difficulties in mobilising technical staff for projects
- European companies resort to virtual team technologies and external contractors to mitigate staffing difficulties, while Asian companies prefer coaching and mobility

Regional Issues

- The gas industry provides exciting growth perspectives in the Middle East, Asia and Americas but Europe faces a more challenging outlook with a mature industry and debate around the decarbonisation agenda
- In non-OECD countries, the industry needs to hire not only new graduates but also skilled and experienced people
- Several countries establish targets for hiring local employees. The targets are either a percentage of the local workforce, such as in the Middle East and Africa, or are embedded in the overall local context, such as in Brazil. This results in pressure to improve the quality of university courses and to provide supplementary in-house training for new recruits
- In order to improve quality of intake, several companies have put in place their own “corporate universities”, others are developing courses and a syllabi with universities
- In Asia there is an emerging need to balance traditional job-for-life with career development and refreshing the ageing workforce
- Several Downstream and Midstream companies are moving Upstream to secure gas supplies and many are increasing their portfolio of international assets. They need to recruit experienced people with exploration and production and commercial skills and who are comfortable to work abroad
- For companies which operate on local and regional levels, language is also a barrier to international recruitment. Although English is increasingly seen as the international business language, local staff speak their native language at their local offices
- The image of the gas industry seems to be more of a concern only in parts of Europe and North America. The image of the industry in Eastern Europe, South America, Middle East and Asia seems reasonably strong among graduates and young professionals
- There is evidence suggesting that a relatively low number of Engineering graduates work in the core business, for example in the United Kingdom (UK). This may suggest that either there are not so many jobs in sciences or the quality of the university courses needs to be improved

Talent Attraction –experts’ and youth perspective

- Young people want to make an impact in the world
- Companies should show social responsibility, respect for nature and respect and recognition for employees. Beyond comfort and technology, people seek the sense of respect for nature and social equality as part of an “improved lifestyle”
- A good career plan would be a benefit because the young generation won’t work just for the intangible rewards of a job but are also looking for an attractive career path and reward package

- A balanced recruitment policy: internal recruitment seems an important tool to encourage employees to continuously improve their professional skills whereas external recruitment helps to refresh the talent pool and infuse fresh ideas
- Transparency in demonstrating that the industry is not just exploiting natural resources of a country but is also bringing value to the resource owners
- International companies should demonstrate commitment to developing local talent
- The industry should endeavour to demonstrate that the efficient and wise use of natural gas can help the global economy to transition to a cleaner, sustainable energy environment in conjunction with continued development and improvement of renewable sources. Focus on gas being “green” and cleaner
- Companies should endeavour to recruit more women into the workforce thus widening the talent pool
- Companies with multicultural management and multidisciplinary approach, seem more attractive to young people
- Companies should provide development opportunities to employees, including job rotation, accelerated career path and international mobility
- Top selling points to attract young people:
  - work-life balance
  - dynamic and creative work environment
  - diversified portfolio
  - career opportunities
  - competitive remuneration package
  - pleasant work environment
  - challenging tasks
  - attractive products and services
  - professional development and training
  - company’s social responsibility

Conclusions

According to TF1 Triennium work the gas industry needs to recruit thousands of technical staff over the next five years, both at graduate and mid-career levels. The industry needs to dedicate effort to address technical and commercial skills gaps and to improve its image. Although gas is perceived as an important fuel in the global energy mix, young people appear unaware or unwilling to pursue careers in the industry.

- The gas industry is characterised by an ageing workforce, particularly in North America and Europe. The industry is starting to devise initiatives to use experienced people as consultants and in developing and mentoring young professionals
- Companies are increasingly resorting to developing in-house programmes to polish the skills of their graduate intake. Several companies have also established cooperation with academic institutions to develop curricula in oil and gas disciplines
- In response to industry competition, companies have started to develop attractive and differentiated reward packages
- Although issues appear similar across the world, there is little evidence of cooperation among companies and institutions or sharing of best practice. TF1 highlights case studies from Asia, Middle East and South America which hopefully can foster knowledge sharing among IGU members
- In order to attract young people, the gas industry needs an "image makeover" and a coordinated communication and marketing campaign aimed specifically at young people, particularly women, showing the benefits of careers in the gas industry

TF1 developed a series of specific recommendations for the IGU/National Gas Associations and gas companies. A summary is set out below. The full details can be found at page 68.

Recommendations to the IGU and National Gas Associations

- Expand IGU advocacy to include specific messages to young people, depicting an exciting picture of the gas industry, including international mobility and career opportunities. Local campaigns should highlight the benefits of “green”, “abundant”, “international”, “stable” and “exciting”
- Develop an IGU training offer and a coaching/mentoring programme
- Design a web-based “Centre of Excellence” for human resources in natural gas
- Produce a catalogue of best practice particularly in fields of academic cooperation, corporate universities and diversity
- Develop a gas syllabus in cooperation with companies and universities, particularly addressing emerging gas markets’ needs and capability building (LNG, Marketing and Trading, Engineering and Construction, Operations, Gas Commercial and Distribution)
- Expand the World Gas Conference to provide more interaction for HR professionals

Recommendations to gas companies

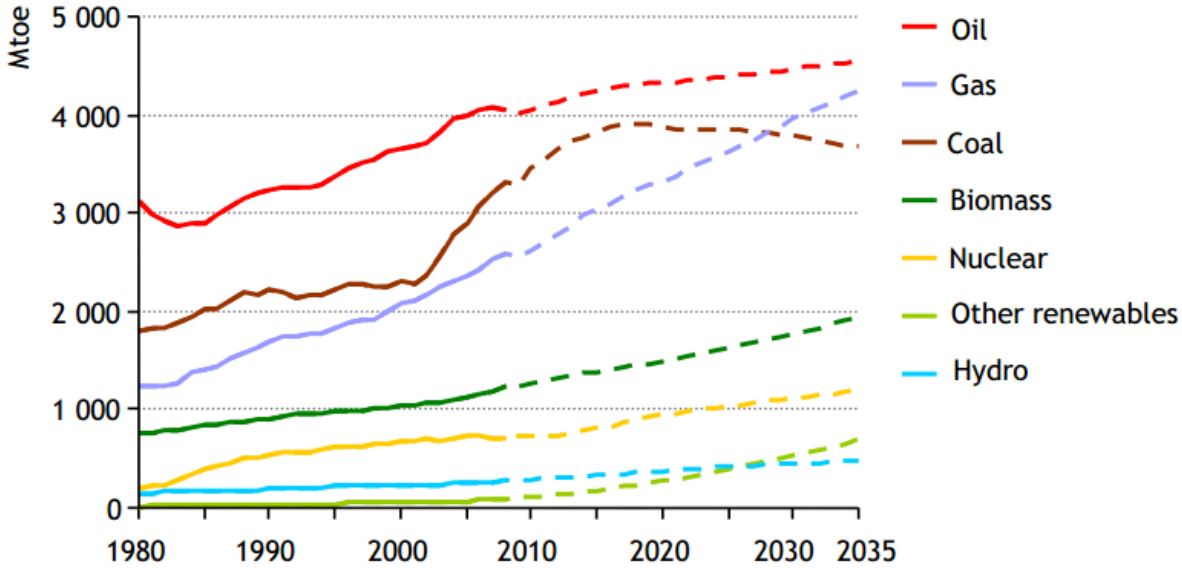
- Fund university courses and post-graduate programmes
- Promote school and university linkage programmes
- Promote mentoring programmes and skills advisers’ networks
- Fast track younger professionals into managerial roles
- Develop and promote clear and well documented career plans showing managerial and technical career paths
- Utilise social media, blogs and virtual simulation tools showing how the industry works
- Delink recruitment campaigns from oil prices
- Foster female networks and female oriented workshops
- Introduce “hire today and deploy later” programmes
- Recruit Engineering and Geosciences professionals abroad
- Provide three year international rotation roles for local employees within global companies
- Cooperate with National Gas Associations and the IGU to promote the image of the industry

Building Strategic Human Capital

Introduction

According to BP[1] and the IEA, the world's primary energy consumption grew by 45% over the past 20 years and is likely to grow by 39% over the next 20 years. Natural gas accounts for 21% of the world's primary energy consumption and is poised to account for 25% by 2035, overtaking coal by 2030.

Figure 1: World Primary Energy Demand by Fuel in the Gas Scenario



Source: IEA, World Energy Outlook, 2011

There are currently nearly 50 countries in the world with relevant gas production. However, due to the increase in growth of international trading by pipeline and LNG there are more than 70 countries consuming natural gas. Natural gas consumption has grown on average 2.8%over the last 10 years, 7.3% alone in 2009/2010.

The IEA, in its special report "Are We Entering a Golden Age of Gas?", forecasts that natural gas demand will grow 30% by 2035. Non-OECD countries account for 51% of today's gas consumption and will account for 80% of the growth by 2035.

The growth in gas demand will be driven by the following factors:

- Natural gas's role in reducing carbon emissions and pollutants in general when compared to other fossil fuels
- Enhanced security of supply by diversifying the world energy mix, with resources geographically dispersed and the increased opportunities provided by LNG trading
- Vast global gas resource with conventional resources equivalent to 120 years of current gas consumption while total recoverable resources could sustain 250 years of current gas production
- The increasing role of LNG in expanding global gas trading, particularly in light of fast paced floating regasification technologies

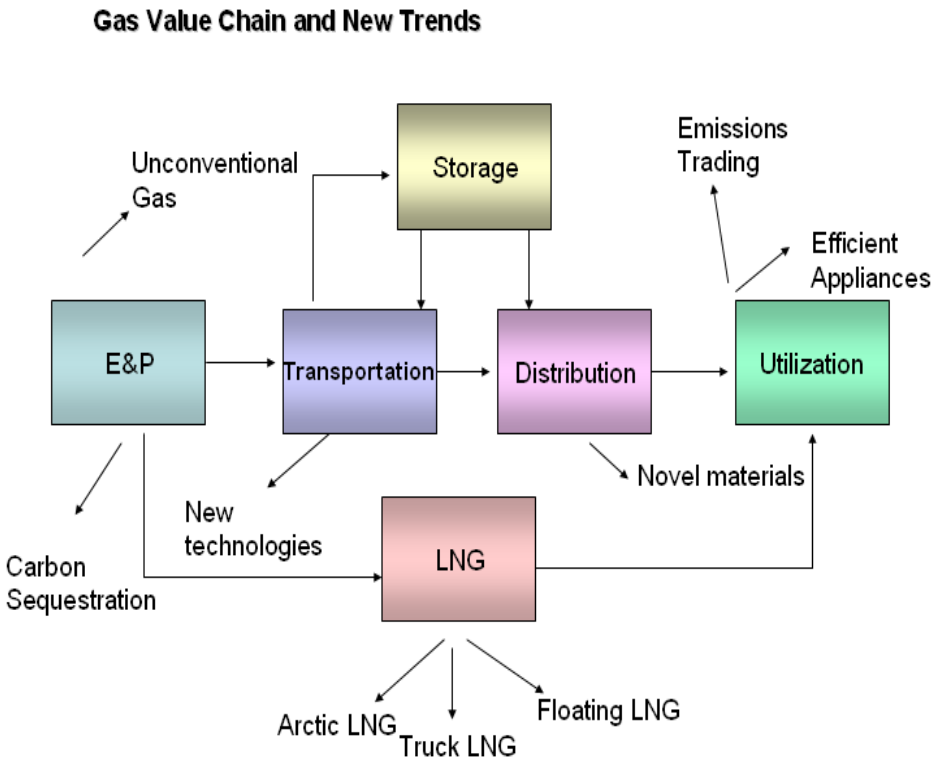
[1] BP Statistical Review of World Energy 2011

In order to add 1.8 trillion cubic metres per annum by 2035 to 2010's consumption, the cumulative investment in gas-supply infrastructure will amount to $8 trillion, from which $5.1 trillion is required in exploration and production, $2.1 trillion in Transmission and Distribution and $0.7 trillion in LNG. The shale gas revolution initiated in the United States of America (US) will potentially expand to other regions increasing gas availability across all continents.

The increased role of natural gas will bring additional challenges and opportunities in Technology, Engineering and Marketing, for example:

- Non-OECD countries will need to invest in enabling infrastructure, such as pipelines, distribution grids, power plants and LNG terminals
- Enhanced technologies to bring unconventional gas to markets
- Floating liquefaction projects for offshore stranded gas
- Natural gas as a complementary fuel for renewable energy
- Enhanced and more efficient gas utilisation technologies
- Carbon sequestration technologies to allow for reduced CO2 emissions in line with Europe's emissions targets
- Smart energy grids
- Sophisticated tariff modelling
- New technologies for gas storage and carbon sequestration
- New gas geographies, particularly Africa, Middle East and South Asia will require a massive increase in infrastructure and human resources to deliver growth

Figure 1.01: Gas Value Chain and New Trends



Objectives of the Task Force: Why people matter?

The principal objective of TF1 is to understand the key issues impacting the attraction and retention of talent in the gas industry and develop a strategic approach to human capacity building to ensure sufficient capable manpower is available at the right time and place for the future sustainability and integrity of the gas industry.

The Task Force is concerned with the manpower issues impacting all areas of the gas industry and the report has been prepared against a background of enormous economic, political and social change. Apart from these important factors, there is the accepted view that energy growth over the next 20 years is expected to be dominated by emerging economies such as China, India, Russia and Brazil. Natural gas is projected to be the fastest growing fossil fuel, and coal and oil are likely to lose market share as all fossil fuels experience lower growth rates (source: BP Energy Outlook 2030).

As already stated, the manpower dimension in the industry is fast becoming a critical business issue and the work of TF1 focused on gaining a better understanding of the issues and more importantly seeking out strategies and solutions for the future.

Scope of the work

The scope of work for TF1 encompassed the following activities:

- To map critical talent and human resources necessary to deliver projects and business across the gas value chain, from production to utilisation
- To produce a picture of the skills and resources necessary to deliver the gas business of today and develop the gas industry of the future. Identify gaps and key human resources issues impacting the gas industry in the short and long term, particularly in recruitment and capability development
- To compile examples of best practice across the gas value chain and regions to attract, develop and retain talent
- To investigate the gas industry outlook and its attractiveness from the perspective of industry professionals
- To assess the role of governments, industry associations, universities and private companies in cooperating to promote awareness and develop resources

The Task Force assembled 68professionals from IGU members. In addition to its core membersTF1appointedanAdvisory Committee of five members to provide insight and advice to the Triennium programme. A list of TF1 members is shown at Appendix 1.

Methodology

In order to meet its objective and get a wide array of contributions and views, the Triennium work was conducted through a mix of surveys, workshops and interviews, including:

- A demographic survey in 2010 and a detailed survey in 2011-2012
- Two regional workshops in Doha and Paris – highlighting issues and case studies in Middle East, Asia and Europe
- Over 30 in-depth interviews with experienced and young professionals

Surveys methodology

TF1 conducted two surveys to research and map out the most important issues impacting the workforce in the gas industry. The first survey, conducted in 2010-2011, was a Demographic survey which was based on a quantitative approach to the recruitment and retention of talent. The second survey, conducted in 2011-2012, was the IGU HR Benchmark survey (HR Benchmark) that took a qualitative approach in further detailing the issues of the first survey and furthermore researching topics such as competency management and career development. The two surveys are described below in more detail:

Demographic survey

In 2010, TF1 conducted its first demographic survey of the gas industry. This survey took a quantitative approach, and provided a snapshot of the HR issues across the gas value chain. The aim of this first survey was to map out the key issues impacting the industry today and tomorrow as well as to establish the HR commonalities and specificities across different regions and industry segments. The survey was responded by 82 companies. The survey had three sections and comprised of 17 questions:

Section 1: Company information - This section identified the location, size and segments where the companies are active.

Section 2: Recruiting Talent - The second section contained questions relating to attraction and recruitment of talent. Companies were asked whether they felt there was a shortage of skills (technical, managerial, project management, etc.) in the industry and the specific areas that present the greatest challenges.

Furthermore, participants were asked where they expected the gas industry will experience a shortage of skills in the future and what skills would become less important in the future.

Next the companies were asked to rank the geographical areas on the basis of difficulty level in recruiting talent. The survey also inquired about the percentage of female workers in the companies' workforce. Finally, in this section, companies were asked to indicate top three people-related priorities for their gas business and what they thought were the top three selling points of their companies in attracting new talent.

Section 3: Retaining Talent - The third section enquired about issues relating to talent management and retention. The first question asked the companies about the average age of employees in the gas business, and also about the attrition rate in their companies in 2009.

After that, attention was focused on employees leaving the company. Companies were asked to rank the most common reasons people give for leaving employment (retirement, compensation, lifestyle, etc.). Then they were asked to indicate the most common place/ direction where the leaving employees were going (retirement, competitors, outside energy sector, etc.).

Finally, the survey asked companies to indicate the top three selling points of their company in retaining talent.

IGU HR Benchmark survey

In 2011, TF1 followed up with a detailed survey, the IGU HR Benchmark Survey (HR Benchmark). The objective of this survey was to update and detail out the analysis of issues identified in the demographic survey and to provide a more distributed and regional overview of the human resources issues faced by the gas industry. The HR Benchmark was launched in mid April 2011 and has had responses from 24 companies representing all segments of the gas value chain. This second survey took an in-depth approach by inquiring about detailed information on companies' various strategies towards attracting, developing and retaining talent. With this detailed survey, TF1 aimed to compare and recommend best practice and innovative HR policies across the gas industry. This survey had five sections:

Section 1: Company details - The objective of this section was to gather information about the companies' core business and main characteristics in order to segment them. The survey asked companies about their geographic locations, size and presence along the gas value chain.

Section 2: Perspectives and projections of the gas industry - Supply and Demand of key staff. The objective was to identify key deficits or surplus of talent in each segment of the value chain. Here the survey inquired about the number of employees in the different functions in the company, about the drivers behind the companies' manpower strategy (compensation attrition rates/retirement, junior gap/mid-career gap). Companies were also asked about retirement and attrition rates and what they do to resolve issues.

Section 3: Recruitment challenges in the gas industry –The objective was to identify the key needs of the gas industry in terms of various disciplines and functions. In this section companies were asked about the recruiting priorities of the company per function (Engineering, Finance, etc.) as well as per part of value chain (exploration and production, transportation, etc.). The survey also tried to identify main attraction and rejection factors for talent in these companies i.e. what were the main factors (pay, company image, etc.) that attracted or repelled graduates/mid-careers to the company. Furthermore, this section also inquired about the existence and nature of diversity and inclusion programmes in the HR policy of the organisation.

Section 4: Competency development requirements in the gas industry– This section attempted to highlight best practice in training and competency development in an increasingly complex and integrated gas business. It aimed to identify new skills in the perspective of a gas industry transitioning from a local business to a more global one.

This section also focused on companies' approach towards assessing competencies and training programmes. Companies were asked if they had structured training programmes for graduates and/or mid-careers. They were also asked if they had a preference between specialising their fresh graduates straight away, or whether they took a generalist approach in developing their young employees. Companies were also asked whether they conducted technical competency assessments and if so what were the most often used methods. Furthermore, this section of the survey inquired about coaching programmes, their profile of coaches (internal/external), training programmes for coaches and average number of 'students' assigned to one coach.

Section 5: Career management practices in the gas industry - The objective was to assess the capacity of the gas industry to adapt its workforce to an ever-changing business environment. In this final section companies were asked about their career ladders for both technical and managerial specialisation, how they develop their high potentials and rotate their personnel through different positions within the company. Furthermore, it inquired whether companies encounter problems in mobilising technical staff to projects and if so what they were doing to mitigate these challenges.

Expert Interviews

TF1 also conducted in-depth interviews throughout the Triennium with experts and young professionals from both within and outside the gas industry**.** The interviewees were asked their views on the energy mix of the future (20-50 years) and the role for natural gas in that mix. Participants were also asked about the opportunities that the natural gas industry provided and the challenges it faced in the future. TF1 wanted to hear the opinion of interviewees with regard to the competitive environment for gas and the relationship of natural gas to other energy types i.e. oil, coal, nuclear and renewable.

Interviewees were asked whether, in today's business environment, the gas industry is still a profitable sector in which to invest and its ability to attract funding from investors. Finally, the interviews inquired about the perceived image of the gas industry and what the industry needed to do to become more attractive to potential employees.

Regional Workshops

First TF1 Workshop – Doha, October 2010

The first TF1 workshop was held on 19th October 2010 in Doha, Qatar. The theme of the workshop was ***'Recruiting and retaining talent in the gas industry: Challenges and opportunities in the Middle East'***. There were nine speakers from eight countries presenting in the workshop before an audience of approximately 80 participants. There were two panel sessions. The first session focused on the development of talent in the Middle East. In this first panel, four presenters from Saudi Arabia, Iran, Oman and Qatar debated specific regional issues including the policies of countries and companies towards the development of local talent, growing participation of women in technical roles, and the way companies work together with academic institutions to motivate young people. The second panel included speakers from Brazil, China and Europe who shared their views on the HR issues in their relevant countries/regions.

The speakers in the Middle East panel were:

- Essa Rashed Al Kaabi, Chairman, Qatarisation Committee, Qatargas, Qatar
- Deya A. Elyas, Director Staffing Services, Saudi Aramco , Saudi Arabia
- Shukri Al Mandhari, HR Director, Oman LNG, Oman
- Hossein Taghinezhad, National Iranian Gas Company (NIGC), Iran

The Middle East regional speakers highlighted the following trends:

- Nationalisation of workforce is a key strategy
- Buyout from the top of the house and their commitment to nationalisation
- Challenges remain to attract "quality workforce"
- Poor image of the sector in the mind of young people

The speakers in the Europe/Asia/Brazil panel were:

- Steve Surrall, Asset Manager, BG Group
- Martha Desmond, HR Director, BG Group
- Dave Pinchbeck, Director, European Gas Research Group (GERG), Belgium
- Liu Zhao Yan, Shenzhen Gas Corporation, China
- Jorge Paulo Delmonte, Gas Manager, Brazilian Institute of Oil, Gas & Renewables (IBP), Brazil

These speakers highlighted the following:

- Changing profile of supply and demand dynamics
- Challenges to recruit for newer areas like LNG, unconventional gas, little or no growth in mature markets
- Focus towards enhanced cooperation between industry and universities
- “Job for life” culture in countries like China and focus on corporate culture
- Nation-wide programme in Brazil to fund university programmes

Second TF1 Workshop – Paris, September 2011

The second TF1 workshop was held on 13th September 2011. The workshop was well represented with a total of seven speakers and over 50 participants. There were two panels, respectively presenting the European and the Asian perspectives.

European Panel:

- Philippe Lazzarotto - GDF SUEZ, France
- Marta Cydejko – Head of HR Office, Polish Oil and Gas Company (PGNiG)
- Alberto Cabellos - Head of HR Governance ,Gas Natural Fenosa, Spain
- Elena Volostnykh – Director, Centre Advanced Education & Skill Development Gazprom VNIIGAZ, Russia

Asian Panel:

- Daisuke Ozaki – Assistant Manager, Human Resources, Osaka Gas, Japan
- Jeom Su Kim - Head of HR Development, KOGAS
- Nor’Aini Jalaludin - Leadership and Capability Development Manager, PETRONAS

Insights from the workshop:

- There is a need for hiring new people, particularly in technical sciences across all regions
- Some companies are aggressive in hiring petro-technical staff
- Companies have differentiated pay structures rewarding technical careers
- Career plans, rewards and a clear progression path are seen as selling points for hiring new talent
- Companies which are moving across the value chain towards exploration and production projects are facing competition from traditional Upstream companies

Demographic survey and HR Benchmark

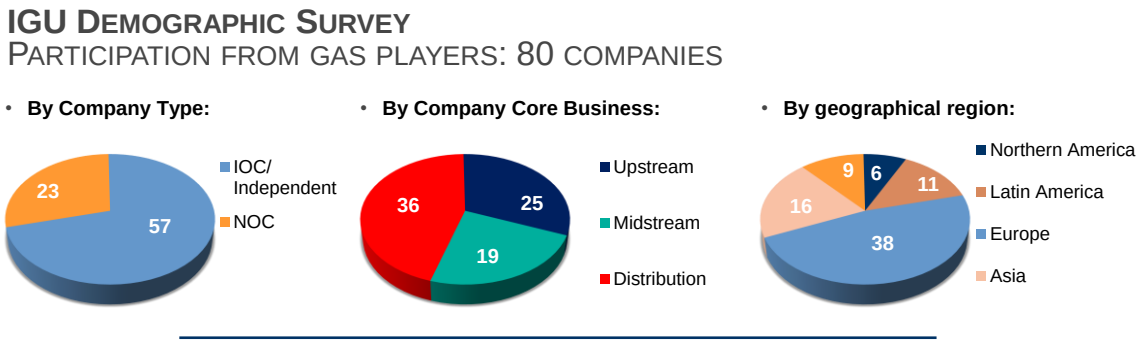
Introduction and Background

Natural gas is predicted to continue playing a key role in the energy landscape and its share in the energy mix is likely to increase in the next decades. According to IEA's revised 2011 World Energy Outlook ("Golden Age of Gas"), gas companies will be under pressure to meet increasing demand. Pressure will increase on exploration and production efforts to find new fields and to push the frontiers of technology to explore unconventional gas. Tensions will be exerted on LNG and gas transport linking production sites to consumers and also on commercial functions to sell and negotiate gas contracts to domestic and international consumers.

These tensions are rising all along the gas value chain which in contrast to the oil chain, is much more integrated and market driven than crude oil whose commercialisation is not a major concern for oil and gas exploration and production companies. Through an analysis of the demographic profiles of gas companies, manpower planning concerns, recruitment challenges, training and career practices and attrition trends, the IGU HR surveys provide a detailed and exhaustive picture on how human talent issues impact the gas companies.

IGU's Task Force 1 conducted two surveys on the topic of human resources; one on the demographics of the gas industry (Demographics survey) and the other on the HR practices of each segment of the gas value chain (HR Benchmark). The first one gathered 80 participants (Figure 2) providing a high level view of the main shortages and HR concerns. The second one, a detailed analysis of HR practices along the gas value chain collected responses from 24 companies (Figure 2.02).

Figure 2: Participants of the Demographic Survey

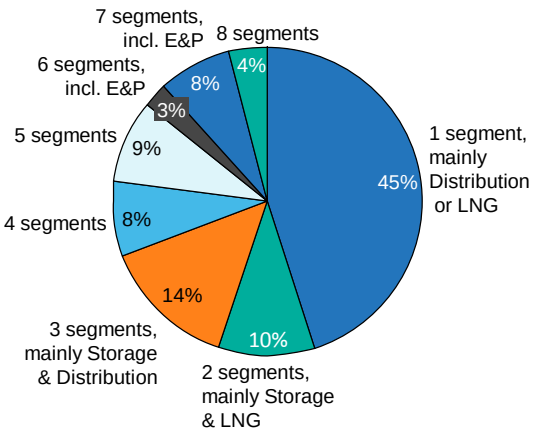


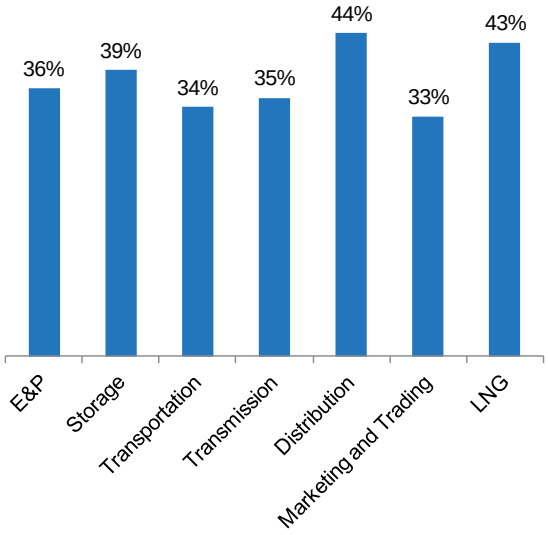
80 companies organised by Geographies and Core Business

	Europe	Middle-East Africa	Asia	N. America	L. America
Upstream	13	-	7	2	3
Midstream	6	4	5	2	2
Distribution	19	5	4	2	6

In the demographics survey, most of the participants are non-integrated gas players (Figure 2) and they are well distributed across the whole value chain (Figure 2.01).

Figure 2.01: Details of the Participation of the Demographic Survey, 2010





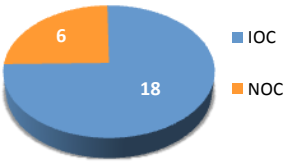
All the sectors of the gas value chain are evenly represented by the companies who responded to the survey. Almost half of the respondents to the survey are present in only one segment of the gas value chain, mainly Distribution or LNG.

Players in the exploration and production sector tend to be integrated companies that conduct business in 6-8other areas of the gas industry as well, whereas Distribution, Storage or LNG companies tend to be more focused on their own sectors.

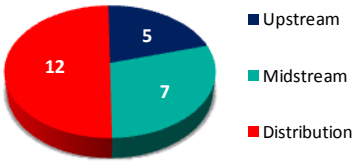
Figure 2.02: Participants of the HR Benchmark

IGU HR BENCHMARK SURVEY
PARTICIPATION FROM GAS PLAYERS: 24 COMPANIES

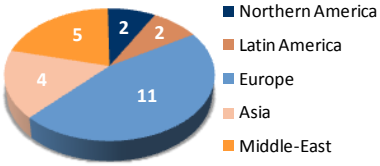
- **By Company Type:**



- **By Company Core Business:**



- **By geographical region:**



24 companies organised by Geographies and Core Business

	Europe	Middle-East	Asia	N. America	L. America
Upstream	3	-	1	1	-
Midstream	1	4	1	-	1
Distribution	7	1	2	1	1

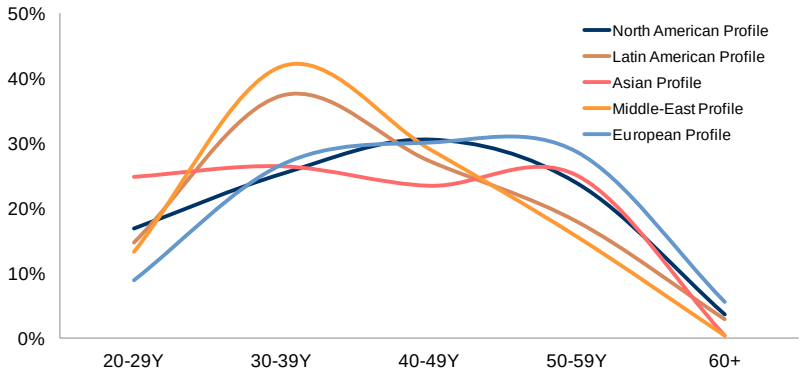
In the HR Benchmark, 75% of the participants come from the private sector and the remaining quarter is made up of state-owned companies. This figure shows that half of the participants have Distribution as their core business while the other half of the respondents come from the Midstream and Upstream segments. The majority of the respondents originate from Europe. The Middle East and Asia are represented by a comparable number of participants. Sector and geographical break down is illustrated in Figure 2.02.

Main Findings

Demographics of the Gas Industry

- Technical staff is ageing in North American/European companies, whereas Latin American and Middle Eastern companies have a younger demographic profile. Indeed, approximately 60% of technical staff of a typical Middle Eastern company is below 40
- the demographic profile of technical staff is more balanced in a typical Asian company

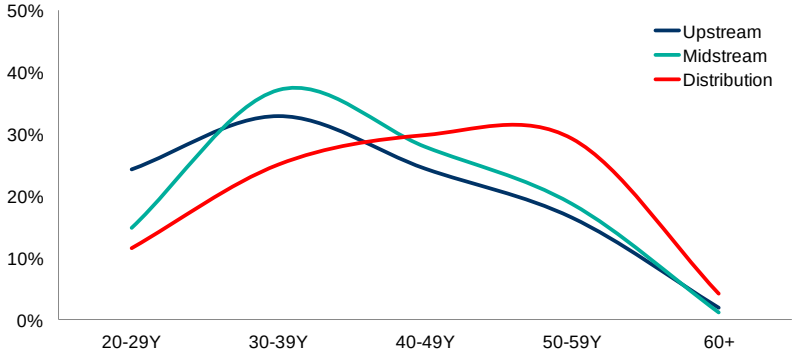
Figure 2.03: Regional Demographic Profiles (Technical Staff*)



* Technical staff includes Operation and Production and Engineering and Construction. Profiles are based on weighted average.

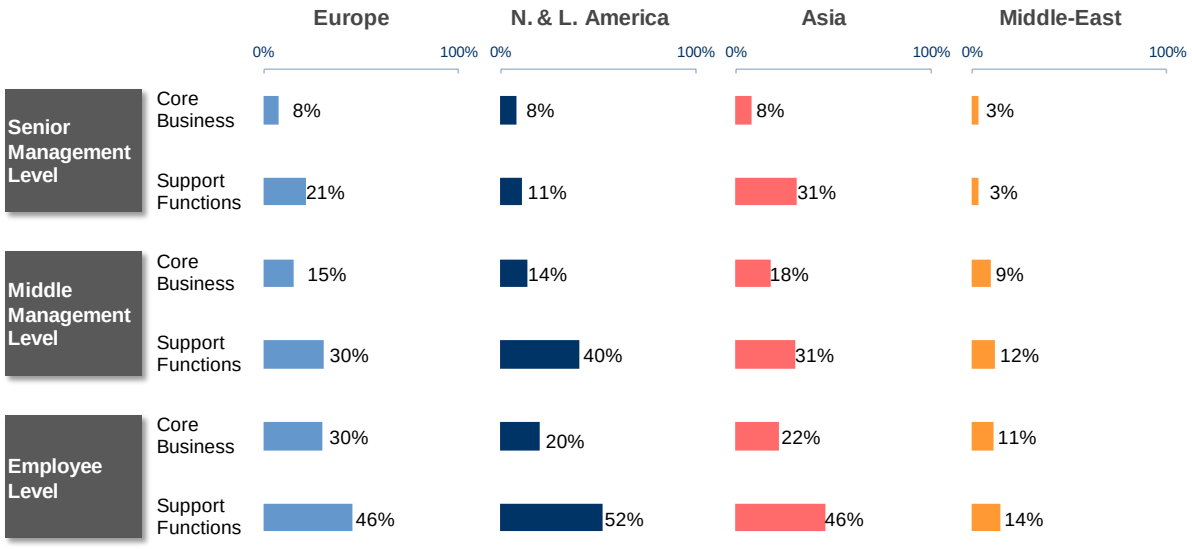
As illustrated in Figure 2.04, Distribution companies show an older age profile than companies focused in the Upstream and Midstream segments. Upstream companies and Midstream companies focusing on LNG have stepped up their recruitment efforts over the last few years to access new resources and develop a large pipeline of projects.

Figure 2.04: Demographic Profiles by Core-Business (Technical Staff)



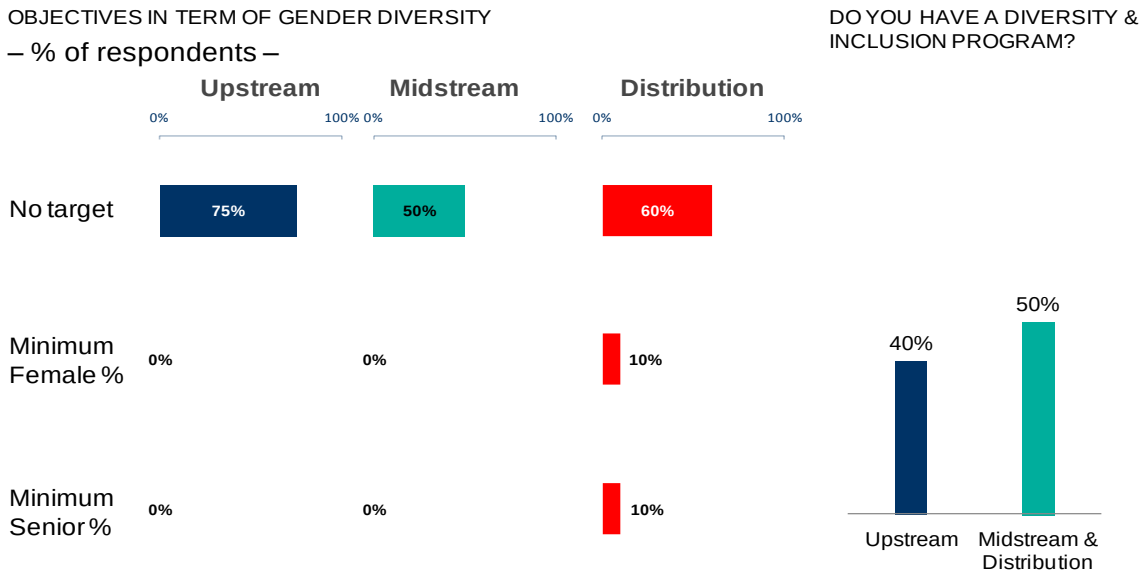
Gender Diversity

Figure 2.05: Percentage of Female Staff per Job Category and Region



In most regions and especially in the Middle East, the proportion of female is low among gas companies. Senior levels are the most affected by this lack of gender diversity.

Figure 2.06: Companies with gender diversity targets and companies with Diversity and Inclusion programmes



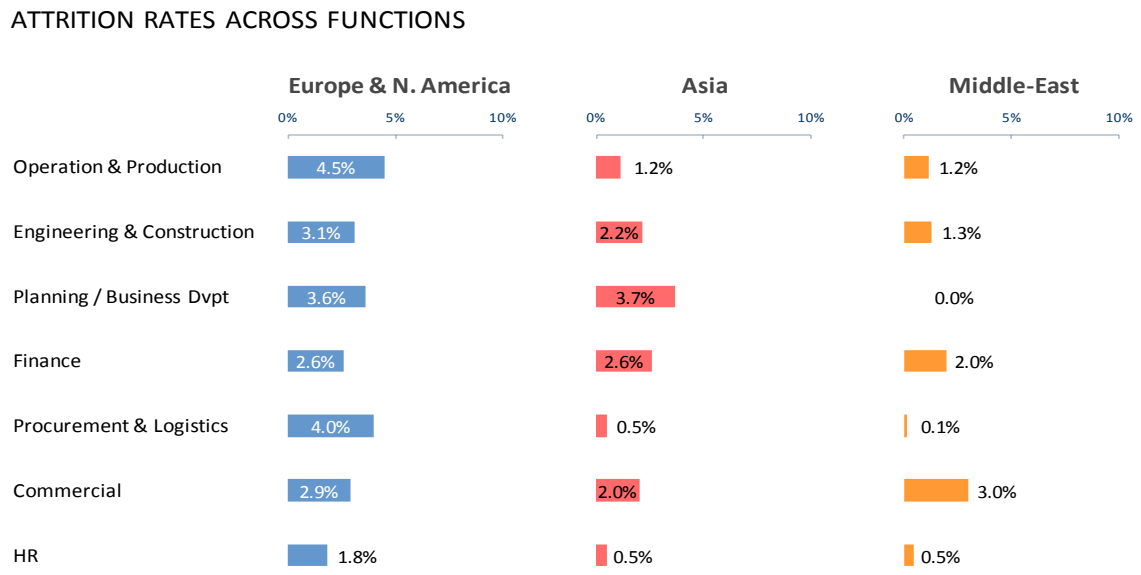
Gender diversity does not seem to be a priority for gas companies:

- It is low in all segments of the gas value chain and most companies do not set any targets
- More than 50% of responding companies do not have any Diversity & Inclusion programme

Attrition

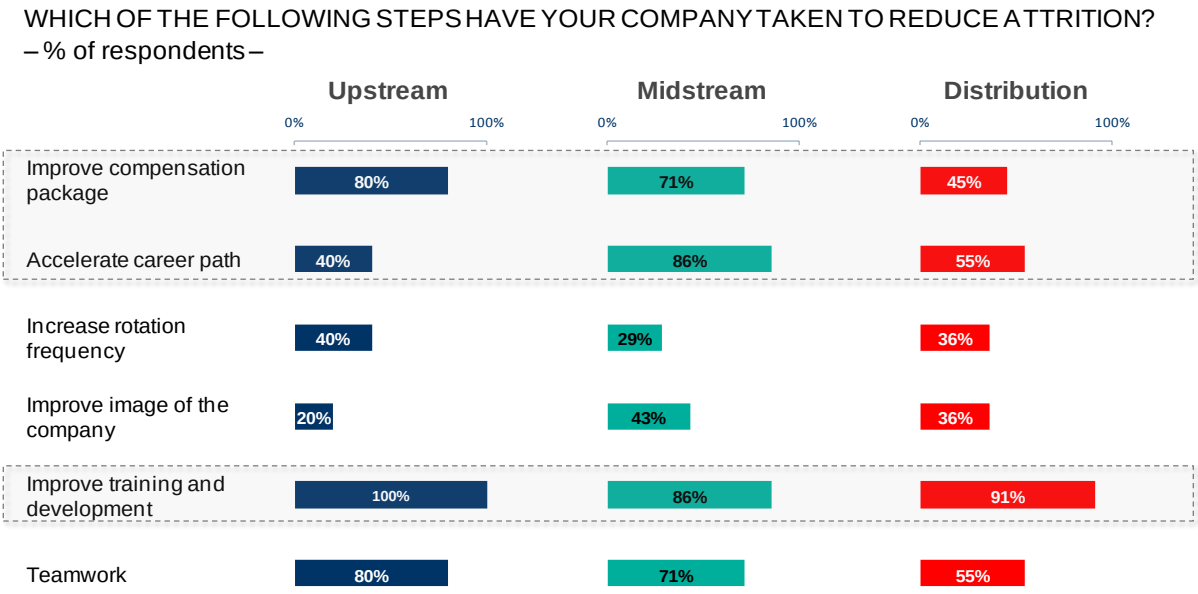
Attrition here is defined as the degree of losses of personnel due to causes other than retirement and redundancy. The highest attrition rates are reported in European and North American companies, reflecting the strong tensions on the labour market and the increasing poaching among technical talents.

Figure 2.07: Attrition Rates across Functions



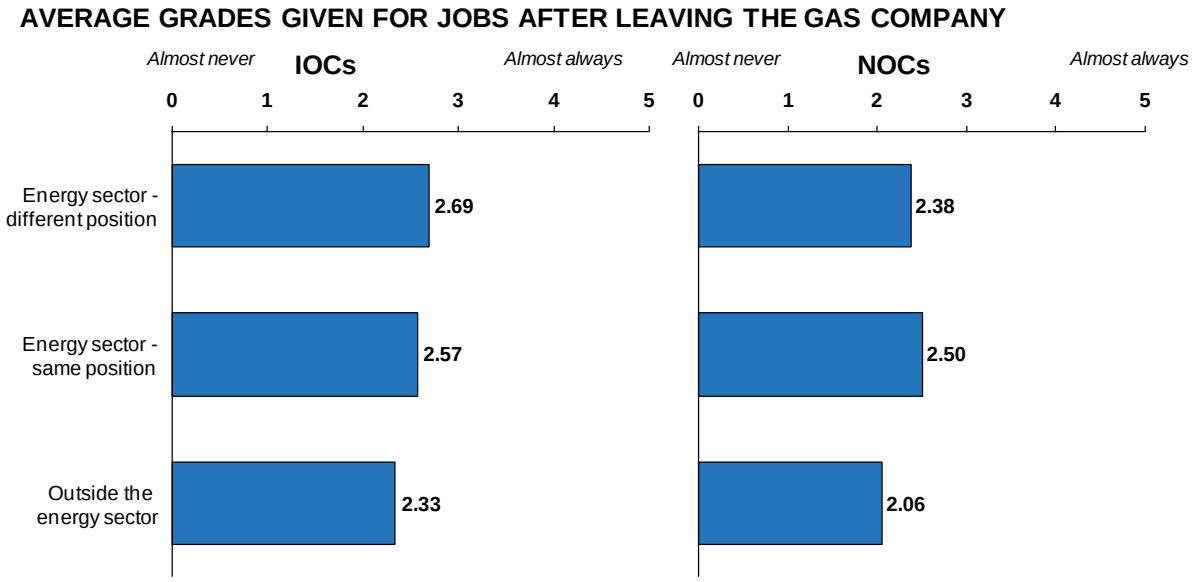
Training and development as well as career perspectives are the preferred steps applied by companies to fight attrition. Compensation remains a key lever for retention and it is a must have but not a sufficient element to attract candidates.

Figure 2.08: Steps Taken by Companies to Reduce Attrition



When leaving companies, most employees remain within the energy sector. This is relatively good news as it shows that poaching remains a zero sum game and not a leak for the energy industry.

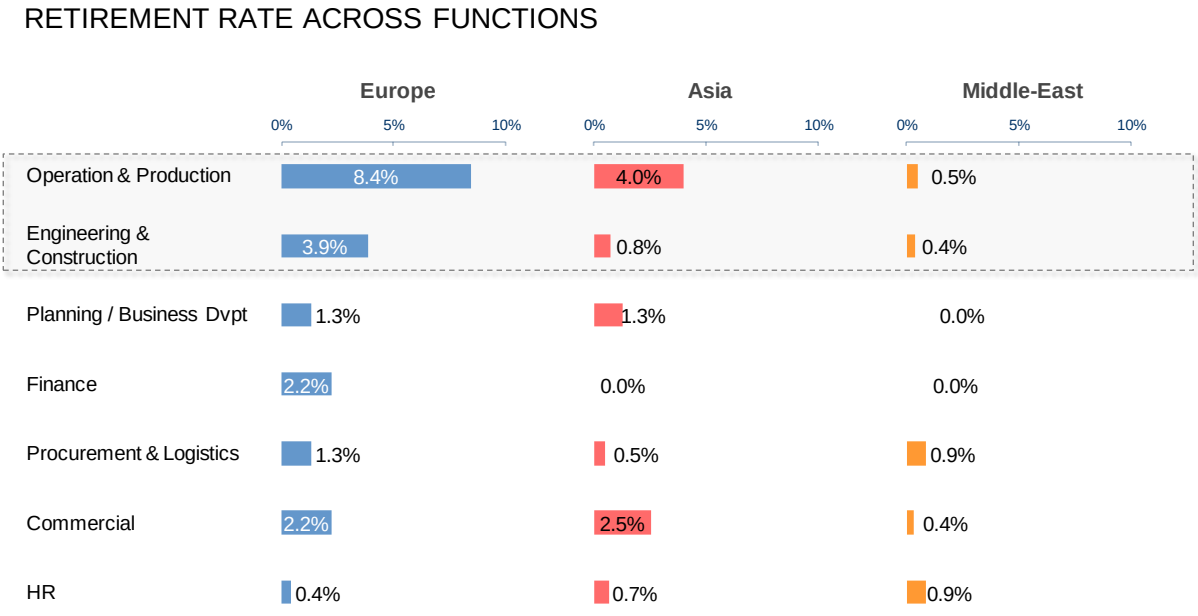
Figure 2.09: Jobs after Leaving the Company



Retirement

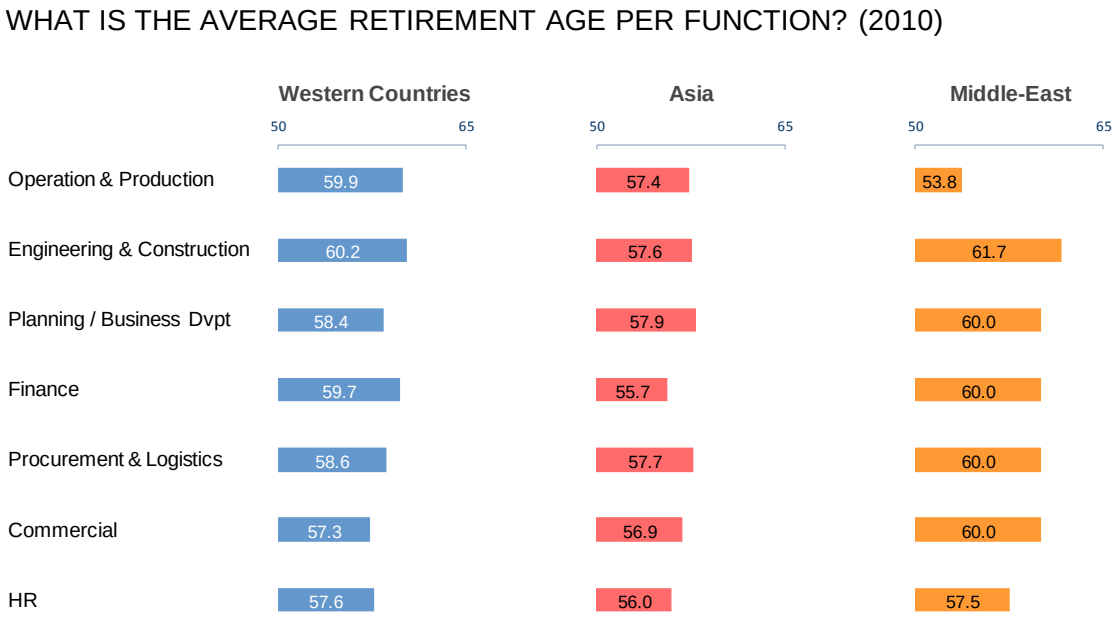
European companies are the most affected by retirement of technical staff, particularly across Operation and Production and Engineering and Construction.

Figure 2.10: Retirement Rates across Functions and Regions



Asian companies have the lowest retirement age.

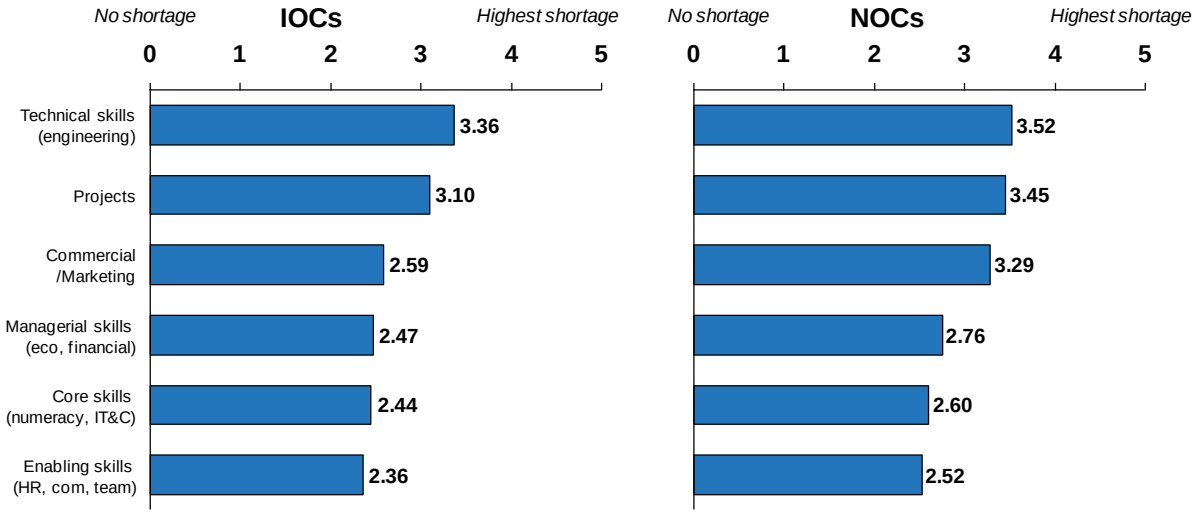
Figure 2.11: Average Retirement Age across Functions



Supply and Demand of Key Staff

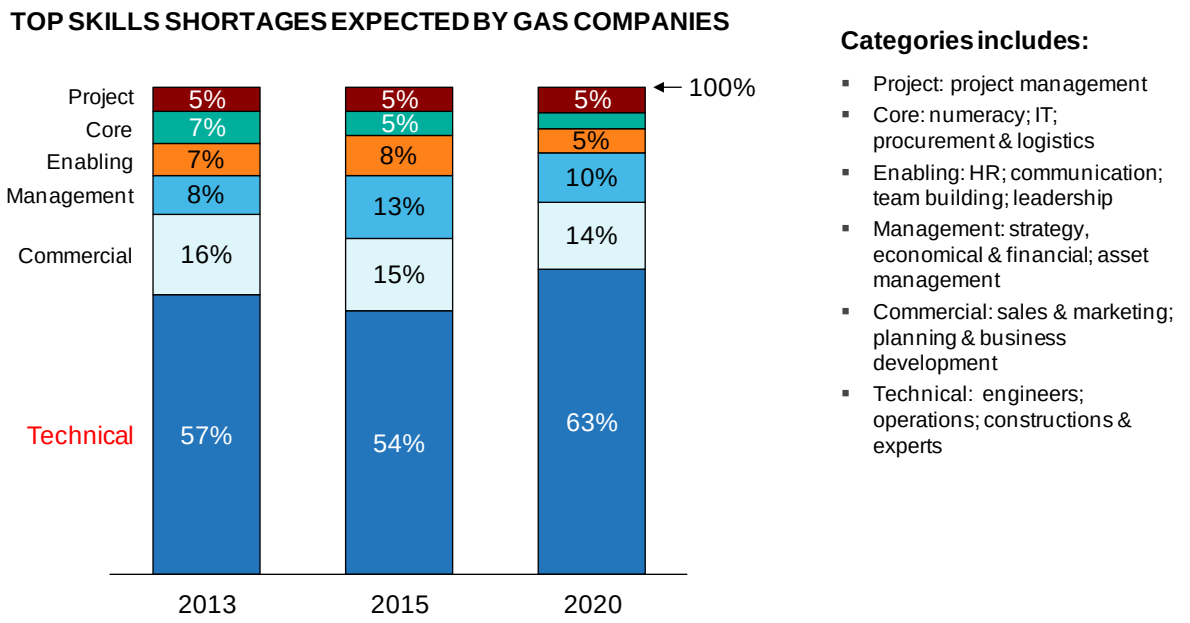
- Technical, project and commercial skills are the most significant competency gaps experienced by gas companies
- Technical skills shortage affects mostly Engineering, Construction and Operations
- National Oil Companies (NOCs) suffer more from skill shortage than International Oil Companies (IOCs)

Figure 2.12: Average Grades for Shortage of Skills



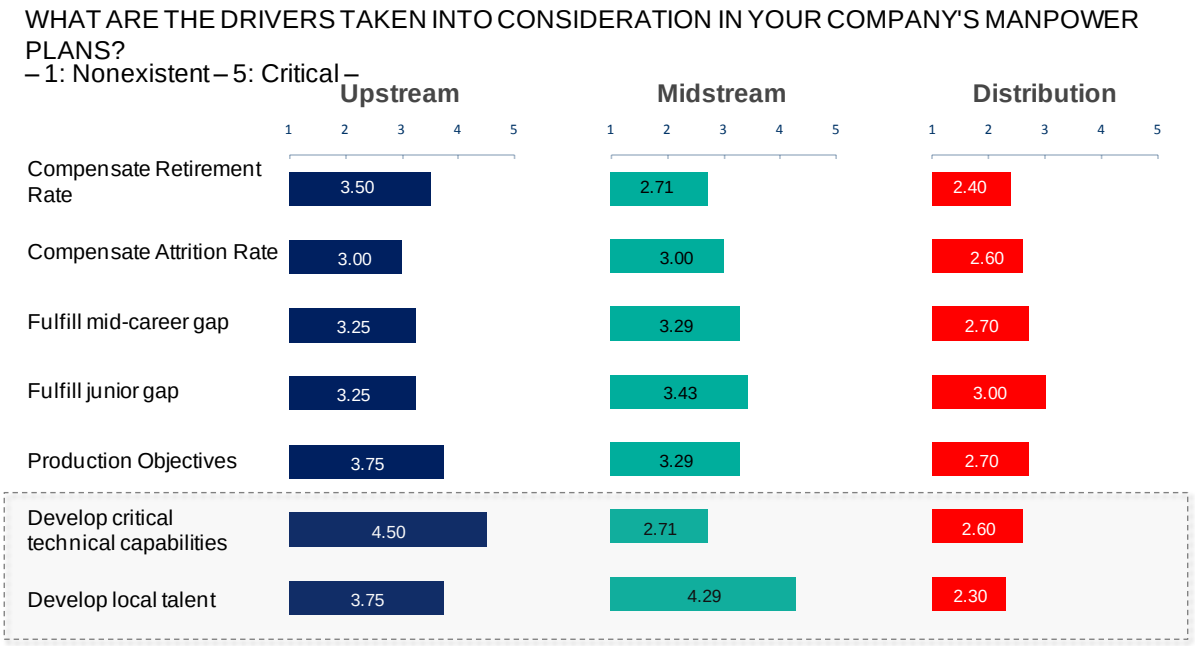
As illustrated by figure 2.13, gas companies expect that the technical talent gap will intensify from the current level.

Figure 2.13: Top Skill Shortages Expected by Gas Companies



The development of critical capabilities and local talent are key elements driving companies' manpower planning.

Figure 2.14: Main Drivers taken into Consideration by Companies in their Manpower Plans



- Over the next two to ten years, LNG and Marketing and Trading are the key capabilities companies seek to develop
- LNG capabilities are essential for Asian and Middle Eastern companies
- Marketing and Trading capabilities are essential in most regions
- Low carbon technology capabilities don't feature as priority in any segment, although it seems important for Asian companies

Figure 2.15: Long Term (2-10 years) Capabilities Critical for Companies to Develop per Segment

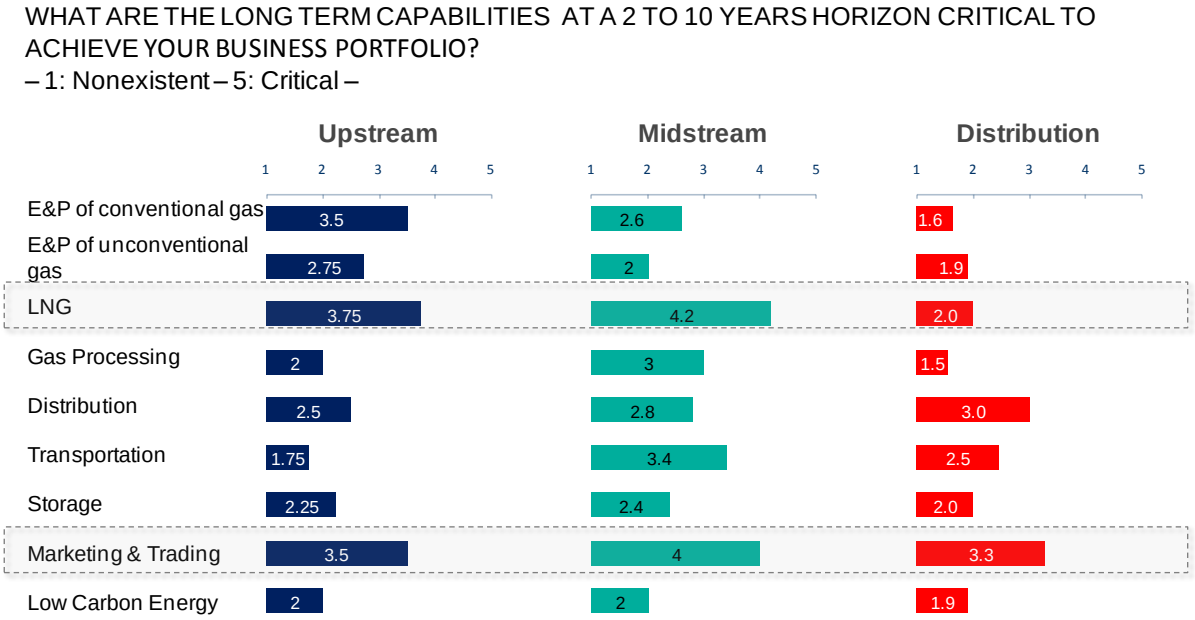
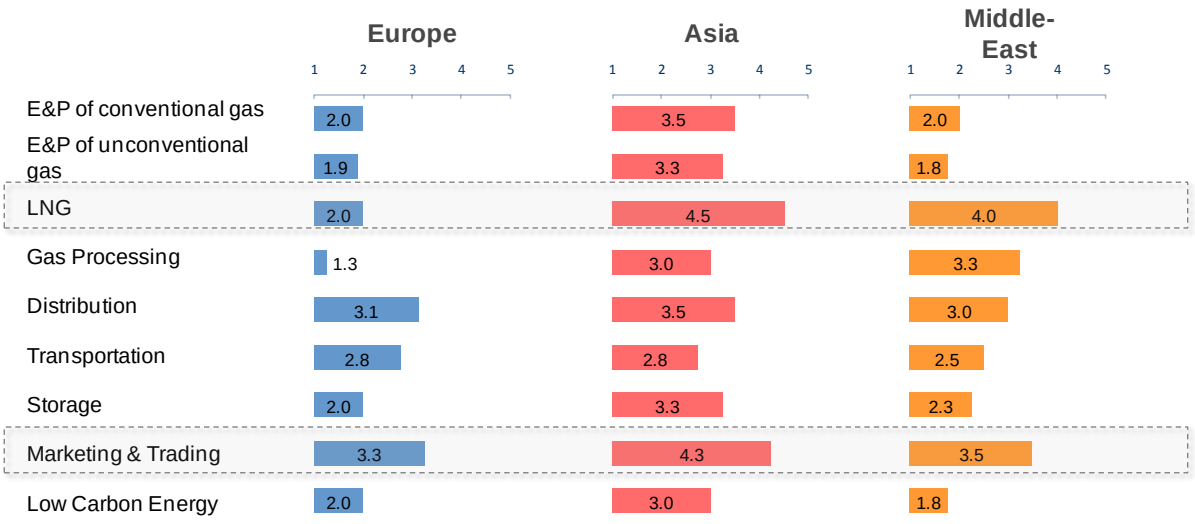


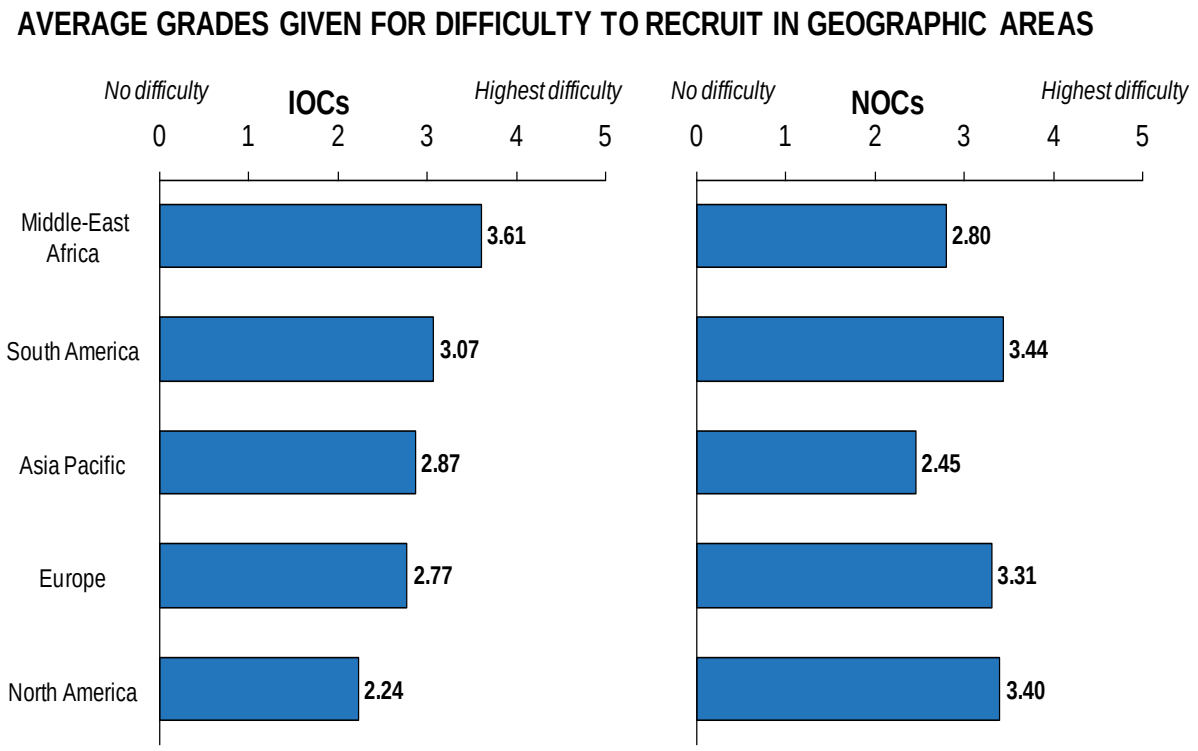
Figure 2.16: Long term (2-10 years) Capabilities Critical for Companies to Develop per Region



Recruitment Challenges

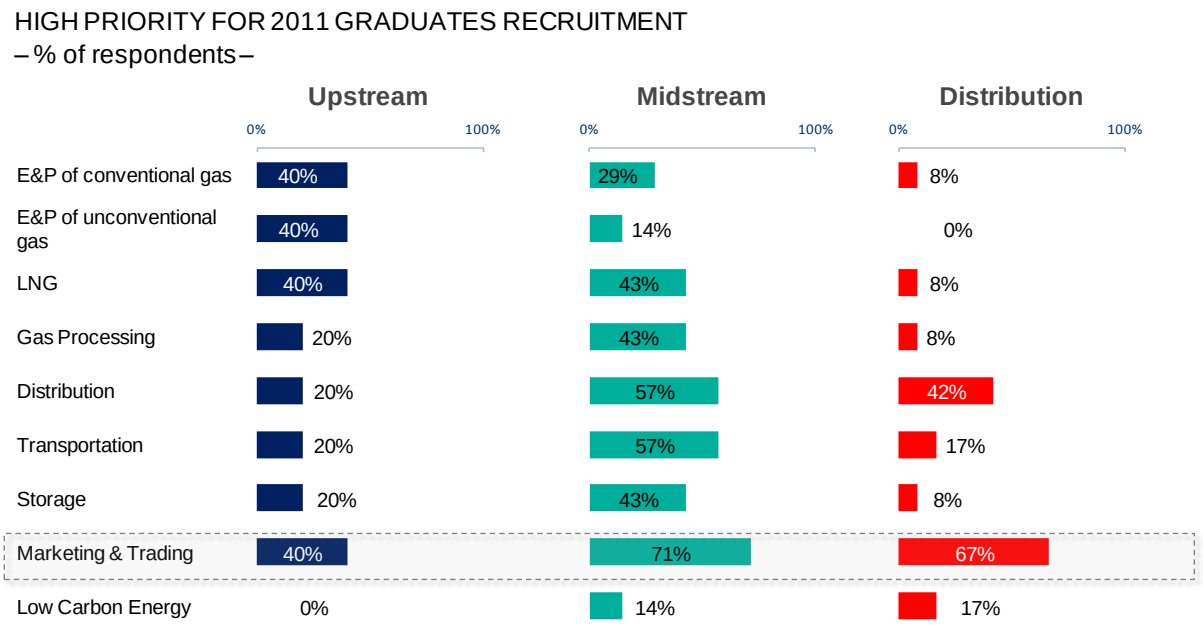
- For both IOCs and NOCs, Middle East, Africa and South America are difficult regions to find talent
- Recruitment in Europe and North America is complex for NOCs but not for IOCs, confirming that it is easier for western companies to find talent in their own regions
- This poses a particular challenge for companies that are developing projects in countries that have national recruitment targets and highlight the need to develop initiatives to allow for the development of young professionals in the Middle East, Africa and South America

Figure 2.17: Recruitment Difficulties per Region



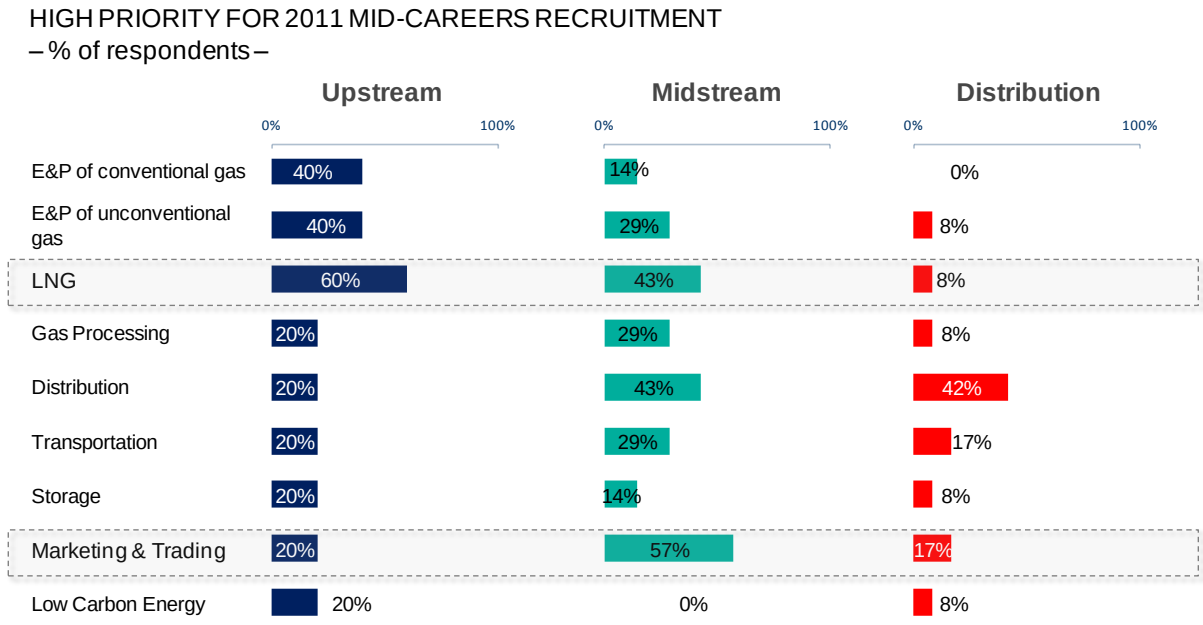
Recruitment of graduates in Marketing and Trading is critical for gas companies.

Figure 2.18: Priority for Graduates Recruitment



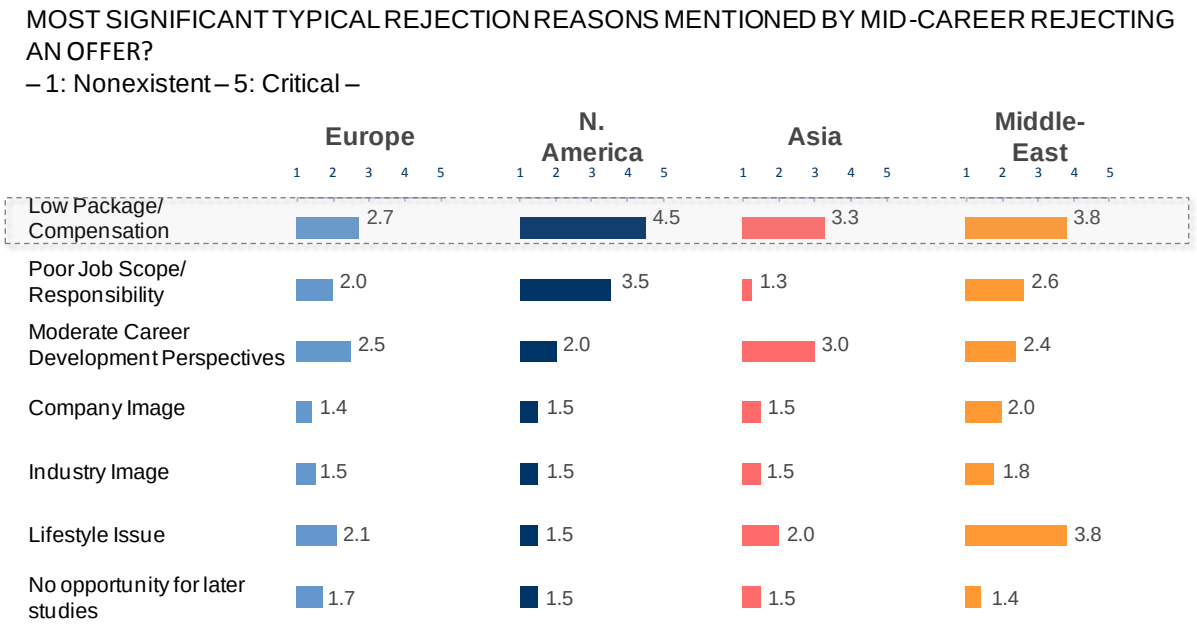
- mid-career profiles specialised in LNG are a critical need for Upstream and Midstream companies
- Most Midstream companies also need Marketing and Trading experienced mid-careers. This is not a surprise considering that with the development of LNG trade and new markets these companies need experienced negotiators

Figure 2.19: Priority for Mid-Careers Recruitment



- It is essential to ensure attractive compensation to attract mid-career profiles, particularly in Europe, North America and Asia
- Lifestyle is a very important rejection factor in the Middle East

Figure 2.20: Reasons Highlighted by Mid-Careers when Rejecting a Job Offer



- Career development and company image are key drivers to attract both graduates and mid-careers
- For mid-careers, job scope and responsibilities are key drivers for joining a gas company

Figure 2.21: Reasons Highlighted by Graduates for Joining a Company

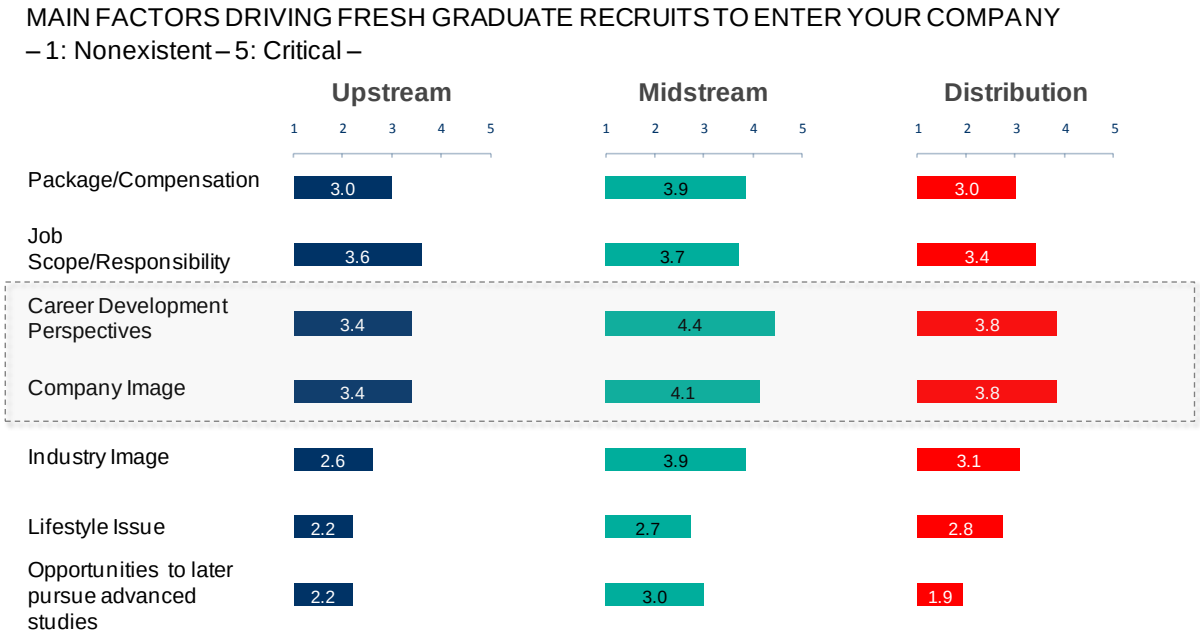
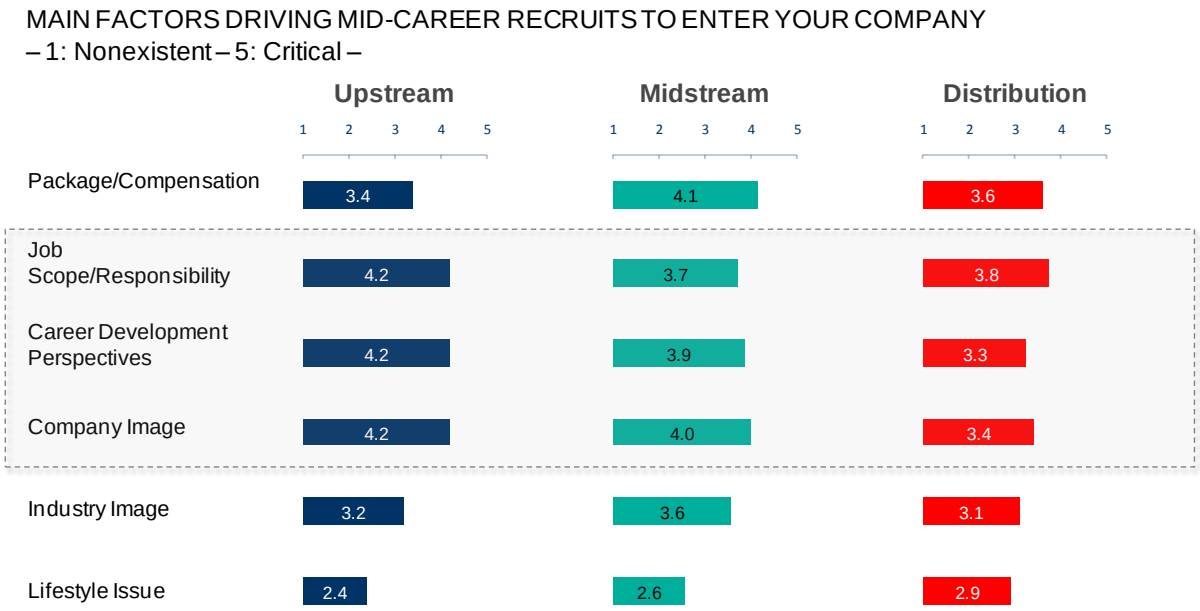


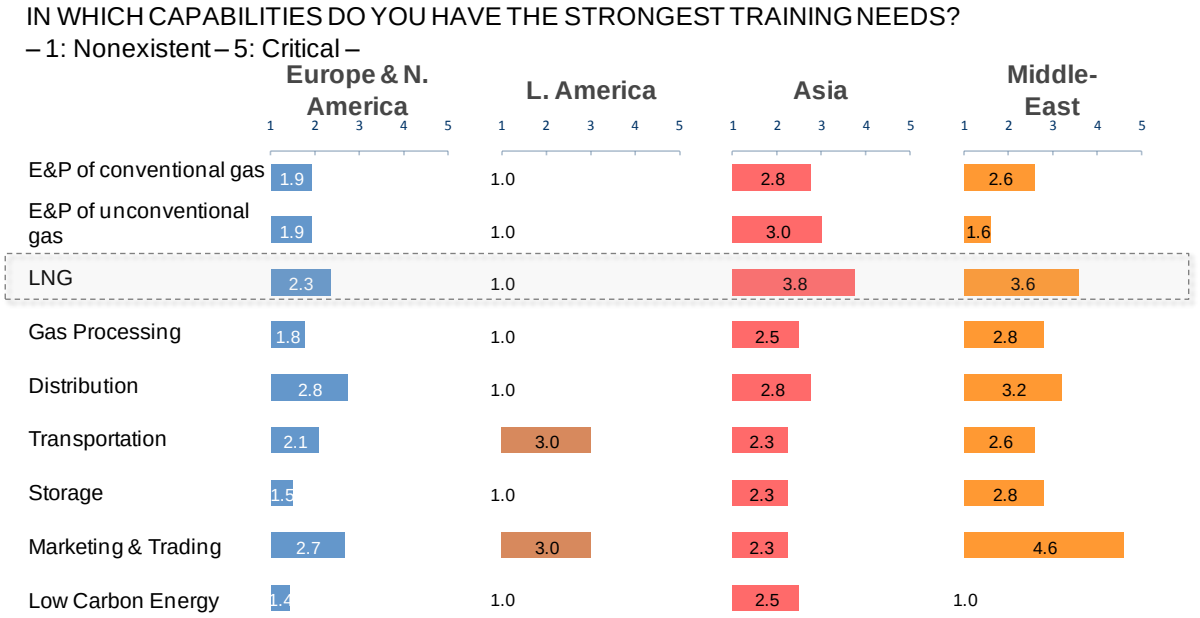
Figure 2.22: Reasons Highlighted by Mid-Careers for Joining a Company



Competency Development

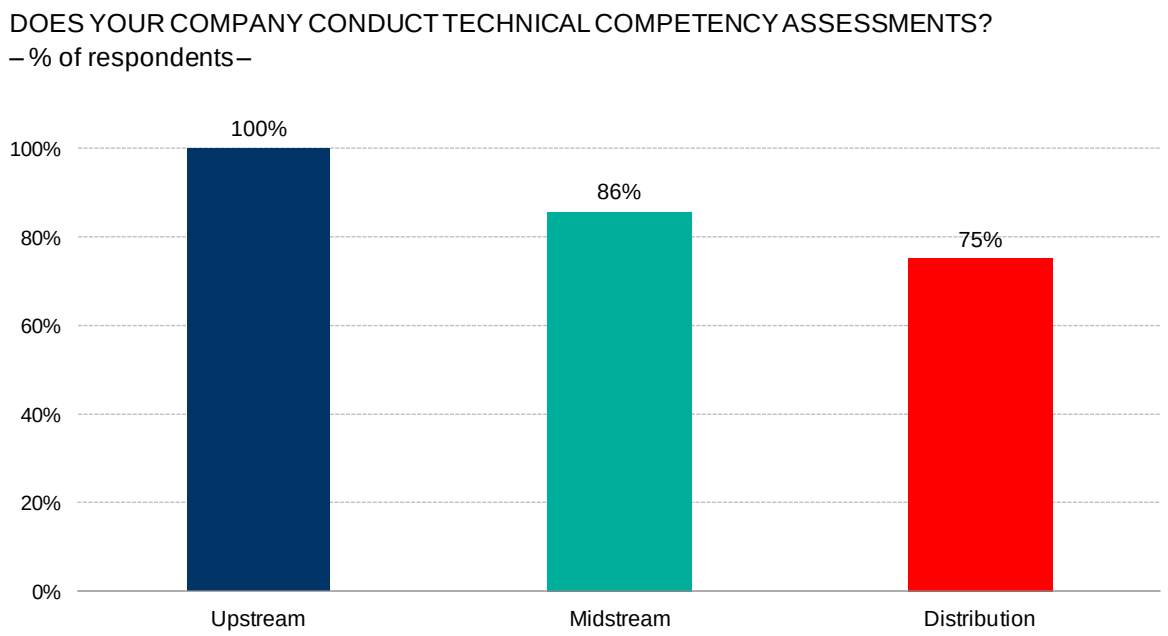
- Along with the development of LNG, strong training needs are raised in this activity, especially in Asia and in the Middle East.
- Marketing and Trading are reported as acute training needs in the Middle East

Figure 2.23: Strongest Needs by Capability and Region



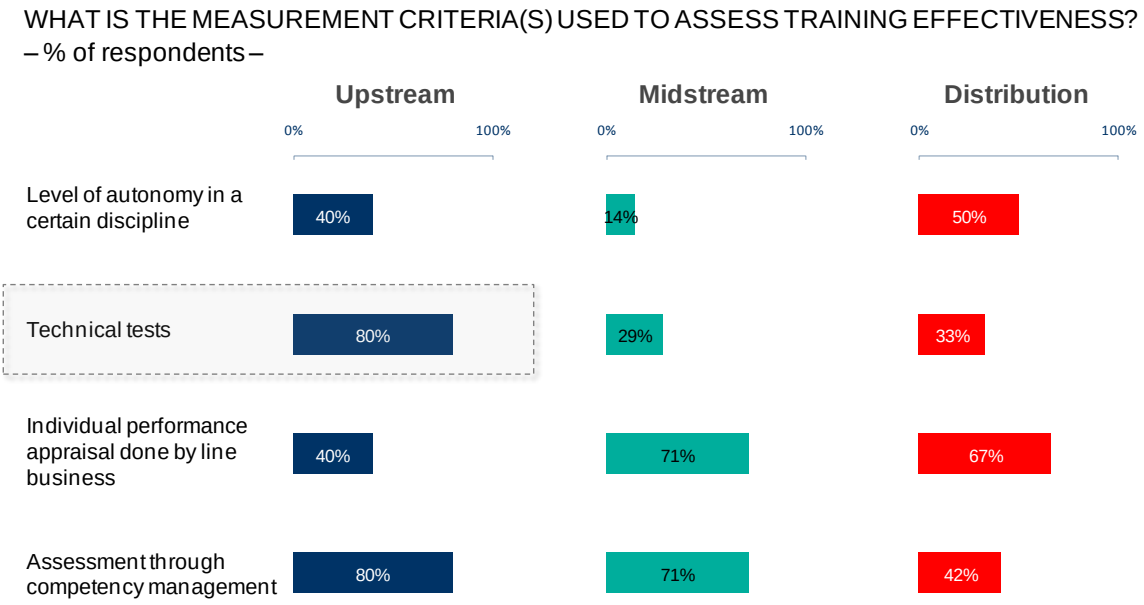
Technical competency assessment is widely adopted among gas companies, especially in the Upstream segment where the intensity of technology is the highest compared to the other segments of the gas value chain.

Figure 2.24: Companies Conducting Technical Competency Assessments



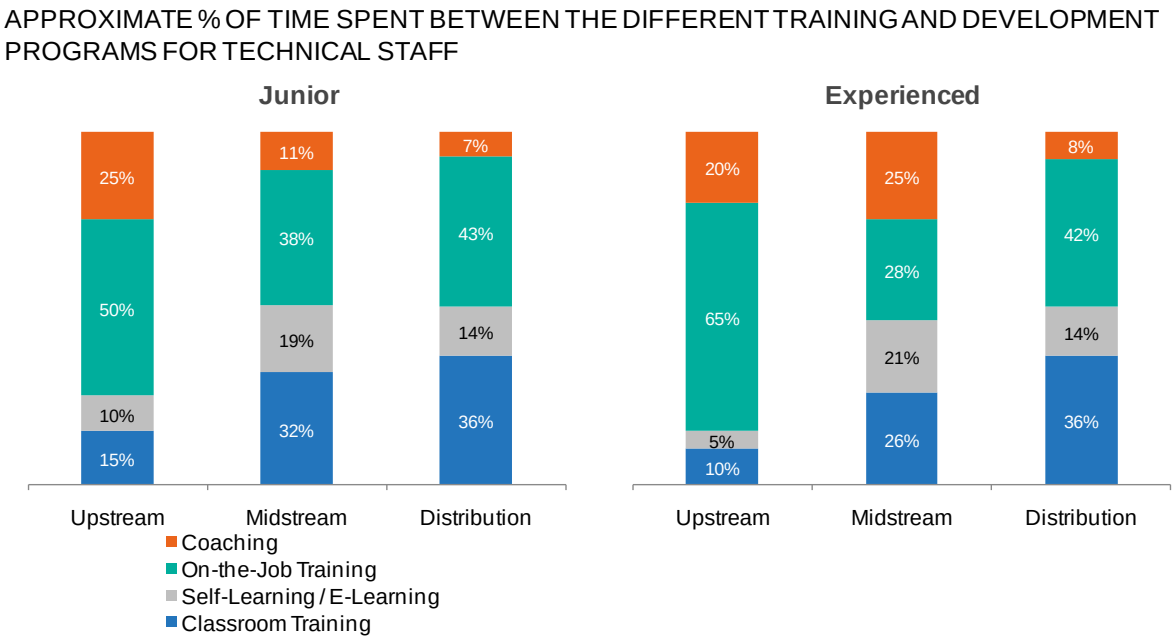
- most of the responding companies use competency management and individual performance to assess training effectiveness
- Upstream companies also resort to technical tests
- competency assessment is usually done by line managers

Figure 2.25: Criteria to Assess Training Effectiveness



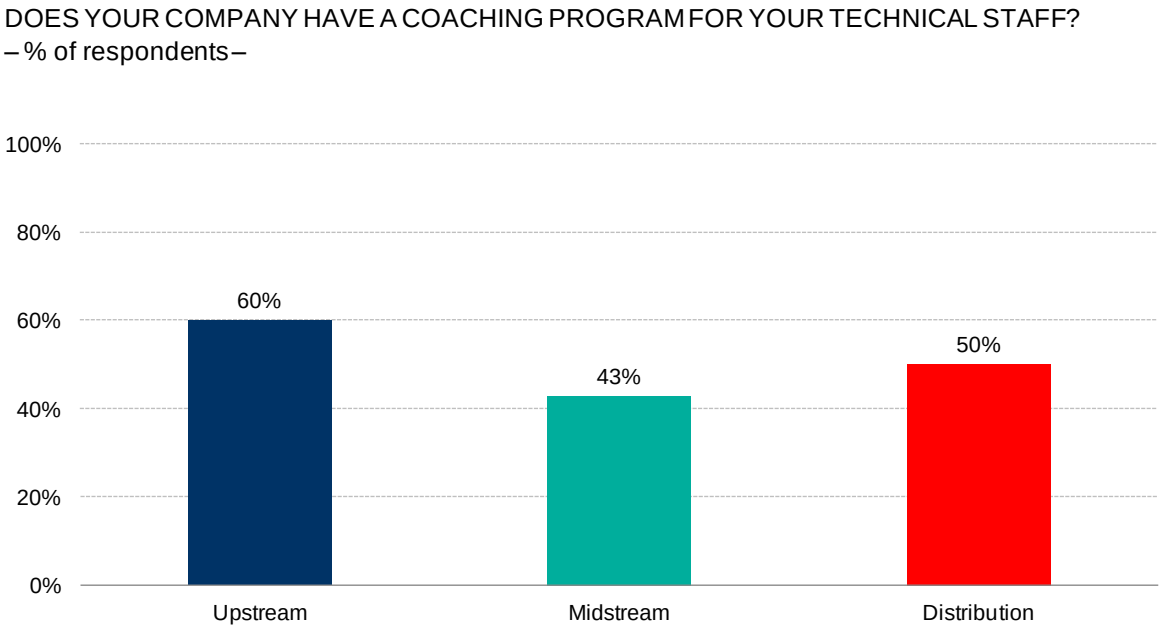
For both junior and experienced staff, Upstream companies tend to use more coaching and on the job training and less classroom training than Distribution companies.

Figure 2.26: Time Spent Between Training Programmes (Technical Staff)



- Half of the responding companies have a coaching programme for their junior technical staff
- Upstream companies tend to pay more attention to coaching programmes than Midstream and Downstream players, which illustrates the need to develop technical skills in a very tight environment in terms of availability of talent

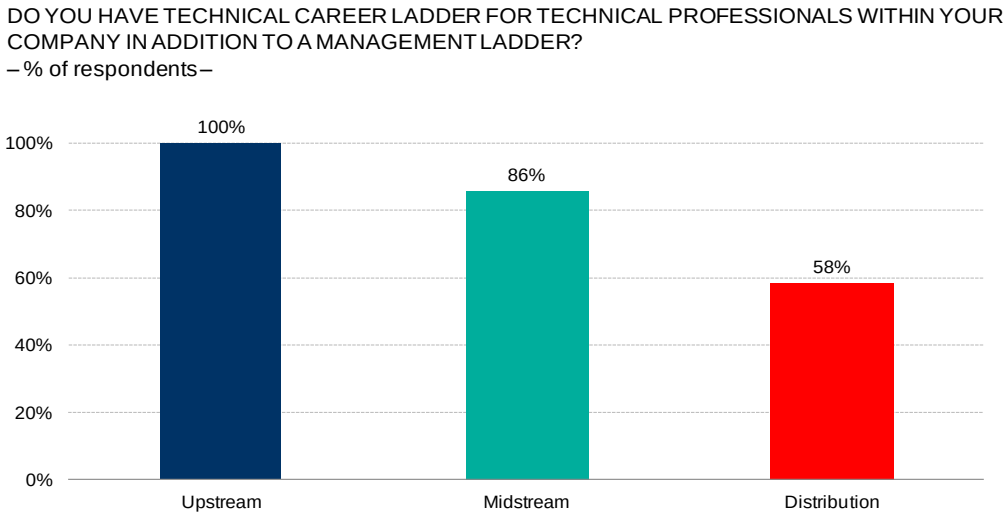
Figure 2.27: Companies with Coaching Programmes for Young Technical Staff



Career Management Practices

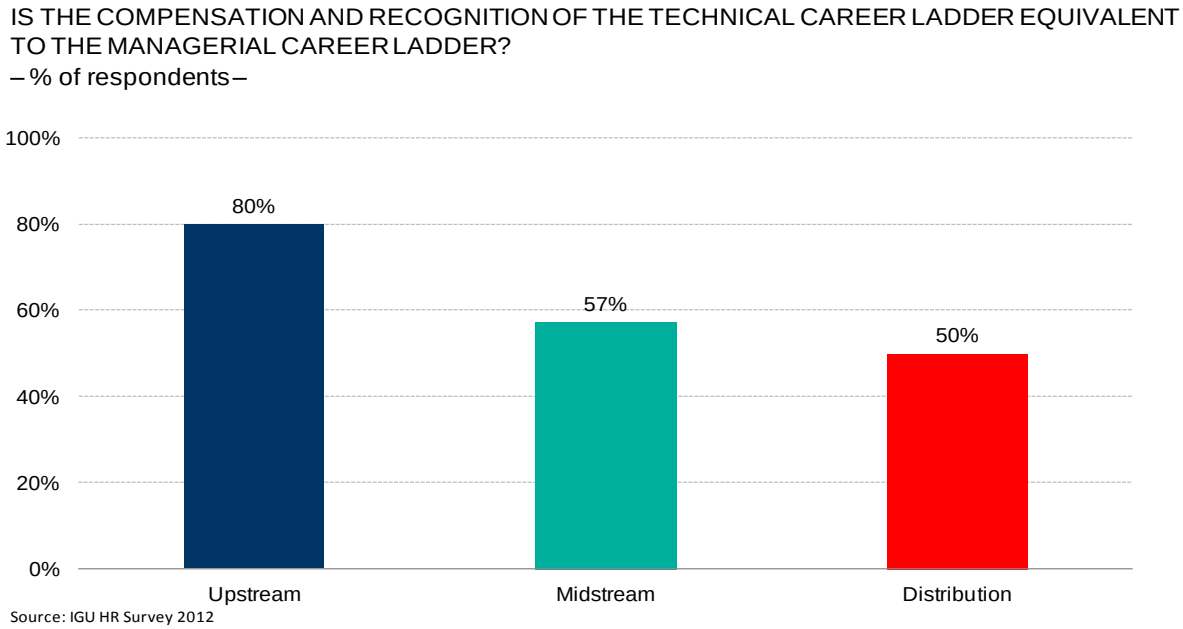
A technical career ladder parallel to management ladder exists for all Upstream responding companies, it is less common among Distribution companies.

Figure 2.28: Companies with Technical Career Ladders in Addition to Management Ladders



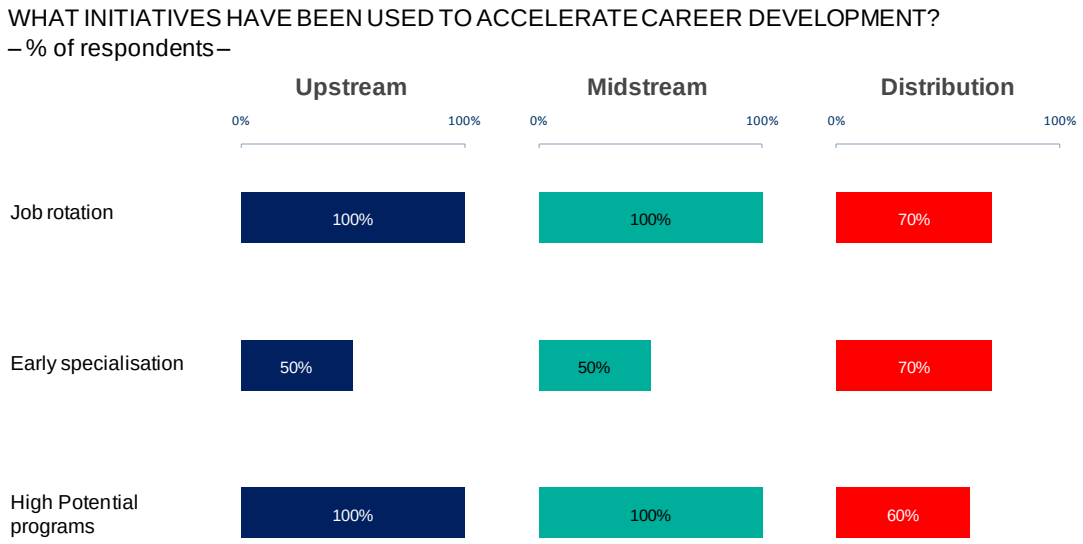
- only half of Midstream and Distribution respondents align technical and managerial career ladders in terms of recognition and compensation
- technical careers are better recognised in Upstream companies

Figure 2.29: Companies with Compensation and Recognition for Technical Career Ladders Equivalent to Managerial Career Ladders



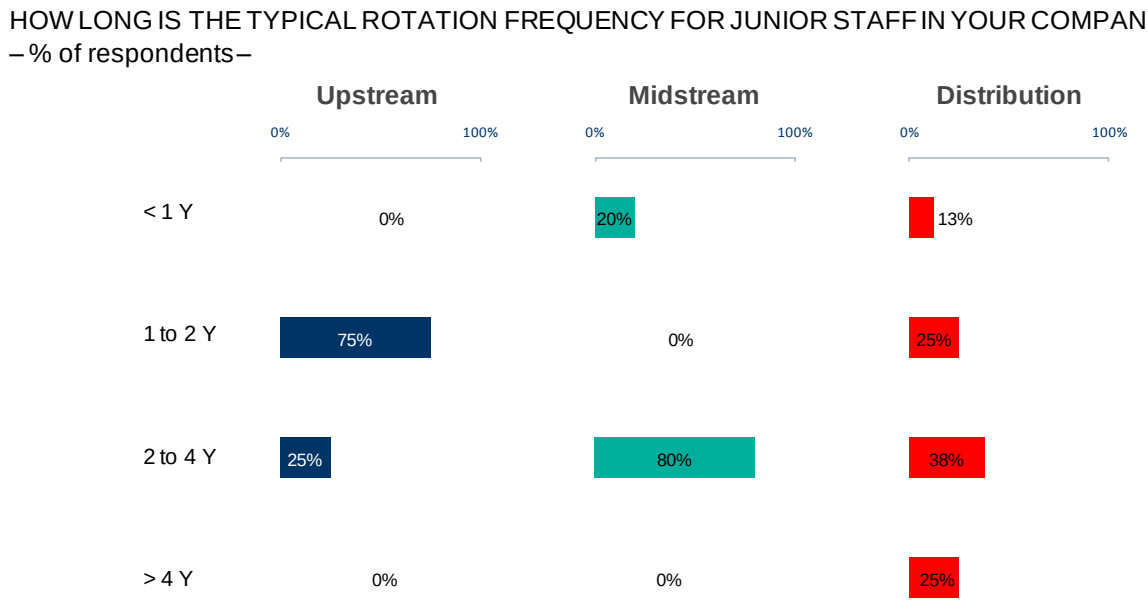
- Job rotation and high potential programmes are the main levers to accelerate career development
- Rotation across functions and disciplines as well as programmes for high potential staff are common within Upstream and Midstream companies

Figure 2.30: Initiatives taken to Accelerate Career Development



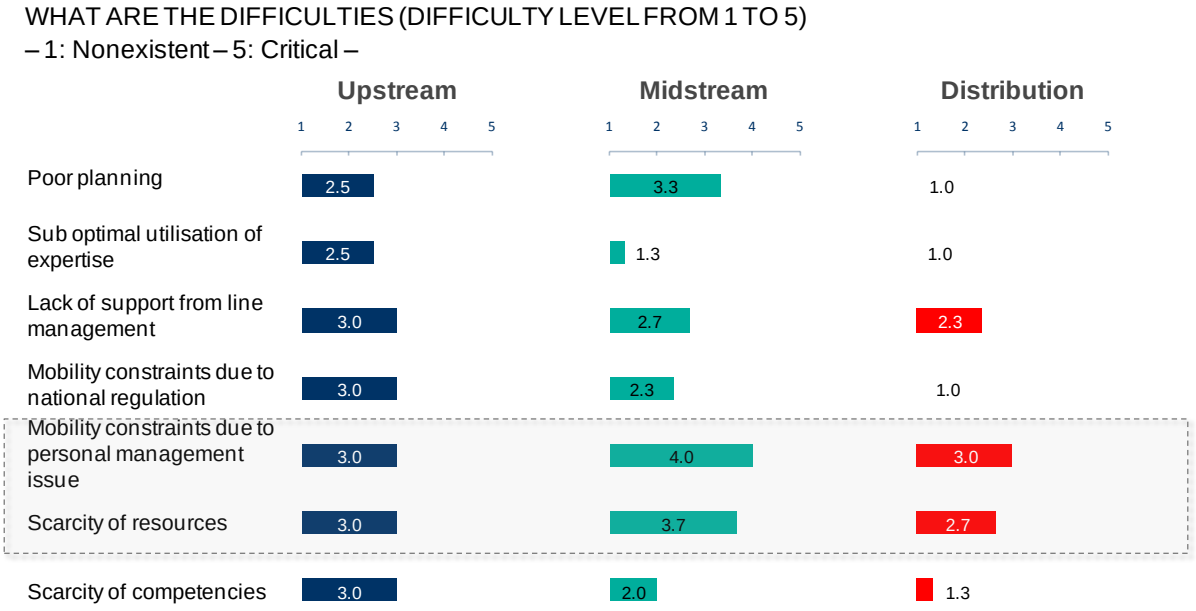
- Upstream companies rotate junior staff faster than other segments
- The typical rotation frequency is two to four years for most companies

Figure 2.31: Typical Length of Rotation Frequency for Junior Staff



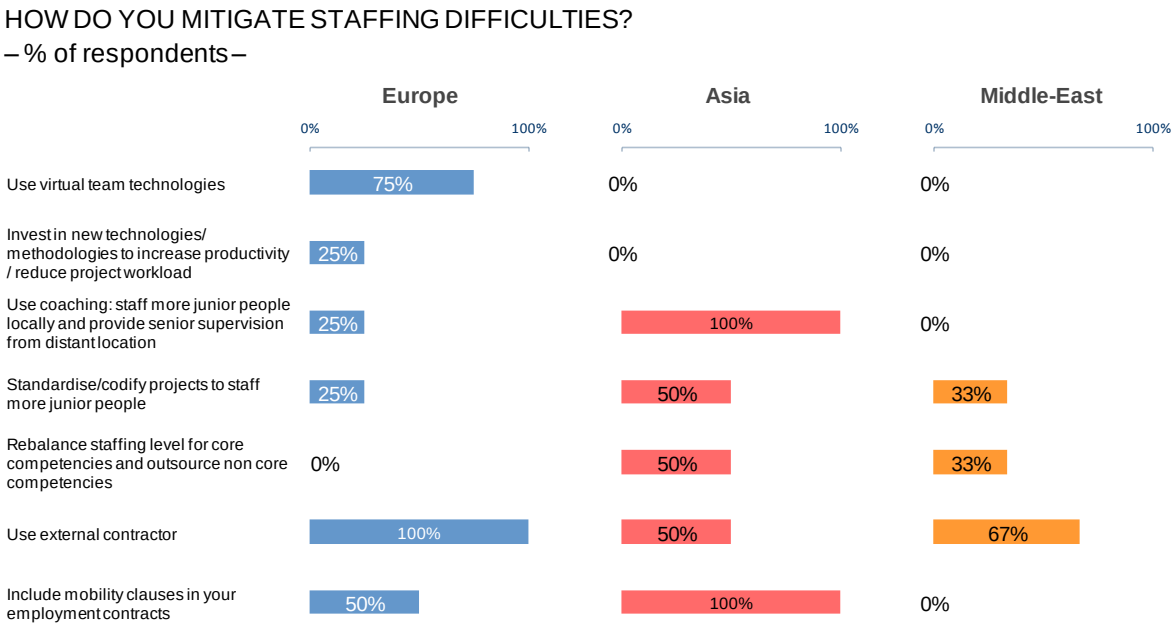
For all segments of the gas chain, staffing people on projects is mainly hindered by mobility constrains and scarcity of resources. Poor planning also feature high in the Midstream while suboptimal utilisation and lack of management support feature high in the Upstream.

Figure 2.32: Main Difficulties in Staffing Projects



To mitigate staffing difficulties, European companies mainly resort to virtual team technologies and external contractors. Asian companies resort to coaching and mobility. Use of external contractors is an important mitigation factor in the Middle East.

Figure 2.33: Mitigation Strategies to Address Difficulties in Staffing Projects



Conclusions and recommendations

The gas industry is under strong tensions. Faced with a long term growing demand, the gas industry has to undertake the challenge of producing more with less talent in an increasingly complex environment made up of the boom of shale gas and the development of LNG projects. In such a situation, the gas industry needs to create its own development path between the oil and gas exploration and production giants on one hand and the medium-sized and often fragile renewable energy producers on the other hand.

The overall gas industry is ageing slightly less than the oil and gas exploration and production business, but the situation is also worrying: a large pool of experienced technical engineers and specialists will retire within the decade. This pool needs to be renewed, which requires tapping into new talent pools. In particular, companies are looking for people to fill technical positions in LNG projects and commercial functions to secure gas sales.

Compared to the upstream oil and gas industry, the gas industry has some unique advantages to leverage to attract candidates:

- Firstly, the image of gas is much better than the image of “polluting” crude oil. Today, oil and gas are still too closely combined at the level of exploration and production and the green image of gas is underused at the campus level. The survey shows that candidates are sensible to the image of the company, meaning that the gas industry needs to leverage this potential to distinct itself from the crude oil industry
- Secondly, the gas industry can also bring forward its financial and economical robustness with the most favourable prospects in terms of its development within the energy mix, much more than renewable energies. The IEA’s “Golden Age of Gas” means security of employment, far from the recent bankruptcy of solar energy giants;
- Thirdly, the gas industry is integrated and geographically less complex to manage than the oil industry. Mobility is becoming the main challenge for oil exploration and production operators whose best talents often refuse to move to remote locations or live in the same working conditions than their predecessors in the 80s and 90s. The gas industry once again can manage this challenge differently, as its large set of activities may provide wider career development, with an easier balance of difficult and comfortable locations

Although the gas industry has obvious strengths to leverage to win the struggle for talent, it has still lots of improvement to make. The current image is more the old style conservative industry.

- Competency development remains essentially based on methods from the past. While best performers use on the job training and coaching to individualise and accelerate learning, most gas players are still the less efficient classroom training
- Similarly to the exploration and production industry, it often takes a long time before talented people are promoted to challenging positions
- In terms of promoting technical careers, few companies have adopted the practice that technical and managerial career ladders should be based on the same compensation and benefit levels
- Finally, the gas industry is even worse than the oil industry in terms of female participation in key positions such as core technical senior management

The gas industry needs to design its own “employee value proposition” by taking the best from the oil industry, like the strong recognition of technical competencies, and leverage its strengths such as a greener image, a large variety of jobs and the possibility to work in diversified geographies.

Regional Themes, Best Practice and Case Studies

The workshops organised by TF1 were aimed at better understanding the regional issues captured in the first demographic survey and to identify examples of best practices. The regional workshops brought together speakers from key companies and institutions from the Middle East, Asia, South America and Europe. Although there are distinct regional issues impacting the attraction and retention of talent, there are some common threads for all companies participating in the workshops:

- A large number of companies are increasing their workforce in the near and medium term and rank the attraction and retention of technical professionals as their main priority
- Most companies are diversifying their business into new frontiers, including exploration and production (for Midstream/Downstream companies), LNG, unconventional gas and renewable energy, and need to develop an attractive offer to recruit skilled professionals
- All companies are developing special career development and recruitment projects aimed at attracting and retaining technical talent
- To a certain extent, most companies are working with government and universities to develop specific training and development programmes; some companies have gone further and created their own corporate universities
- Direct and indirect targets for hiring a high percentage of nationals are in place in the Middle East and Brazil

This chapter summarises regional themes highlighted during the workshops in Qatar and Paris and TF1 members' contributions on best practice for attracting and retaining talent.

Asia – the growth story

China and India are poised to lead the growth in gas demand. China is predicted to become the largest gas consuming nation by 2035. Other Asian markets, such as Pakistan, Bangladesh, Malaysia, Vietnam, Indonesia and Thailand which were once self-sufficient will resort to imports to maintain the pace of economic growth. Traditional LNG importers such as Japan and Korea are investing in upstream projects to secure future supplies. Some of the key drivers for the gas industry in Asia are:

- Security and diversification of supply, including investment in international exploration and production, developing unconventional gas resources and LNG projects. This requires new skills and competencies, often in competition with traditional exploration and production and LNG players
- Developing enabling gas infrastructure, particularly domestic gas pipelines, city gas grids, combined cycle power plants and LNG import terminals
- Implementing policies and regulation conducive to investment in gas projects, taking into account energy subsidies and competition with coal
- Balancing the traditional job for life culture with a dynamic career path

Best practice examples from Asia

PETRONAS – Malaysia: Talent Management Strategy

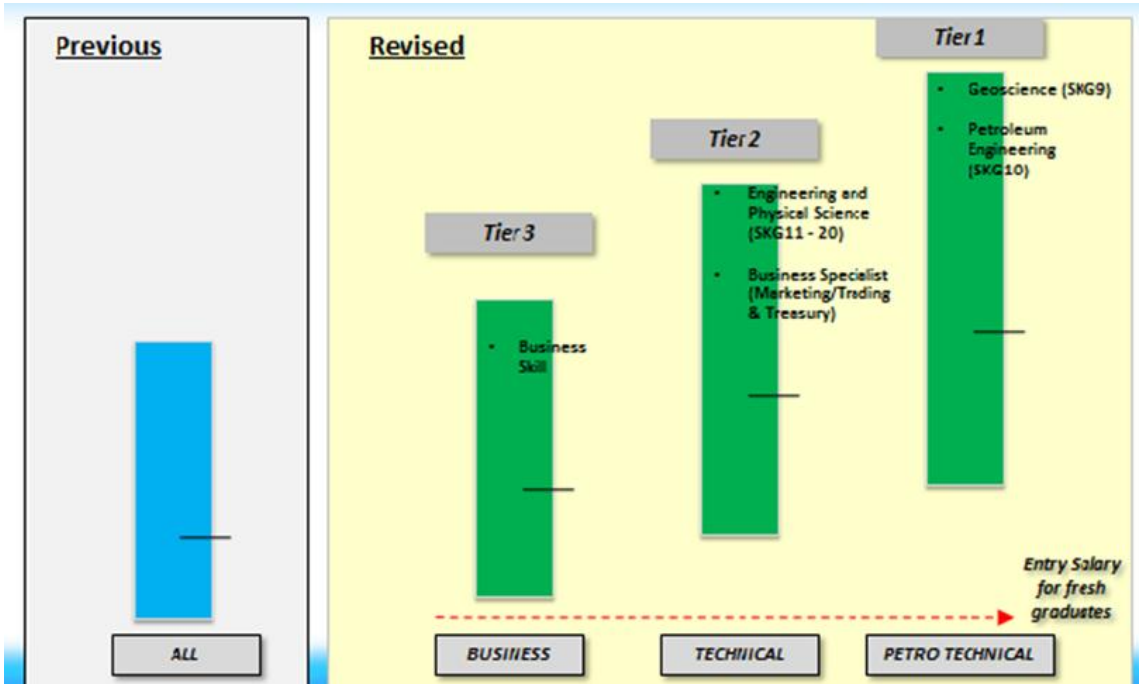
PETRONAS has evolved from a domestic focused company into a global company with a substantial portfolio of international projects in exploration and production, LNG and trading. This change has brought about many challenges from a human resource perspective. Attracting, developing and retaining talent is key to keeping pace with aggressive expansion and changes in business focus. Some of the main challenges faced by them are:

- Insufficient talent pool in the domestic market to realise critical projects

- Lack of competent and capable staff for business expansion including frontier technology in exploration and production e.g. gas shale, coal bed methane, floating LNG
- Shortage of senior professionals for business critical positions
- Succession planning

To address these challenges PETRONAS has devised a two-pronged strategy: 1) to attract and retain talent and 2) to collaborate with educational institutions to develop a pipeline of talent. In addition PETRONAS has also developed in-house education establishments (including a university, Leadership Centre and Technical Training Centre) which provide a solid foundation for becoming a regional learning hub for the oil and gas industry in Asia. The education facility consists of a centre of learning excellence and well networked institutions with strong oil and gas industry support, which presents opportunities for institution-industry collaboration.

Figure 3: PETRONAS -Tiered Career Path



Realising the importance of technical personnel, PETRONAS is moving from a homogeneous remuneration scheme to a more differentiated remuneration system to enhance competitiveness in retaining and attracting talent. A three-tier remuneration system provides for higher remuneration opportunities for petro technical careers such as geosciences and Petroleum Engineering.

Skills Development Programme

The grouping of skills in PETRONAS started 20 years ago with 14 functional groups introduced in 1986. The grouping helped to allocate staff into job families essential to the organisation. PETRONAS' intense expansion of the oil and gas value chain, both Midstream and Downstream, as well as its global business focus in the mid-1990s lead to capability development for staff being more granular and structured. To support PETRONAS' demand for a highly skilled workforce, dedicated skills advisors were selected by senior management.

The skill advisors supported by Discipline Resource Person (DRPs) are responsible for the identification, design, development and implementation of the required capability development of executives for respective groups, across the company. These skill advisors are from amongst the senior management with subject matter expertise. As PETRONAS is a firm advocate of the principle of “leaders develop leaders”, the advisors’ or DRP’s roles are not an independent role. It is carried out in addition to the advisors’ or DRPs’ current business role or portfolio. This arrangement contributes to the personal growth of PETRONAS potential leaders and makes them more mindful of the importance of talent management. Figure 3.01 displays a typical structure for a skill advisor and their leadership team. A number of current Executive Vice Presidents and Vice Presidents fulfilled the role of skills advisor or DRPs at some point in their career.

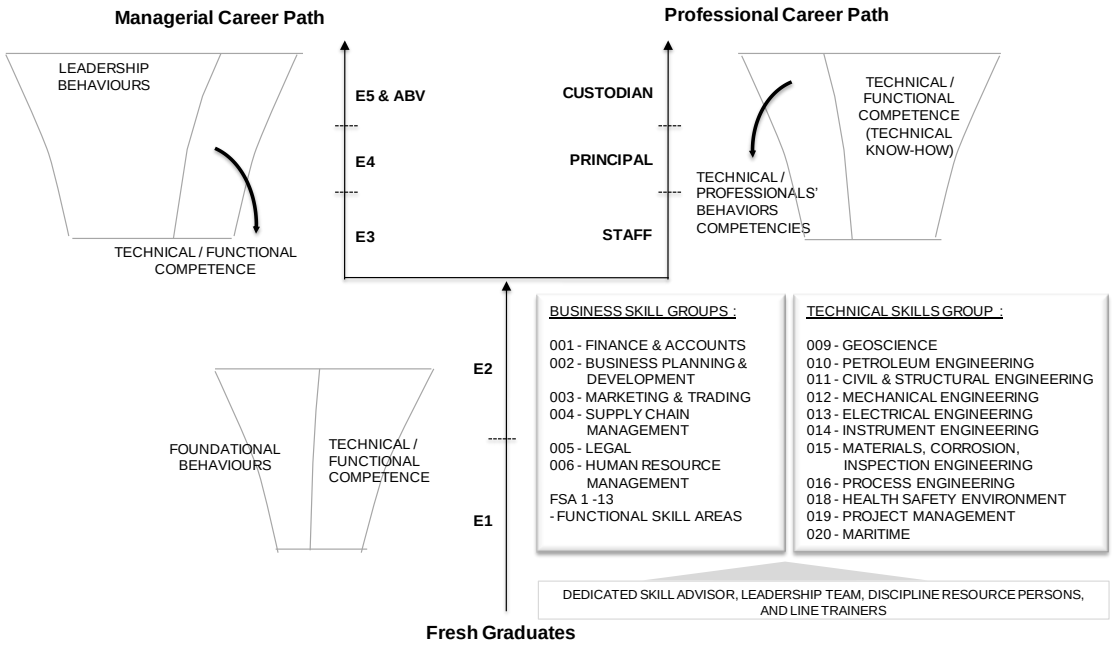
Figure 3.01: PETRONAS - Skill Group Leadership Team

One of the learning opportunities provided by skills advisors and DRPs for their groups are the skill group development programmes (SGDPs); these are participated by PETRONAS staff across the company for capability building to close any competency gaps. SGDPs are an approach created by PETRONAS to capture, make explicit and transfer tacit know-how and expertise. Therefore, SGDPs are typically designed, developed and delivered by PETRONAS own line professionals including skill advisors and DRPs. SGDPs were launched in 1996 and became one of promotion eligibility requirement for PETRONAS Executives from 2002.

Dual Career Path for Executives

Competitive business landscape, rapid business growth, ageing facilities, etc. have made it essential for PETRONAS to strengthen its staff competencies in highly technical or specialist areas. In 2000, PETRONAS introduced dual career paths for Executives–they could either take the Manager Career Path or Professional Career Path. The latter serves for continuous building of a pool of people with deep expertise for the organisation. These experts are sought after by companies in PETRONAS (as well as other external stakeholders) for their expert advice, innovative technical or business solution and business growth. This reduces PETRONAS dependency on external expertise in core areas. To-date, PETRONAS has appointed more than 1,000 specialists from various core functions. The dual career path is shown on figure 3.02.

Figure 3.02: PETRONAS -Dual Path Career Scheme



Accelerated Capability Development

PETRONAS recognised that under its existing development model the younger employees would not have the required skills to take over from individuals who were retiring from the company. Having recognised this fact the organisation decided to accelerate the capability of its workforce. In 2008, after the success of a pilot exercise in Petro-Technical groups a year earlier, Accelerated Capability Development (ACD) was rolled out to accelerate the development time of PETRONAS young workforce from graduate entry level to autonomy. An autonomous individual would be able to independently problem solve or recommend solution in his or her line of work. The key intervention introduced in ACD involved a rigorous annual assessment of the workforce and assignment of technical coaches to each executive to help close the competency gap. PETRONAS has started to see the benefits of this revolutionary intervention. To-date, it has been able to reduce to a total of seven years and ten months the development time of its workforce from starting a new job to a mature role. Besides this, PETRONAS also made available a structured career path progression ladder for staff to refer to when charting their career.

KOGAS – South Korea: Career Development

KOGAS has become the world's number one LNG buyer and the fourth most admired company according to Fortune magazine. KOGAS is currently diversifying its business from the traditional LNG import, gas transmission and sales and focusing its investments overseas, particularly on exploration and production projects. This is posing a big challenge for the company since it is difficult to attract employees willing to work in places such as Iraq, Mozambique, Myanmar and Uzbekistan.

By the end of 2011 KOGAS' workforce totalled nearly 3,000 employees, KOGAS has increased its expenditure in training by 50% in the past two years; current expenditure is nearly $9.5 million per annum, with approximately 900 training courses on offer, as shown in figure3.03.

Figure 3.03: KOGAS -Training in Numbers

	2009	2010	2011
Total Expenditure (Thousand, USD)	6,528	7,943	9,371
Number of Employees	2,796	2,862	2,960
Per Expenditure (USD)	2,335	2,775	3,176
Number of Training Courses	347	605	897
Per Training Time (Hours)	101	102	108
Number of Trainees	16,813	16,974	21,124

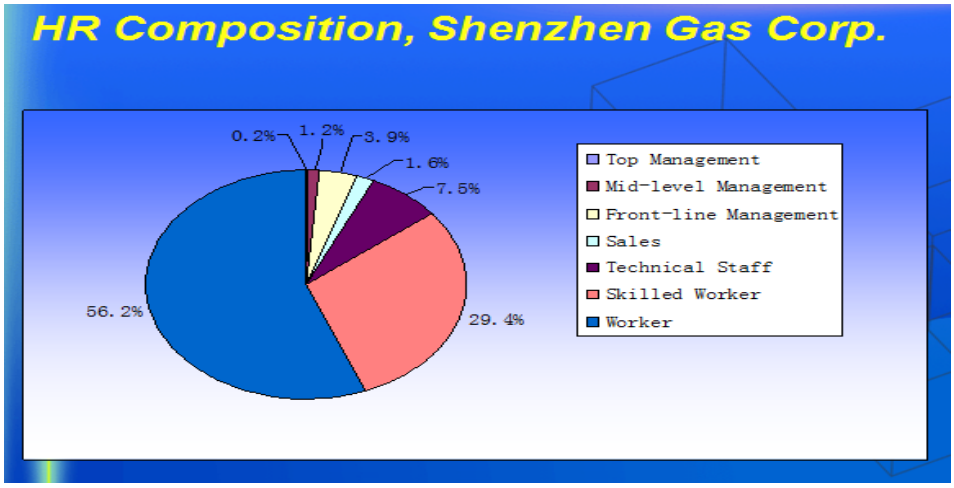
KOGAS Career Development and Competency Development Model – KOGAS has developed a model which is based on 4 key competencies i.e.: Foundation, Technical, Global and Leadership competencies. The Foundation Competency stresses KOGAS values such as Trust, Change and Challenge. The Global Competency is underpinned by lingual ability, understanding different cultures and global business etiquette, whereas the Technical Competency comprises 118 jobs and 349 technical attributes. The Leadership Competencies apply to Board and Team leader level only.

Shenzhen Gas Corporation – China: human capital philosophy

At Shenzhen Gas Corporation they keep true to a 2000-year-old proverb in China: “Make the best possible use of each human being and each piece of material”. This can be translated into “Every single employee is important”, as every single employee has his relative strengths. For Shenzhen Gas Corporation, the keywords in human capital construction can be summarised in three main themes:

- Make the best possible use of an employee versus core employees
- Career planning versus corporate vision
- Regulation guidance versus corporate culture

Figure 3.04: Distribution of Shenzhen Gas Workforce



Nearly 86% of the workforce comprises labour and skilled workers, at the bottom of the hierarchy. The Company aims to provide an appropriate degree of security for the base workers and at the same time incentivise management to lead the company through the challenges of growth. Shenzhen Gas Corporation's incentive plan caters for a combination of security and incentive: i.e. front and mid-level managers have a higher proportion of their income paid as incentive, where the salary component varies from 25% to 40% of the total pay, whereas for an hourly worker the salary is equivalent to 70-75% of the total pay. There are two sets of clearly defined policies for its core and non-core employees:

Policies for core employees:

- High standards for employment
- Advanced training courses
- Support and allowance for in-service study
- Opportunities and challenges for young talents

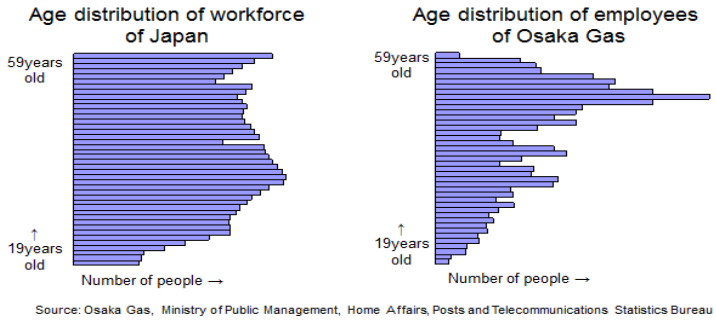
Policies for non-core employees:

- Meeting reasonable standards for employment
- Accepting continuous training
- Acquiring necessary certificates and qualification
- Maintain the validity of certificates and qualification

Osaka Gas – Japan: attracting talent in a changing business

Osaka Gas is the second largest gas company in Japan. Their core businesses are LNG import, regasification, gas Distribution and Marketing.

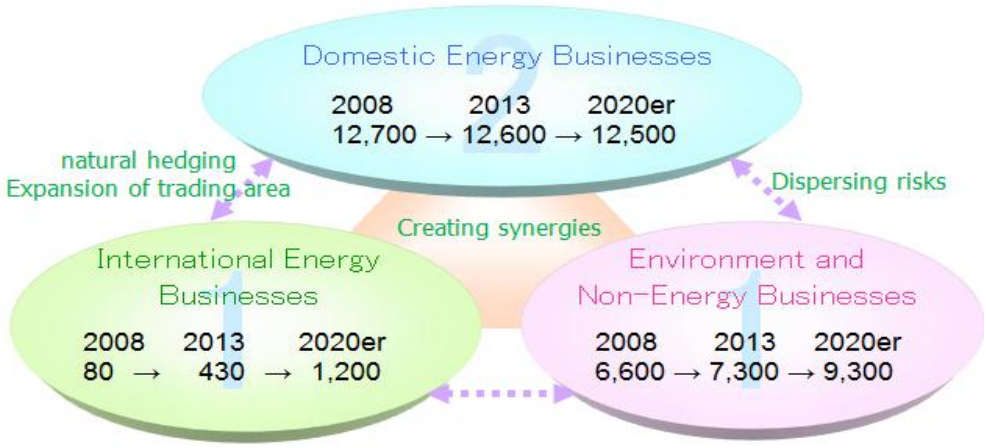
Figure 3.05: Age Distribution of Workforce in Japan and Osaka Gas



Source: Osaka Gas, Ministry of Public Management, Home Affairs, Posts and Telecommunications Statistics Bureau

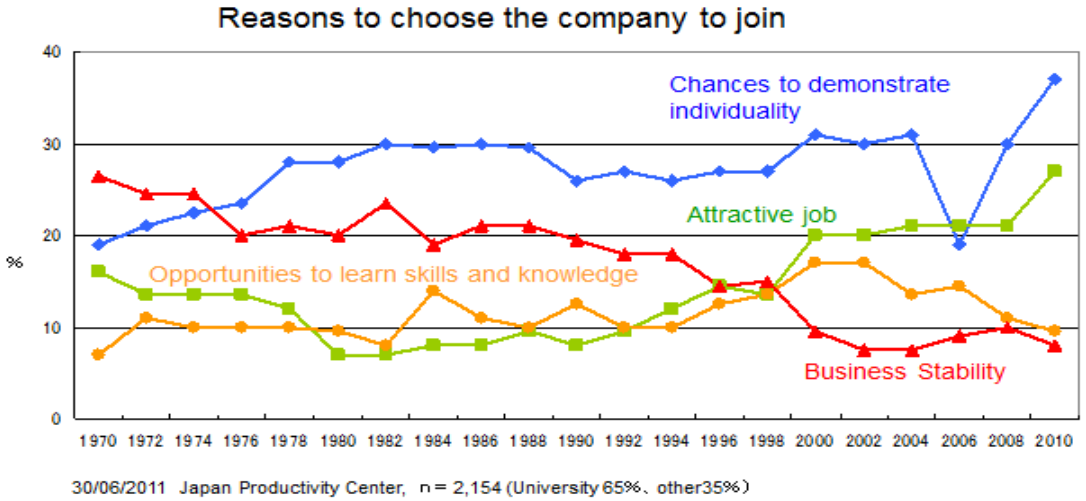
Osaka Gas's management philosophy is to increase employees' value by allocating new members to positions according to their educational background, as well as to their individual ability. Osaka Gas' personnel system was traditionally based on lifetime employment with workers staying with the same company until retirement. Most of Osaka Gas's workforce is aged 45+ and slightly disproportionate to Japan's workforce age as is shown on Figure 3.05. As a lot of skilled employees are due to retire in the near term it is necessary to transfer these skills on to younger workers. In addition, Osaka Gas is also increasing its employee strength in areas which are the business focus of the corporation i.e. in trading and international business and environment and other non-energy businesses.

Figure 3.06: Rapid Expansion of Osaka Gas Business Overseas



By 2020 Osaka Gas' new businesses will employ nearly the same amount of people as the domestic energy business. To address this formidable challenge, Osaka Gas is recruiting experienced workers, fostering initiatives to retain existing workers, such as mentoring and training, and conducting internal surveys on working environment and management skills. In the new system, skills and knowledge are passed on to younger members by senior staff. The key challenge for Osaka Gas is recruiting experienced workers and overseas employees. Internal surveys show that most employees have high attachment to the company with a low rate of attrition. However, over the last couple of years employees have rated criteria such as opportunities to demonstrate their individual capabilities and doing an attractive job much higher than the traditional corporate culture of business stability.

Figure 3.07: Key Attraction Factors for Employees in Japan



Middle East- Gas demand growth and young workforce

Together with Asia, the Middle East is poised to lead the growth of gas demand over the next 25 years, according to the IEA. The region holds 40% of the world proven gas reserves but circa 70% of the gas is associated thus dependent on oil production and the Organization of the Petroleum Exporting Countries (OPEC) quotas. Non-associated gas in the regions is becoming increasingly difficult (sour, tight) and its development requires adequate prices to producers, which do not co-exist easily with currently subsidised energy prices. A growing number of countries in the Middle East have started importing LNG and pipeline gas.

The majority of the gas companies in the region are controlled by national governments, with international companies as minor stakeholders. Most gas/oil producing countries in the Middle East have a young population and governments in the region have become increasingly concerned about high levels of unemployment. A key issue is developing local talent to meet targets for local nationals working in the industry. Many countries have put in place targets to employ nationals from 50% to 90% of the total workforce.

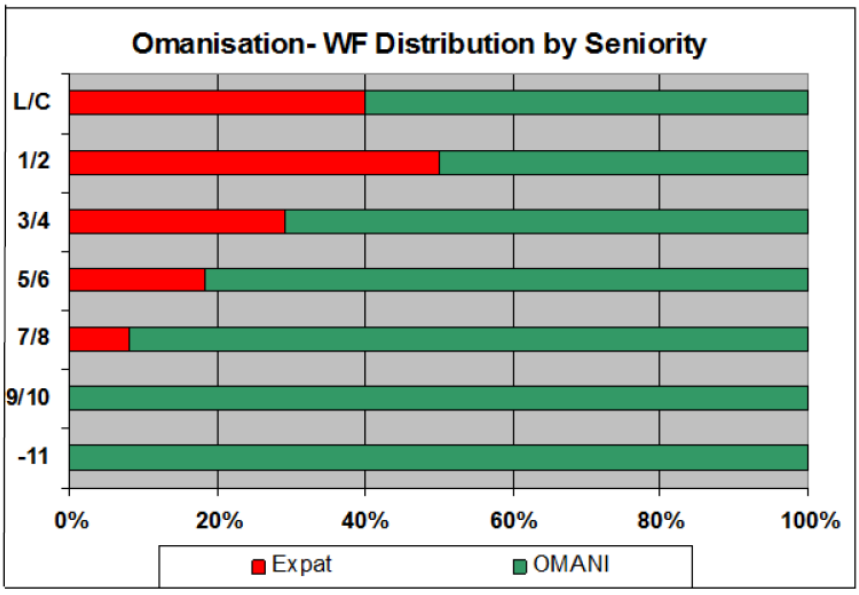
Another regional theme of interest relates to women in the workforce. A growing number of women are studying sciences and are recruited by the national oil and gas companies but face a few issues such as travelling unaccompanied on business abroad and working in the field where the environment is designed to accommodate male employees.

Best practice examples from the Middle East

Oman LNG (OLNG) – Oman: development of local workforce

OLNG is the largest LNG producing company in Oman, with 404 employees. Currently 86% of OLNG workforce consists of local employees. Most of the nationals are in lower skilled jobs, although the number of Omanis in management and senior positions is increasing.

Figure 3.08: Distribution of Oman LNG Workforce



Staff Level	Number of Staff
L/C	5
1/2	12
3/4	48
5/6	116
7/8	139
9/10	53
-11	31
TOTAL	**404**

The company is facing a number of challenges because of the very competitive nature of their business (LNG) and the environment within which they operate. Some of these challenges are:

- Distinctive LNG business requirements (specialised workforce)

- Well trained and Talented Workforce (attractive for other competitors)
- Booming market (open market policy)
- Remote working locations
- Limited opportunities (today 86%+ "Omanised")
- Lengthy recruitment processes
- Scarcity of skill pools

Attraction and Development initiatives

OLNG has taken coordinated actions to address the challenges in attracting and retaining a skilled, motivated and talented workforce. The main drivers for this integrated approach are:

- Organisational capability to integrate / coordinate the talent management
- Attraction and recruitment strategy
- Develop focus and commitment at corporate level
- Deliver resources when needed
- Create business contingency planning opportunities for future deployment
- Annual salary and staff surveys
- Integrated performance and development programme

This has translated into a series of programmes and initiatives, for example:

- Hire today and deploy later as competent
- Differentiated development programmes
- Hiring mature workers as well as graduates
- Business contingency planning (17 positions)
- Best practice in developing Omani talent
- Link between Corporate Score card and Retain the Right Talent (15-20% weighting)
- Ladder progress / professional accreditation

Qatargas – Qatar: recruiting and developing local talent

Qatargas was established in 1984 and is currently the largest LNG producer in the world, with l LNG production capacity of 42 million tonnes per annum. Qatargas operates offshore and onshore facilities including seven LNG trains and market and trade LNG and gas products worldwide.

"Qatarisation" Plan

Qatar has put in place an annually reviewed, long term "Qatarisation" Plan for its oil and gas industry. There are 40 participant companies engaged in long term "Qatarisation" planning. The plan is a combination of the plans produced by each company and is structured on three levels: Corporate (Strategic), Departmental (Operations) and Individual (Developmental). It involves three processes: recruitment, training and development and career progression. It also provides for mentorship opportunities and is linked to other similar programmes at national level.

A specialised programme for national graduates has been designed to develop the overall business skills and knowledge needed for future roles. An individual development plan is structured around the needs of each graduate to ensure they have the opportunity to succeed in the company.

The main challenges facing the "Qatarisation" programme are:

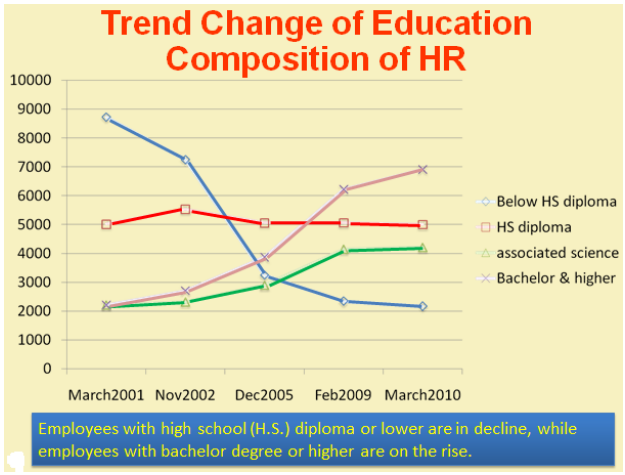
- Ability to attract quality Qataris into the industry (by quality we mean well educated, hard-working, career minded and motivated)
- Competition for quality Qatari employees in the industry
- Ability to retain quality Qatari employees in the industry

A lot of these challenges are due to the fact that many young people believe that the energy sector is not an exciting workplace. Competition for talent is from 'sunshine sectors' like banking and finance, IT, telecommunications, etc.

National Iranian Gas Company (NIGC) – Iran: talent management

NIGC is one of the four energy companies controlled by Iran's Ministry of Petroleum. NIGC is responsible for the treatment, transmission, and delivery of natural gas to the domestic, industrial, and commercial sectors and power plants and has 18,000 employees. Due to the history and important role of natural gas in Iran's energy scenario, NIGC believes there are also many opportunities to attract talented candidates. Over the last 10 years, NIGC reversed the pattern in hiring high school leavers to favour hiring employees with university degrees. Figure 3.09shows the changing trend in education composition of employees in NIGC:

Figure 3.09: Workforce Trends for NIGC



NIGC goals focus on the following points:

- Succeeding in Global Economy
- Leading in competitive business environment
- Achieving sustainable competitive advantage
- Maximising use of human capital
- Increasing return on investment
- Access to diversified talent

Talent Management

According to NIGC there is a diverse and available pool of young graduates and there are many high standard universities in Iran. In addition to that the oil and gas industry is over a century old and the wide spread use of gas in Iran provides high visibility of the gas companies. The key selling points to attract talent at NIGC are:

- Strength and reputation of gas brand in Iran
- Ratified rules to attract talented individuals including waiver of entrance test to accelerate recruitment phase along with financial incentives providing social and cultural services
- Advanced technology in comparison with the other organisations
- Providing talent capability development and improvement
- Educational performances for spiritual development and perfection
- Petroleum Industry University as a tool for recruiting and training talent
- Establishment of "Elite" foundation in Iran

Current challenges to NIGC talent management goals:

- Quality of the graduate pool to draw from security
- Bad weather conditions
- Competition with the other gas companies in the Persian Gulf
- Brain drain
- Hard conditions of work

Saudi Aramco – Kingdom of Saudi Arabia: developing local talent

Saudi Aramco a state owned company of the Kingdom of Saudi Arabia is the world largest non-listed oil company and the world's largest oil producer. Aramco was established in 1933 and in addition to its core business of producing oil and gas, the company has diversified into areas such as petrochemicals, shipping, refining, marketing and distribution. Aramco is currently focusing on expanding its capability to discover, produce, process and transport natural gas. Aramco has more than 54,000 employees from 70 countries.

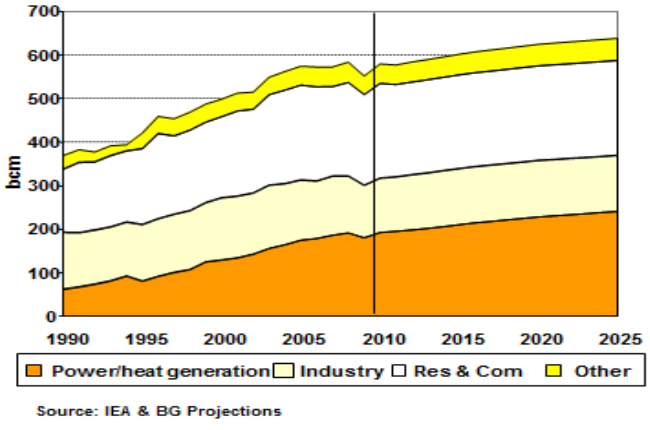
Talent attraction and retention is a key priority for Saudi Aramco. A programme to develop a workforce comprising Saudi nationals has been in place since the 1940s. The current level is 88% with 100% of the management cadre being Saudi nationals. The programme includes the following areas:

- In-house training for unskilled new hires
- Continuous development for all employees
- Engagement and retention programmes
- Performance Management Process
- Survey markets and offer competitive packages
- Apprentice training programme for young Saudis
- College degree programme for non-employees
- High standards for hiring Saudi fresh graduates

Europe – a mature gas industry

Natural gas plays an important role in Europe, but no major growth is predicted. Europe is an increasingly mature gas market, with a growth rate of 1.0% per annum compared to Asia which is expected to grow at over 4%. Most of the growth in Europe's gas demand is in power generation. Europe is unique in co-existing long-term gas contracts with liquid hub markets, and under the EU-led liberalisation agenda Europe is re-designing its gas markets. Europe's decarbonisation targets and the growing opposition to fossil fuels have also raised questions on the image and role of gas in meeting its future energy needs.

Figure 3.10: European Natural Gas Demand Forecast



The key challenges impacting the talent issue in Europe are:

- Complex web of EU and national energy policies and targets
- UK and European tax regimes
- Perception of oil and gas industry
- Ageing workforce
- Competition for resources
- New skills needed in unconventional gas (shale and coal bed methane)

Age is also a key issue in Europe. By 2050, half of the population of Europe will reach pensionable age, and Europe will face a shortage of over 160 million employees in the labour market. In the face of these challenges, companies have developed mitigation plans on several fronts, for example BG Group has put in place a combination of restructuring reward packages, investment in brand, mentoring and consultancy opportunities, fast track development programmes, expanding graduate opportunities, strategic partnerships (i.e. water companies), and recruiting in skill rich markets. Other companies are implementing specific projects to attract young people, developing internal university programmes, age management and female coaching programmes.

Best practice examples from Europe

Gazprom – Russia: attracting young talent

Gazprom is the world's largest gas company and is involved in the entire gas value chain from Production to Distribution and Utilisation. Over the last few years Gazprom has also been developing a significant international LNG production, Marketing and Trading business. It is also leading an Arctic exploration programme which may result in future pipeline and LNG exports.

Gazprom VNIIGAZ LLC is the leading Research and Development Centre of Gazprom with more than 60years' experience in implementing major integrated oil and gas projects, in line with Gazprom Group strategic targets. The Institute employs more than 2,000 specialists, including 50 Doctors of Sciences and 250 PhDs, 38 Professors and over 800 young scientists and experts. Scientific schools are established in the Institute on the main directions of Gazprom's activities. It works very closely with schools and universities to manage and plan the talent requirement for the Gazprom group. Some of the programmes that they have implemented are:

Early Talent Development

Work with schoolchildren:

- Organising career guidance activities for school youth
- Holding annual All-Russian Science Olympiad in order to attract talented young specialists to the oil and gas industry
- Training for entering technical faculties of the Gubkin Russian State University of Oil and Gas
- Scholarships awarded to the best pupils of Razvilka secondary school held under the Institute's patronage

Work with Universities:

- Organising work with the basic sciences chairs at the leading Moscow Universities
- Organising excursions, overview and pre-graduate practical training for students
- Scholarships for the best senior students of the Gubkin Russian State University of Oil and Gas

Post Graduate Training

- Education and training of employees of subsidiaries at the post-graduate courses at Gazprom VNIIGAZ LLC and other organisations
- Improving Qualification and Professional Re-training for the leaders and specialists of Gazprom Group

GDF SUEZ – France: talent attraction programmes

According to Forbes magazine, GDF SUEZ is the largest utility company in the world. It encompasses a diversified portfolio of gas, electricity, water and environment services employing nearly 220,000 employees across 70 countries. The French government is the largest shareholder in the company. GDF SUEZ is the largest buyer of natural gas and importer of LNG in Europe and the largest independent power producer in the world. With such a diversified portfolio and geographic presence, GDF SUEZ is always looking to recruit talent.

Results from a survey carried out by GDF SUEZ with young professional people show that the top ten selling points for an employer are**:**

- Work-life balance
- Remuneration and career opportunities
- Dynamic and creative work environment
- Good professional references for the future
- Diversified portfolio
- Competitive base salary
- Pleasant work environment
- Challenging tasks
- Attractive products and services
- Professional development and training

Talent Attraction Programme

In order to address the key challenges in the area of talent management, GDF SUEZ developed a series of initiatives targeting young people and graduates:

- Answering specific sourcing needs of different business lines
- GDF SUEZ trainee programmes
- Gas Engineering post graduate programme
- New uses of internet as leverage for specific sourcing

How to attract the best international profiles?

- Selective international partnerships and specific programmes, e.g.:
    - CEMS, a global alliance of academic and corporate institutions dedicated to educating and preparing future generations of international business leaders. CEMS' main vehicle is a Master in International Management, currently assembling 920 students of 59 nationalities
    - Copernic programme, an industry partnership programme by the French Ministry of Foreign Affairs. It takes the form of a 12-month management course for students from Central and Eastern Europe, specialising in Engineering, Law or Economics, plus an in-company module of six to nine months
    - Collège des Ingénieurs, Institute Français du Pétrole (IFP) School

How to convey corporate values and business lines to graduate students?

- Career fairs
- Presentations
- Global partnerships

- New programmes (Golden Mission, Innovation challenge, etc.)
- Networks

Some initiatives developed by GDF SUEZ to target young people include:

- Targeting communication and media, for example, sponsoring a blog “The Golden Mission”
- Promoting social responsibility initiatives
- Emphasis on gas professions and careers
- Implementing new ways to meet students: for example the World University Sports Challenge bringing together 4,000 students from France and Europe
- Developing networks, e.g. French and Belgian target Schools and Universities:
    - 30 Ambassadors
    - 50 Campus Partners
    - 40 Campus Links

Gas Natural Fenosa (GNF) – Spain: talent development and management

GNF is an integrated gas and power company, with nearly 19,000 employees in 23 countries. GNF possesses a diversified, international portfolio of assets and projects in Europe and Americas, encompassing natural gas, LNG and electricity. For many years gas demand growth in Spain has outpaced other sources of energy, but the industry was affected by the economic crisis in 2008. The industry is currently recovering from the economic downturn but the Eurozone crisis is impacting on short term improvement prospects.

Talent Management and Retention Programme

Talent management is already a critical process for GNF. Following the merger of Gas Natural with Union Fenosa, one of the fundamental objectives of the new group was to promote cultural integration to achieve empowerment of engagement, satisfaction and diversity. One of its main initiatives is the Corporate University. The GNF Corporate University aims to promote knowledge management, cultural integration and best-in-class corporate training.

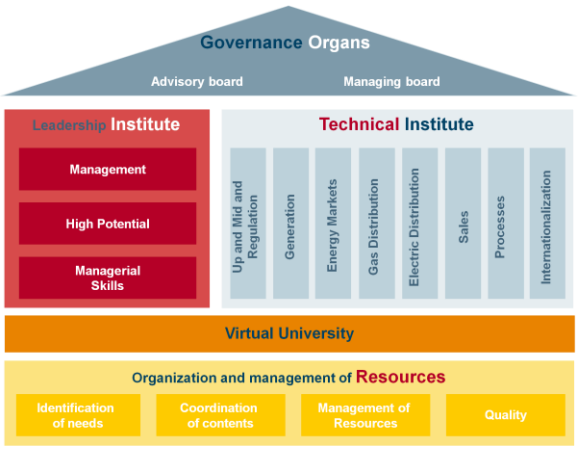
The University was established in 2000 and was the pioneering initiative in the Spanish corporate world. Its main objective is to cater to GNF’s training needs at all organisational levels and fields of activity. GNF is currently considering the possibility of extending their training offering to other groups (clients and suppliers). The University is also responsible for managing knowledge at a company-wide level.

The University governance, mission, vision and objectives are provided by a Steering Committee and a Consultative Council. The programme management organises content, identify needs and resources and assesses quality. Two governance bodies were created, the Advisory Board and the Steering Committee, which ensure that the company’s strategy and the implemented programmes remain aligned at all times. Members include representatives of the company’s senior management, and external advisors from prestigious academic institutions.

The University provides academic and residential facilities in ten countries (Argentina, Brazil, Colombia, Spain, Egypt, Italia, Mexico, Moldavia, Nicaragua and Panama), totalling over 47,000 square meters of academic infrastructures. The most emblematic complex is the Puente Nuevo Campus, in Spain, with a four-hectare site and the capacity to accommodate 150 professionals.

In 2010, the company invested €30 million, or approximately€485 per worker. A total of 794,769 hours of classes were provided within this framework, and 48 hours of training per GNF professional. 50% of these training programmes were provided by in-house professors and experts.

Figure 3.11: Structure of GNF Corporate University



In 2011, GNF Corporate University engaged in an evolutionary process to adapt to the organisation's needs. It adopted a new approach, in its endeavour to become a talent development centre pursuing excellence in training. Its new mission, objectives and structure were defined, in line with the corporate strategy.

The Corporate University is structured in two Institutes, the Leadership and the Technical Institutes. Both are broken down into schools (three from the Leadership Institute and eight from the Technical Institute), which are divided into classrooms, designed to increase the level of specialisation to the maximum possible extent.

The Leadership Institute caters for top managers and high potential employees, whereas the Technical Institute provides training on gas, energy markets, supply, processing and other disciplines. The Leadership Institute, which caters to all senior and middle management levels, guarantees the development of talent to promote the strategic vision in the short and long term. Its work focuses on three types of skills: business skills, interpersonal skills, and personal skills.

The goal of the Technical Institute is to ensure that the know-how required for GNF's growth is developed, through its 50 classrooms and 82 programmes. It focuses on work-related concepts and techniques for business areas and corporate functions; on training in models, processes, and procedures; on transmitting the knowledge of in-house experts with critical experience; on spreading external experiences and best practices; on providing training on state-of-the-art technologies, and on acting as an observatory for innovation, which is transmitted through its activity.

The Corporate University identifies training needs, with the support of the business and corporate areas and Business Partners, and allocates the resources needed to satisfy these needs. Subsequently, the Corporate University, which has its own model, measures the effectiveness and practical results of the training programmes through surveys on satisfaction, training application, and how corporate and business unit managers perceive the programmes. The purpose of the measurement is to improve training quality, pursuing excellence.

A Virtual University was launched during the last quarter of 2011, a space that will centralise training and knowledge, accessible to all workers reflecting the structure and objectives of the Corporate University. In the first stage, professionals from Argentina, Spain, France, Morocco and Mexico were granted access to the Virtual University. During 2012 the remaining countries in which GNF operates will also be granted access.

The Virtual University runs on an advanced technological platform, organised in groups, according to the knowledge needs of its users. Content will be made available in different formats (videos, simulators, webinars, etc.) and it will also feature collaborative tools, in a way such that employees can draw on and contribute to knowledge. At launch, its offering included over 400 content items. In its first month of operation alone, 40% of employees in the countries included in the first stage had already accessed the Virtual University.

International NRG Battle – The Netherlands: attracting and motivating young talent

The International NRG Battle is a programme designed by the Dutch company Studentstock, aimed at creating a space for students to meet, compete, innovate and develop an interest in the energy industry. The project has been in existence for two years and in 2012 the Battle is sponsored by Gasterra and other Dutch partners such as Grontmij, TenneT, and Alliander.

By participating in the Battle, students benefit from direct contact with the leadership of companies operating in areas of gas quality, energy transmission and smart energy grids. The sponsors benefit from engaging with young talent and assessing their creative solutions for the problems and challenges posed by NRG.

Two weeks prior to the NRG Battle, the partner companies select their teams. Every company has access to two pools, an online global talent pool where companies are able to find top talent for recruitment purposes and a talent battle pool. All companies are searching for top talent in the same talent battle pool this is where the 'war for talent' really starts. Some students are contacted by more than one company and have to decide on the project or company with which to work. Approximately 130 students engage in battle for a day. At the end of the day each team puts their ideas to an expert jury consisting of chief executives and directors from the energy sector. The judges then nominate five teams based on agreed criteria. The finalist teams enter the finals of the NRG Battle. A film crew follows the finalist teams in the preparation for the finals which are held during the Energy Delta Convention.

The NRG Battle is advertised on the biggest national online student network in the Netherlands, called BOM Media. Over 100 student websites display the information about the International NRG Battle reaching more than ten million views during the battle cycle. There is also a newsletter circulated to Students Media's database, in addition to flyers and posters spread throughout the biggest student cities of the Netherlands.

Figure 3.12: Finalists in the International NRG battle

RWE Transgas - Czech Republic: gender diversity and female development

RWE Transgas is part of the RWE East Group. RWE entered the Czech market in 2002 with the acquisition of the former joint stock company Transgas. RWE Transgas' main business is natural gas import and trading. The company employs circa 300 people.

Target Group and Programme Targets

The "Woman to Lead" programme was designed as a comprehensive programme for 41 female participants from across the RWE Group in the Czech Republic. The programme aims to support women in managerial positions and women with potential to advance in RWE Group companies in the Czech Republic. RWE Group objective is to increase the number of women in managerial positions and in the potential pool.

"Woman to Lead" has sister programmes in RWE Group companies elsewhere, and, at the same time, the programme is a part of the so-called Senior Women´s Network. In Slovakia, RWE runs the Senior Women´s Network, RWE Hungary has "Women with Energy", and RWE Poland conducts its version of the programme under the name "Women's Network".

Among other areas, it focuses on improving management and leadership skills and on harmonising work with family life. At the same time, the programme concentrates on transferring experiences and positive patterns of conduct from senior employees to their junior counterparts through work on philanthropy projects. The programme was created with the notion that every participant should be able to find in it something that would cater to her needs and interests. The "Woman to Lead" is a practical project unlike the typical development programmes that are made up of training modules or workshops only. It is a unique programme in the context of Czech corporate training and staff development.

The programme was introduced in 2011. 'Get together events' were an integral part of "The Woman to Lead" programme. The programme events in 2011 focused on getting to know each other, playing various games that simulated management situations, networking, introducing projects, setting up project teams. The participants fine-tuned their management skills by engaging in interesting untraditional activities and strengthened the team spirit through shared experiences. They received feedback on individual activities and the solutions they employed in handling specific situations. Using simulated management situations, the participants were led to realise that the most important factors are determining a shared objective, agreeing on a joint course of action, and making sure that all team members clearly understand these tasks.

Working on philanthropy projects is one of the most important parts of the project. The main target is the learning process itself to deepen organisational, communicational and negotiation skills by practice. Projects are intentionally aimed at areas out of RWE business to challenge participants in unknown environments. The following activities were developed in the cadre of the programme:

- "Family Time" organised around Mothers' Day – Family Pétanque Tournament
- "A New Lease on Life for Our Things" aimed at extending the life of things that one person no longer needs, but someone else may find useful
- "A Nice Day for Senior Citizens – Joy Sharing" a one-day programme for the residents of a retirement home that provides shelter for both senior citizens and disabled persons who need someone to help them with basic everyday needs

A series of workshops provided opportunities for progressive development. Participation in workshops was organised on a voluntary basis and according to individual needs:

- "Art of Social Skills – Business Etiquette" workshop provides participants with a straightforward and comprehensive overview of etiquette rules in various situations (dress code, contact situations, everyday social conventions, business etiquette, dining) and with self-assurance in social and business contact

- “Energy Preservation” workshop organised around themes such as using energy to its best potential, handling energy efficiently, refraining from unnecessary energy expenditures, and maintaining high energy levels through an active attitude. In addition, the participants learn about how their lifestyles affect the quality and amount of energy they have
- “Positive Attitude to Feedback” workshop showed techniques designed to help to discover their true potential. Besides that, the participants had the opportunity to stimulate, develop, and practice the giving of shaping feedback, to learn the rules of efficient feedback, and to see how these techniques can be employed in practical situations
- “Presentation and Self-Presentation – How to Improve Presentation Skills” workshop was aimed at helping to acquire greater self-assurance in giving presentations, strengthen ability to prepare an attractive presentation fast, and convey the message to their audiences. Other topics included tips on time-proven methods for gaining and maintaining listeners' attention, advanced techniques and methods for discussion management, and suggestion for dealing with nervousness.
- “Getting Things Done, Being a Woman Manager Who Has Everything under Control” workshop taught participants how to create a personal information system that would allow them to keep their thinking clear and improve their concentration through mind management techniques that prevent a person from thinking unintentionally about various issues with the objective to use the mind in a purposeful, creative, and positive manner. The participants were also shown methods for establishing and maintaining spiritual balance, self-control, and inner perspective
- “When You Are Holding a Sword, You Cannot Shake Hands – Techniques and Methods for Challenging Communication” workshop took a look at circumstances under which a conflict is not necessarily detrimental. The participants were taught the most common strategies for resolving conflicts and ways of dealing with differences in opinions; they learned the rules of active listening as a starting point for productive communication
- “Determining and Working with Concentration” workshop was focused on the fundamental nature of concentration and its aspects that are important for performance, confidence, and energy

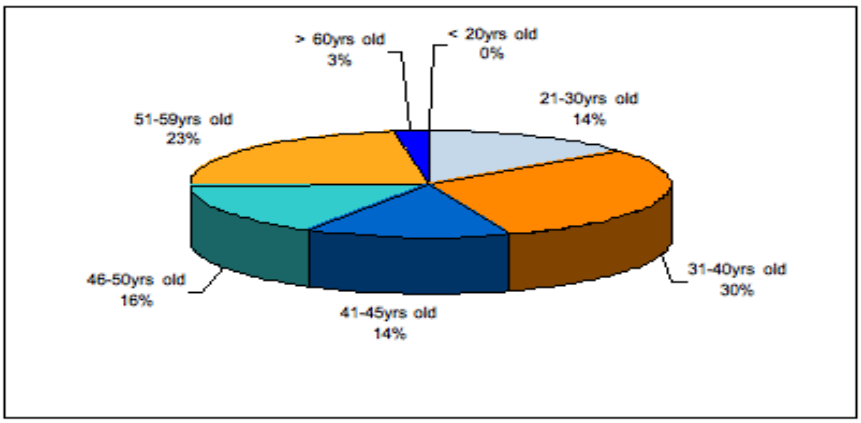
The programme also included mentoring workshops with focus on giving effective explanations, verifying correct comprehension, giving feedback with a view to change a person's comportment, formulating sensible objectives of a role, giving praise in a correct manner, and engaging in dialogues that motivate growth.

In the “Coaching for Women Managers: How to Help Subordinate Employees Develop Effectively” workshop the participants learned what the ubiquitous word 'coaching' actually means, what types of coaching there are, and what are the differences between coaching by a supervisor and by an external coach. There were exercises aimed at practicing a coaching interview with a supervisor and the related necessary communication skills. In addition, the participants were told what to watch out for, what mistakes not to make, and how to use one's strengths when coaching.

Polish Oil & Gas Company (PGNiG) – Poland: Age management programme

PGNiG is controlled by the Polish government and one of the largest employers in Poland with nearly 32,000 employees. PGNiG activities encompass exploration and production of natural gas and crude oil as well as import, storage, trade and distribution of gas and liquid fuels. Age is a critical factor in PGNiG medium term human resources planning: 42% of its employees are aged over 45.

Figure 3.13: Age Distribution at PGNiG



Faced with the challenge of an ageing workforce, PGNiG decided to take an informed decision of hiring mature employees. The concept of "Age Management" relates to a set of activities and practices designed for older employees. The target is to improve their work environment and thereby their ability to perform a job. This includes planning and selection of employment, recruitment, salary designing, job organisation and employee motivation. The age management policy at PGNiG comprises the following elements:

- Recruitment of employees in the 50+ age group:
  - employment offers are directed to any candidates
  - the base of employment are skills, qualifications and competences
  - age is not an obstacle in taking up a job at PGNiG
- Lifelong learning – to secure access to training and the possibility to develop their professional career on a level of younger co-workers
- "Retirees on Call" - to enable the experienced pensioners to come back to work on a part time basis and use their skills to support a variety of projects
- "PGNiG Expert" - addressed to high level specialists in energy, among which a substantial majority are already over 50 years old. The programme objective is to promote the sharing of knowledge with younger employees. The mature workers also mentor younger employees

Naturgas Energia – Spain: talent attraction and development programmes

Naturgas Energia is a regional supplier of natural gas and electricity supplying nine autonomous regions in Spain. Naturgas Energia has 400 employees and is controlled by the Hidro Cantabrico Group which is part of the Portuguese Eletricidade de Portugal (EDP). The company has been developing a Talent Development: Corporate University Programme.

This initiative aims to share the significant knowledge asset that the business group has built up over the years, as a result of collective and individual work experiences, and the intrinsic competences of its employees.

The Corporate University is a project coordinated and developed by Naturgas Energia, and is part of the EDP Group Corporate University Programme in Spain. The objectives of the Corporate University are to foster efficiency and to achieve a return on that investment:

- Operational efficiency: capacity to achieve greater integration between the different business divisions
- Knowledge management: exchanging and disseminating best practice among the different companies
- Disseminating the EDP culture: fostering a common learning culture within the EDP Group Talent Management

This project was introduced in 2009 and currently consists of two programmes: the EDP School, to develop non-exclusive skills and knowledge of business areas; and the Executive Development School aimed at developing management skills and leadership and behavioural skills. The project also has five Functional Schools for the specific development of a business division: Production, Distribution, Gas, Renewable Energy and Commercial.

The Gas Functional School seeks to develop skills that enable the company's managers to operate in their work areas as well as in related areas within the EDP Group. It also aims to provide the greatest possible number of employees with integrated training, with significant value added by means of knowledge retention, concepts and transversal good practices of the Group.

In 2011 the School delivered training sessions in the following areas:

- Integrated view of the gas value chain
- Fundamentals of natural gas
- Managing infrastructure

Figure 3.14: EDP Corporate University – Gas School Students from Naturgas Energia

Attracting talent - AULA[2] Programme

Naturgas Energia has launched a pilot project to attract talent to the gas industry by promoting gas Research and Development (R&D) projects aiming at graduate university students. The Academic Focus Point Project ("Aula" in Spanish) is being developed in partnership with the University of the Basque Country (Spain).The AULA project was launched in the academic year 2010/2011 with five R&D projects. In the year 2011/2012 seven new projects are being developed. Naturgas Energia's proposal aims to attract the attention of university students and foster their interest in the gas industry by focusing on the

[2] AULA is the Spanish word for Classroom

company's R&D work. The AULA's projects are focused on safety, energy efficiency and sustainability. According to the students involved in the Project Aula, this represents an opportunity to get involved with the working world, as well as a chance to demonstrate their worth before finishing their studies. Their enthusiasm and dedication makes it a privilege for Naturgas Energia to work with them. The quality of the work that they are carrying out, to which their university tutors make certain contributions, means that success is guaranteed.

Dr. Juan Ramón Arraibi and Dr. Angel Mª Gutierrez from Naturgas Energia and Dr. Jokin Gorozika and Dr. Belén Güemez from the Bilbao Faculty of Engineering are members of the Academic Focus Point Executive Committee. Their task is to select students and tutors for the year-long projects to organise thematic meetings (see figure 3.15). The Committee ensures that the projects are properly supervised and that they achieve their objectives at the end of the course.

Figure 3.15*:* Academic Focus Points Meeting at the "Aula" of Naturgas Energia

The main conclusions of the Naturgas Energia initiative are the following:

- The project was successful in attracting the best Engineering students to gas subjects;
- AULA has the potential to attract talented workforce for R&D projects developed by the gas company;
- The project enhances the image of the gas industry within the University by promoting innovation.

Coaching programme

On 3rdDecember 2010, Naturgas Energia unveiled the Coaching Programme. This programme seeks to help develop people's skills and capabilities both for the "coachees" and the "coaches", while at the same fostering a leadership style that optimises the potential and performance of the employees by sharing know-how and proven management experiences.

A coaching programme was seen as a means to:

- Create credibility and confidence
- Build/foster relationships
- Motivate/develop others
- Results oriented

This programme involved 34 Naturgas Energia employees, 13 of whom were coaches and 21 coachees.

People strategic skills assessment

As a fundamental tool for people management, a strategic skills assessment aimed at the employees who hold management posts and are team managers is being conducted as part of the Potential Assessment Process.

This process seeks to channel the team and individual actions to the global Naturgas Energia goals. The appropriate development plans are thus defined, by fostering communication between the management and employees. The aim is for each employee to ensure that they are ready to face and overcome the challenges with autonomy, creativity and responsibility and to generate results that create value for the organisation.

Figure 3.16: Final Session of the Naturgas Energia Coaching Programme

European Gas Research Group (GERG) Academic Network – Belgium: the challenge of attracting talent in gas research

The gas industry in Europe has been working for almost 50 years of collaborative Research and Development (R&D) on natural gas topics. GERG has 22 members from 12 countries - all active in natural gas R&D. GERG's aim is to promote effective gas industry network for R&D information exchange. GERG amalgamates a large European reservoir of specialist knowledge dedicated to high quality research resource.

According to GERG's Academic Network:

- There is a widely recognised shortage of young, high quality engineers and scientists available to the gas industry
- For R&D the problem is perhaps even more acute

GERG's objectives are to:

- Show post-graduates that the gas industry offers challenging and rewarding careers
- Encourage a dialogue between experts in industry and academia
- Brussels 'Event' dedicated to young people

The GERG Academic Network offers an opportunity to influence young high quality engineers and scientists to consider a career in the gas industry by:

- Persuading them that they can be part of the gas industry's contribution to a sustainable energy future
- Demonstrating that the gas industry:
    - promotes sustainable energy solutions
    - is high-tech
- Invests in R&D
- Showing post-graduates that the gas industry offers challenging and rewarding careers

GERG suggests that the same approach should be adopted more widely, by other industry associations. The IGU French Triennium (2012-2015) has decided to make Technology a permanent programme committee (PGC-F).

Birmingham University – UK: are there sufficient Engineering jobs to attract Engineering graduates in the UK? Or is it a matter of quality?

In June 2011 the University of Birmingham published the results of a series of their recent research projects looking at the educational trajectories of prospective science, technology, Engineering and Mathematics (STEM) professionals in the UK[3]. Based upon evidence from hundreds of thousands of individuals in the period 1986-2009, the study aimed at answering the assertions that the supply of scientists (including engineers and mathematicians) is crucial to the economy and the health of the nation and there is wide gap between supply and demand.

According to the study, "improving the recruitment, retention and training of the next generation of STEM professionals remains an area of political priority and concerning the UK. Falling levels of engagement in STEM subjects at local and international levels is a problem which is well understood and persistent across administrations. Its roots are considered to be in the poor quality of public education in the sciences, the high levels of dropout from science courses at university, poor pay and career prospects for STEM workers in comparison with other professions, and a failure to respond to the changing demands of an increasingly globalised STEM market".

According to a survey in 2008 by the Confederation of British Industries (CBI), one third of employers report shortages of graduates and 42% claimed that graduates lack the appropriate skills. Similar surveys by Sector Skills Councils and other organisations also point to skills shortages among graduates across STEM areas. These shortages are particularly evident for female STEM employees who experience higher levels of attrition than males at different stages along the STEM pipeline.

A large number of initiatives have been funded by successive governments in the UK to address "the supply shortage" of scientists. However, the Birmingham University study found that:

- In the period 1994-2009 most graduates enter some form of employment, 15% continue to further immediate study, and around 10% are unemployed. These patterns have remained stable over the last 15 years
- In general, less than half of all Engineering graduates who report an occupation are in employment directly related to their degree. The majority of science graduates move into initial occupations that are not directly related to their degree, suggesting that at this stage of life at least, the demand for scientists trained in specific areas is more than met by existing numbers
- Of the rest, circa 20% of the newly qualified engineers report that they are working in what are considered to be non-graduate jobs, including unskilled and routine employment, such as being cashiers and waiters. Circa 10% are in jobs classified as 'other' and another 8-10% are in managerial jobs

According to the authors, it seems unlikely that such a high proportion would prefer non-degree-related employment in the long-term "and the figures suggest that it is not easy or automatic for qualified engineers to get related employment in the UK, despite the purported shortages".

The authors raise the question that "perhaps young people are put off careers in science by their education. Or perhaps the incentives are not right, leading to the 'wrong' kinds of students in science, and so wastage and inefficiency in the supply process".

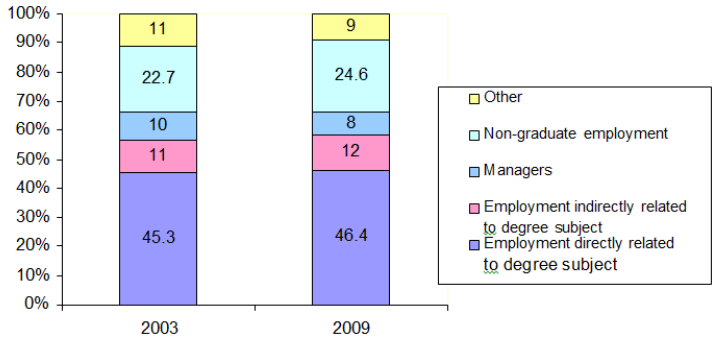
[3] Emma Smith & Stephen Gorard (2011): Is there a shortage of scientists? A re-analysis of supply for the UK, British Journal of Educational Studies, 59:2, 159-177

Some questions raised by the study are thought-provoking:

- Are there too many people studying science for the labour market to cope? Is there a real shortage of scientists in the labour market?
- Or is the quality of the graduates no longer sufficient to meet industry patterns?
- Or are they are 'dropping out' because they no longer enjoy their subject areas?

The study concludes by suggesting undertaking additional analysis in the demand side of the sciences market to compare with the supply data. This may have significant implications on the current understanding that young people are no longer interested in sciences and may help to recalibrate the universities versus job market input/output and/or the quality of the sciences curricula.

Figure 3.17: Percentage of Engineering Graduates in Degree Related Subjects - UK



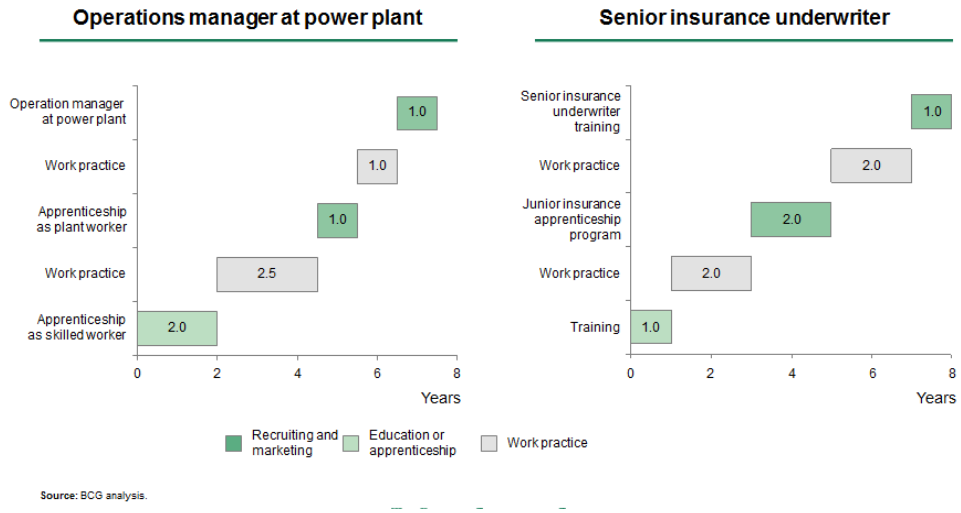
Source: University of Birmingham, 2011

Examples of Worldwide best practice

Boston Consulting Group (BCG): worldwide age issues

The demographics of the global population provide important insights as to how the industry responds to the manpower issues. By 2050 people aged 60 years and over will exceed those aged 15 years and below for the first time in history. It takes at least eight years to develop a skilled manager, as illustrated by Figure 3.18. Europe, North America and North Asia are expected to suffer significant talent gaps over the next few years.

Figure 3.18: Years of Preparation for a Skilled Technical Job



According to BCG, there are two forms of demographic risk which need to be considered by energy companies:

- Capacity risk: the supply shortage of workers, incurred primarily by employee retirements
- Performance risk: the drop in performance as (i) young, less experienced, employees replace older ones; (ii) the workforce gets older and the employee productivity decreases in some roles

BCG has developed a six step strategy for organisations to respond to the demographic pressures:

- Develop job family taxonomy
- Simulate workforce supply per job function, in the present and in the long term
- Simulate workforce demand per job function
- Identify capacity gaps
- Develop HR strategy, defining targets and actions for recruiting, training, transfers, insourcing/outsourcing and head count reduction
- Establish annual process

BCG conducted a survey with 16 of the largest companies worldwide and found several examples of best practice to address age issues in the global workforce, for example:

- Retaining older employees to help knowledge transfer
- Hiring retired people to fill new job vacancies
- Providing career incentives and lifetime supporting programmes for older employees;
- Appointing demography officers to actively manage physical and mental wellbeing for older employees
- Involving older employees in creating corporate culture
- Hiring employees from different job categories
- Retaining female workers by providing flexible work, keeping original job 6-7 years after maternity leave, affordable childcare and mentoring/role models
- Outsourcing and offshoring

South America (Brazil) - The challenges of pre-salt development

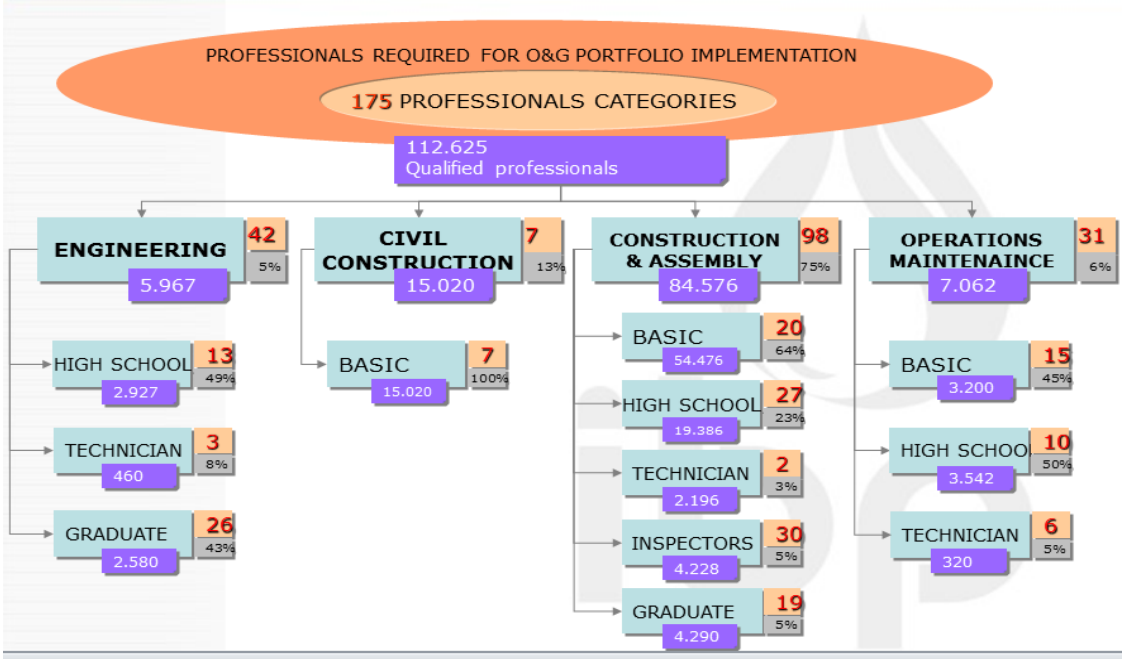
Brazil's oil and gas production is projected to more than double over the next ten years owing to vast pre-salt discoveries, estimated at 30-50 billion barrels of oil and substantial volumes of associated gas. Brazil has the potential to become the world's fourth largest oil producer. Natural gas production is expected to jump from 2.5 to 6 billion cubic feet per day by 2020. The Pre-Salt Programme will require investments of more than US$300 billion. Petrobras alone is planning to invest $225 billion in the period 2011-2015, 50% of which in exploration and production. The key challenges facing Brazil's oil and gas industry are investment, supply of goods/services and human resources.

Brazil's upstream licenses requires circa 60-70% of local content for companies exploring and producing oil and gas. This has generated a huge interest of international companies to partner with Brazilian companies which are already certified to provide goods and services for oil and gas project. This requirement also highlighted the shortage in the supply of skilled technical people in the exploration and production segment.

Other segments in the value chain are also experiencing another cycle of growth, with 27 gas Distribution companies expanding their activities and two LNG import schemes already set up by Petrobras, with a third under construction.

Brazilian Institute of Oil, Natural Gas and Renewables (IBP) – Brazil: Government programmes to attract and develop talent in oil and gas.

Figure 3.19: Brazilian Oil and Gas Workforce Needs



Taking into account the sheer size of Brazil's oil and gas industry development needs the human resources issues needed a long term strategy. The Brazilian government and Petrobras took the lead and created two nationwide human resource programmes, the Human Resources Programme (PRH) coordinated by the National Petroleum Agency (ANP) and the National Programme for Mobilisation of the Oil and Gas Industry (PROMINP) led by the Ministry of Mines and Energy.

The PRH was created in 1999 following the end of the state monopoly in oil and gas, by using fees levelled from the oil and gas industry to fund oil/gas/renewable courses and disciplines within partnering universities. The key disciplines are Engineering (Petroleum, Chemical, Mechanics, Materials and Metallurgy), Geosciences, Law, Economy and Chemistry. The programme has already reached nearly 5,000 people. The programme has spent circa US$120 million in more than 5,000 scholarships in 50 graduation and specialisation courses in more than 30 academic institutions. The partner universities are selected following a public call from ANP and the programme is supervised by ANP/universities management committees.

PROMINP is a much larger programme, which comprises oil and gas companies, government and industry associations to promote local content for goods and services and to develop Brazilian human resources for oil and gas. It is recognised that the industry will require 207,000 employees over the next ten years. From these, 112,000 are qualified professionals distributed among 175 categories and a total of nearly 13,000 university graduates and technicians.

Several initiatives are being implemented under PROMINP, including the Petrobras University, regional training courses promoted by the IBP and other industry bodies and a number of programmes with federal and state universities.

Petrobras, Brazil. Talent attraction and development projects

Petrobras is a publicly traded integrated oil and gas company controlled by the Brazilian government. Petrobras activities span from oil and gas exploration and production, transportation, distribution, marketing and LNG import and trading. Petrobras is also a strong player in biofuels. According to PFC Energy (2011) Petrobras is the third largest listed energy company in the world. It operates in 30 countries and employs 80,000 people.

Petrobras Corporate University

The main corporate school of Petrobras is located in Rio de Janeiro and is responsible for Petrobras' corporate continuous professional education. Petrobras has created the programme "Professionals of Future", in order to attract the talented young technicians in critical and strategic areas, and visit colleges with an emphasis on technical training professional, to inform about careers, opportunities and the variety of assignments in the oil and natural gas industry. This programme emphasises and publicises opportunities for students at the high school level with professional formation. This initiative involves Petrobras keeping in touch with schools around the Brazil territory.

At the same time, Petrobras started a new round of “Talent Attraction University Project”, aiming to promote promising careers in the company, through presentations at universities. The meeting agenda includes information on the company’s operations in Brazil and the world and aims to attract potential talent, mainly for careers in Engineering, Geology and Geophysics, to participate in the selection process of Petrobras.

Brazil "Acceleration Programme Junior Professional Career”

The scenario of constant changes and challenges in the world of work, coupled with demands, aspirations and necessities of young workers, who are entering the work environment, especially in the oil, gas and energy industry, has lead Petrobras to implement the programme "Acceleration Programme Junior Professional Career”. Taking into consideration the evaluation of these junior professionals made by their line managers, there is a belief that the young talent is able to fast track through various phases of development. The professional will be evaluated each year by their manager throughout the programme time. The main objectives include opportunities for professional growth, motivating young professionals to invest more in their career, to develop career expectations, to align junior professional careers with market practices, and implement a well-designed policy of attracting and retaining talent.

North America (USA) -American Gas Association - Energy workforce assessment and initiatives to attract people to the gas industry

Assessment

In the US significant attention is being given to meeting today and tomorrow's workforce needs of the growing natural gas industry. Of particular concern are skilled technicians, including welders and pipefitters, as well as engineers. In the electric and gas utility industry alone, a recent survey suggests the average age of the workforce is 46 and there are a significant number of employees who are age 53 or older or have over 30 years’ experience. While the struggling economy has delayed retirements, it is estimated that by 2015 36% and by 2020 another 16% of the skilled technician and Engineering workforce may need to be replaced due to retirement and attrition. That translates to 110,000 employees in positions identified as the most critical by the electric and gas industry. There is also interest in increasing the diversity of the workforce with a focus on women and minorities.

Initiatives

The production, pipeline and utility industries are implementing various workforce initiatives across the natural gas industry. Highlighted specifically here are the activities of the Center for Energy Workforce Development (CEWD). CEWD is a non-profit organisation of electric, natural gas and nuclear energy companies and their associations formed to help ensure that the nation's electric, natural gas, and nuclear energy industry has the workforce to meet the energy demands of tomorrow. CEWD has established partnerships with national education and workforce associations and organisations to leverage resources for existing and new initiatives. CEWD is also working with secondary and post-secondary educational institutions and the public workforce system to create workable solutions to address the need for a qualified, diverse workforce. Specific initiatives currently underway:

- "Get into Energy" Career Pathways

  CEWD worked with the federal government and education institutions to develop the necessary education path to qualify for energy skilled technician and Engineering jobs. Most recently, CEWD embarked on an initiative to place 500 low income young adults in electric and natural gas utility jobs in nine states. Following a pathways system of education, students have an opportunity to earn credentials that focus on a variety of skilled technician positions in the energy industry. An energy industry fundamentals curriculum assessment and career coaching handbook have been developed to assist in this program.

- Troops into Energy

  CEWD is developing a national template for the military workforce focused on helping those in the military to find ways to utilise or develop new skills to transfer into energy industry jobs. A career awareness camp specific for the military has also been developed. A similar camp to attract women into energy is underway.

- Career Awareness

  CEWD has developed a "Get into Energy" website, which provides career information and links to utilities to identify job opportunities. "Get into Energy" materials have also been developed for high school students.

- Education and Training

  A pilot programme of energy industry employability skills assessments and curriculum has been developed and an energy education network is being formed to identify education institutions that exhibit promising practices in training for key technical positions.

- Tools for Utilities

  CEWD also provides numerous tools for utilities, including workforce development best practices, trends and other materials.

The future of the gas industry: experts and youth outlook

In addition to the Demographic and HR Benchmark surveys, TF1 also conducted a series of interviews to understand the perspectives of people from both within and outside the industry. In order to obtain a broader perspective, the interviews included both experienced and young professionals. The Task Force developed a set of five questions representative of the issues and challenges faced by the gas industry today. The interviews were conducted face to face, whenever possible. The questions were:

- The energy mix of the future (10-20-50 years) - where does gas fit, how much, how long?
- Challenges and opportunities for the global gas industry
- Competition from oil, renewable and nuclear?
- Gas industry ability to attract investment
- Gas industry image - what will the industry need to do to attract the best people there?

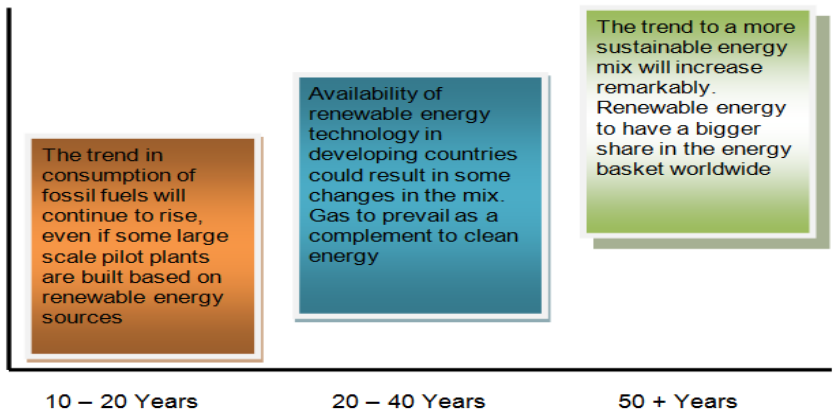
We would like to express our gratitude to the individuals (Appendix 2) that agreed to share their views on the future of the gas industry. The interviews were unstructured with questions acting as guiding thoughts for the interviewee and the interviewer. The interviews provided a range of interesting thoughts, ideas and patterns that have been enlightening and encouraging. The broader themes are set out below:

Future energy mix

Globally there is pressure to move towards a low carbon society and campaigns have highlighted the damage being done to the environment by the extensive use of hydrocarbons. However, a challenge to reducing hydrocarbons in the energy mix is the competitiveness of alternate fuels since the technology is not yet fully developed to make the "greener" sources of energy abundantly available. The other challenge is the demand for energy from developing countries which require access to cheap energy irrespective of "green issues". The relatively high cost of renewable provides an opportunity for natural gas in the energy mix and therefore there is a role for gas to play in the future looking forward to 2050, but predicting the exact share is a challenge and will vary depending on which part of the world is being considered.

A pictorial representation of the natural evolution of the energy mix of the future is represented on Figure 5. Most of the experts interviewed by TF1 share the view that in the short to medium term fossil hydrocarbons will continue to dominate the energy mix. The technology development to make the renewable more efficient and competitive is a long process and the results are unlikely to arise in the short term, more likely in 30-40 years.

Figure 4: Challenges and Opportunities for the Global Gas Industry



Most of the experts share the opinion that natural gas is an efficient, affordable, reliable, secure and clean (when compared to other fossil fuels) energy source. Gas reserves are abundant and the discovery and development of shale gas, tight gas and other unconventional sources of gas like coal bed methane (CBM) have enhanced the case for natural gas. However, there are still challenges to reach an economic exploitation of these gas resources.

The main challenge is to displace oil as a fuel for transportation and power generation. On the other hand, residential use should be minimised to redirect this resource to high-end products instead of burning. The gas business also needs capital intensive transportation infrastructure and geopolitical issues impact development of international pipeline networks.

Other challenge is the optimisation of production methods to increase efficiency. An opportunity will be the introduction of gas-related services to developing markets' consumers including the creation of the needed infrastructure for supply.

The gas industry supports renewable energy and is playing an innovative role in its future. It operates in an international market that is growing and has the confidence of global investors. Long term investors are confident of the future of gas as a fuel although challenges associated with the pace of development of infrastructure remains. However, because natural gas is viewed as a “greener” fossil fuel and an appropriate complement to the intermittency of renewable energy in power generation, this presents an opportunity to develop a strong message associating gas with renewable energy

Competition from oil, renewable and nuclear

The competition from oil, renewables and nuclear varies depending on geographic location, availability and local environmental regulation. However, competition with oil is harder than with the others because they share the same market but gas has an edge in terms of being lower in costs, more efficient and environment-friendly.

There is a global demand to grow renewables in the energy portfolio and the belief is that its influential role will improve in the medium to long term. The current stage of technology development, costs and their intermittent nature makes the combination of renewable and gas a good option. A sudden breakthrough in renewable technology could be a serious threat to the gas industry.

Nuclear energy does feature in the future energy portfolio but with slower growth potential and presence restricted to only a handful of countries. The Fukushima incident in Japan has raised serious concerns about the safety and long term environmental effect of using nuclear fuel.

The gas industry provides an opportunity for investment along the value chain, with different risks and returns. Gas is a proven technology and is growing at a steady pace, which makes it commercially attractive to the financial community.

Ability to attract talent

The gas industry of today has a multi-cultural senior management which sends the right message to young talent that they will be treated fairly and inclusively in the industry. However, a challenge the industry faces relates to its image and the fact that the public associates fossil fuels with “dirty” and “polluting”. This issue has made the industry less attractive to young professionals, compounded by the fact that there are options like finance, technology, IT and telecommunications viewed as careers of “modern” times.

The nature of the business is such that the companies in the sector are not very active in the media and in fact avoid media exposure. This also makes the industry less visible and therefore less attractive to the working population. The gas industry needs to position itself as the green fossil fuel, attracting young professionals.

Little is done today to communicate to people at large and young professionals/students in particular, about the amount of money and resources the gas industry spends in developing new technologies. The industry needs to be more proactive in communicating and connecting with universities and schools about the challenging and exciting work opportunities the gas industry provides. There are lots of opportunities for young professionals to develop and operate within the industry and for young scientists to research and develop leading technologies. It needs to be highlighted that the industry is global in nature and one can spend a lot of time in one's professional career working in different countries.

Recommendations

The following themes emerged from TF1's discussions with experts and young professionals:

- Natural gas will play an important role in the future – hydrocarbons will continue to be single largest source of energy for the next 50 years. Gas has the potential to have a much bigger proportion in the energy mix of the future
- Nuclear, oil and coal present big challenges going forward so gas is a good alternate and abundantly available – with the Fukushima incident in Japan and "dirty" image associated with oil and coal, gas is a "greener" alternative
- Gas is not competing with renewables and it is seen as a transition fuel by some of the interviewees and as destination fuel by others. The renewables technology is rapidly developing but is still 20-30 years away to reach a stage where it competes with hydrocarbons. The gas industry needs to reposition itself as an exciting industry and an employer of choice for the young talent segment; this needs to start as early as possible as it takes a long time to nurture, develop and deploy talent

A brand and communications campaign that communicates the "core values" of gas and the "opportunities" it provides to young professionals is crucial to improve the image of the industry and make it attractive. A bigger effort is required to attract more females to the industry and to create more tailor-made recruitment campaigns to target them. Gas associations should promote the image of gas rather than individual companies.

The gas industry should propagate the benefits of "green", "abundant", "international", "stable" and "exciting" to attract and retain employees. Gas is part of the solution to the world's energy needs and is playing an innovative role in the future of energy.

Conclusions

According to the results of TF1 Triennium work the gas industry needs to recruit thousands of technical staff over the next five years, both at graduate and mid-career levels. The industry needs to dedicate effort to address technical and commercial skills gaps and to improve its image. Although gas is perceived as an important fuel in the global energy mix, in many countries young people appear unaware or unwilling to pursue careers in the industry.

The conclusions of TF1 Triennium work are summarised below:

- Natural gas will continue to grow its share in the world energy mix
- The emergence of non-OECD countries as major gas consumers, the growth of LNG and the need to develop new supplies will pose formidable challenges in the field of human resources:
    - LNG, Marketing and Trading and Gas Distribution are key capabilities required for the growth of the industry in the short and long terms
    - An increasing number of technical resources – Engineering, Construction, and Operations will be needed in emerging markets to build enabling gas infrastructure, from the well-head to consumers' premises
    - Additional technological knowledge and capabilities will be required in the upstream to unlock unconventional gas (tight, sour, arctic, shale)
    - The growth of LNG in international gas trading will require human resources skills in the fields of trading, terminal operation and dispatch, new liquefaction technologies, shipping and safe operations
- The gas industry is characterised by an ageing workforce, particularly in North America and Europe. The development of qualified and experienced professionals requires more time than the development of a gas project from the field to the end-user, 8-10 years at least. The industry is starting to devise initiatives to use experienced people to develop and mentor young professionals
- Companies are increasingly resorting to developing in-house programmes to polish the skills of their graduate intake. Several companies have also implemented cooperation with academic institutions to develop curricula in oil and gas disciplines
- In response to industry competition, companies have started to develop attractive and differentiated reward packages
- Although issues appear similar across the world, there is little evidence of international or regional cooperation among companies, academic institutions and trade organisations
- There is a wealth of best practice that could be shared among IGU members, from age-related programmes, to companies' internal universities and local workforce development. TF1 report highlights case studies from Asia, Middle East and South America
- In order to attract young people, the gas industry needs an "image makeover". Career progression opportunities, non-authoritarian hierarchy, flexible career paths and the desire to make a positive impact in the world feature highly in young professionals' career choices. Many companies have put together social media initiatives, flexible career choices, schools/university programmes, sophisticated simulation tools and advertising campaigns to help with this issue
- There is a strong argument for the industry to develop a coordinated communication and marketing campaign aimed specifically at young people showing the benefits of careers in the gas industry. It is important it addresses the under-representation of women in the industry

Recommendations

TF1's Triennium work shows that there is a large space to be filled by the gas industry, particularly in the fields of international collaboration, sharing of best practice and training. The IGU comprises 78 charter members and 38 associate members representing 77 countries. The IGU can play a vital role in addressing the challenge of human capital, by identifying specific and broader country needs, by connecting companies, governments and other stakeholders and by developing capacity-building programmes in partnership with local gas players and international funding institutions.

Recommendations to the IGU and National Gas Associations

- Expand IGU advocacy to include specific messages to young people, depicting an exciting picture of the gas industry, including international mobility and career opportunities
- Gas associations should promote the image of gas locally in addition to the work undertaken by companies
- Any campaign should highlight the benefits of "green", "abundant", "international", "stable" and "exciting" to attract young people. A career in the gas industry allows the individual to make a positive impact on the environment by developing innovative solutions to meet the world's energy needs and working in an exciting, global environment
- Develop an IGU training offer and a coaching programme in cooperation with local gas associations, international funding agencies and gas companies where appropriate
- It is recommended that the IGU produce a catalogue of best practice particularly in fields of academic cooperation, corporate universities and diversity, to share among its members
- Design a web-based "Centre of Excellence" for human resources in natural gas
- It is suggested that the IGU and gas associations develop a gas syllabus in cooperation with universities and industry players, particularly addressing emerging gas markets' needs and capability building around LNG, Marketing & Trading, Gas Distribution, Engineering, Construction, Operations and Commercial
- Develop a better understanding of the demographics and job market for science professionals. As an example, the Birmingham University study interrogates whether that there are enough jobs for the actual science graduates output in the UK
- The World Gas Conference should provide space for more interaction between HR managers and professionals

Recommendations to gas companies

TF1 understands that companies have country-wide and corporate imperatives and "one size doesn't fit all". However, since the industry is on the verge of becoming a 'younger' industry in terms of demographic profile and strong recruitment needs, work has to be done within companies. Therefore, instead of making specific recommendations to individual companies, TF1 decided to list examples of current initiatives being undertaken by companies to address talent shortage issues and companies working with government to harness levies and duties collected from the gas industry to fund university courses and post- graduate programmes:

- Corporate universities as a tool to address competency gaps
- Differentiated reward and career progression paths for key critical jobs
- career acceleration programmes, where companies fast track younger professionals to managerial roles
- Social media, blogs and virtual simulation tools showing how the industry works

- Delinking recruitment campaigns from oil prices movement and keeping a continuous recruitment effort for key technical and commercial capabilities, fostering female networks and female oriented workshops
- Sharing of best practice and challenges with the IGU and gas associations
- Using senior employees as coaches and mentors
- Hiring senior specialists as consultants and corporate culture shapers
- Skills advisers' networks
- "Hire today and deploy later" programmes
- School and university linkage programmes providing enhanced science syllabus
- Offshoring recruitment in countries with plenty of technical graduates, particularly Engineering and Geosciences professionals
- International companies hiring local employees and providing three year international rotation roles
- Retaining female workers by providing flexible work, keeping original job 6-7 years after maternity leave, affordable childcare and mentoring/role models
- A clear and well documented career plan showing managerial and technical career paths
- Work closer with National Gas Associations and the IGU to promote the gas industry as an attractive employer

Appendices

Appendix 1: TF1 membership and countries

Chair:	Ieda Gomes, Energix Strategy, UK
Vice Chair:	Rod Kenyon, Apprenticeship Ambassadors Network, UK
Secretary:	Manu Kohli, BP, India
Vice-Secretary:	Marius Popescu, Energy Delta Institute, The Netherlands
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22. Reham Gharib, Taqa Gas, Egypt
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Appendix 3: Sponsors/acknowledgement

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Appendix 4: List of figures