

“Nurturing the Future Generations”

Key Findings of IGU Task Force 2 study

By

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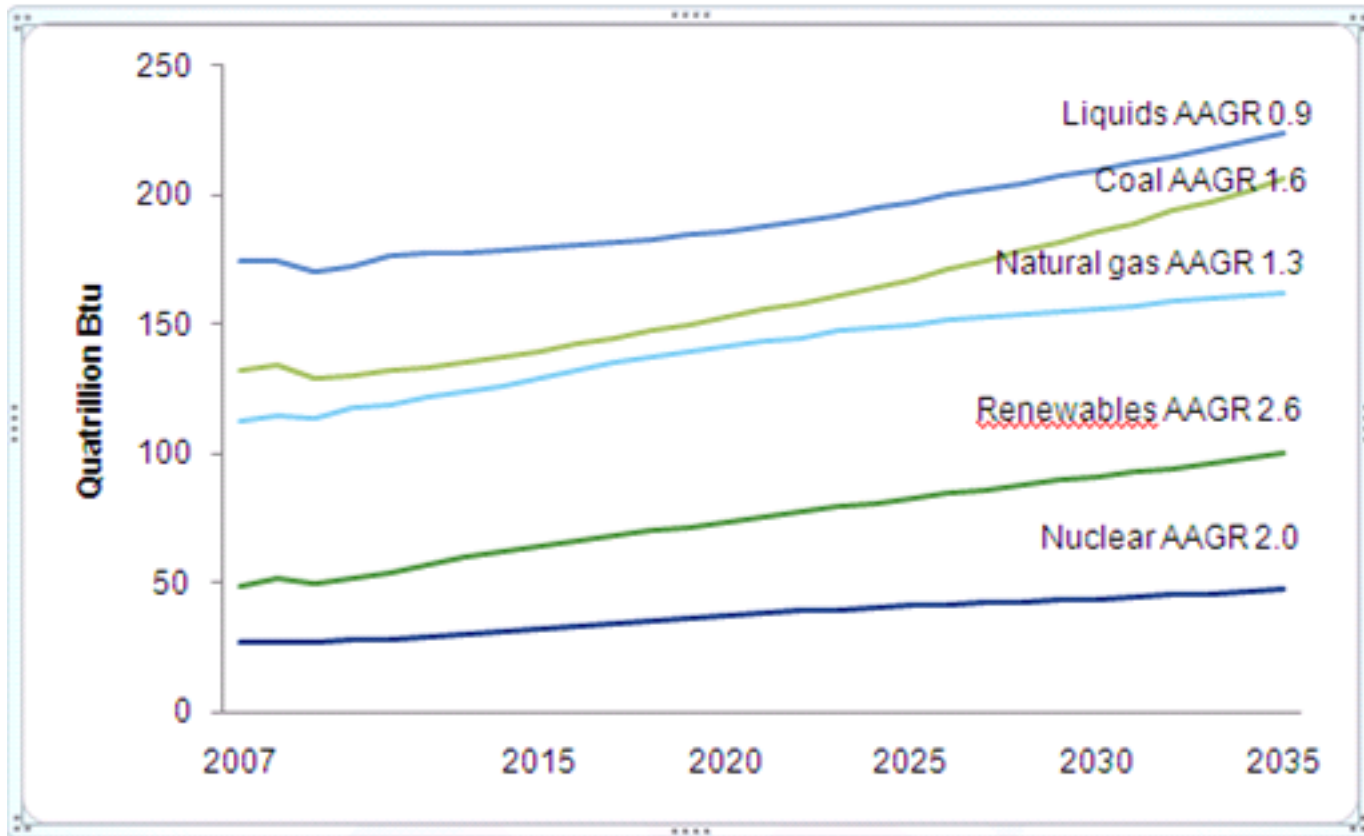
Should young people choose a career in the gas industry?

- IEA's long term forecast on world energy
- Natural gas will play an increasingly important role in both "Business As Usual" and the "Climate Change Mitigation 450 ppm" scenarios
- Natural gas will continue to meet the world's growing energy needs as gas plays an increasing role as the solution ***to a cleaner energy future***
- Natural Gas has an important role in the World's Energy Future, especially in power generation
- Tremendous room for increasing the use of gas if economic framework and policy directives are supportive and encouraging

Fossil fuels remain the largest source of energy in demand

This trend indicates that the O&G industry is projected to continue booming and will provide a lot of career excitement to youths...

Projection of global demand for energy by sources



Source: U.S. Energy Information Administration (2010).

Why is it important for the global gas industry to address talent issues?

1. Innovation is key for the gas industry to make a big leap forward

2. Need to push the limits of technology and the edge of sciences further
 - To discover more molecules in tight resource rocks and deeply buried reservoirs
 - Find innovative solutions on the processing side of the business to deal with CO₂, sour gas, high sulphur gas and new uses

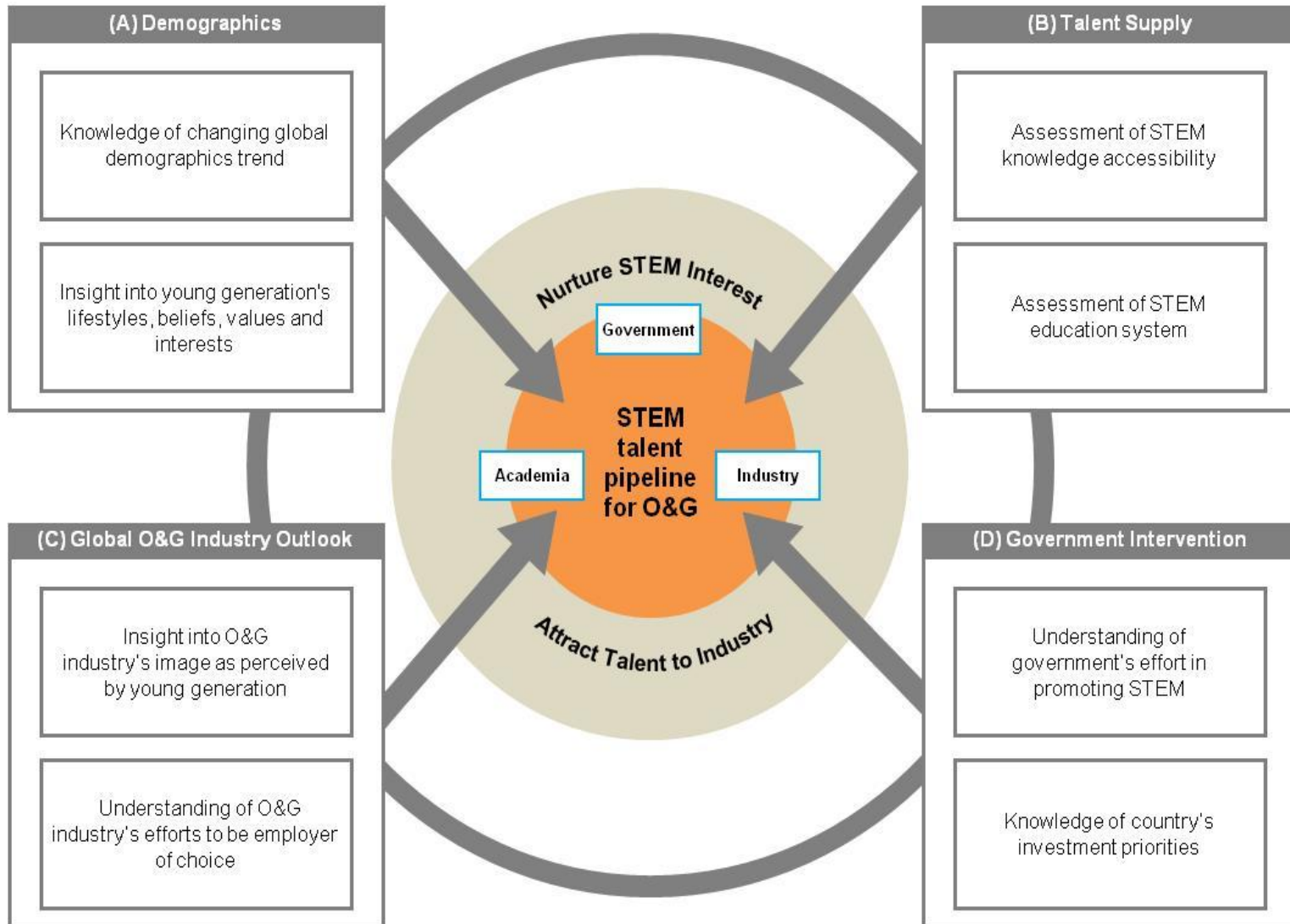
The global gas industry however, is facing mounting challenges...

1. Exploration record of the past decade from 2001, shows that oil and gas finds are getting smaller
2. Accessibility to oil and gas-rich zones are also becoming more challenging as national interest surpasses commercial interests
3. Resource-plays are becoming more complex
4. Even in conventional plays, we need to continue to develop new technologies
5. R & D and innovation requires talented people
6. More and more the global gas industry will need to compete for talent

Under the Malaysian Triennium of the WGC a special project is undertaken by the IGU under TF2

- Project title : “Nurturing the Future Generations”
- Attempt to look into how the gas industry can address the talent issues:
 - by nurturing interests of the young generations in STEM education
 - by correcting their perception of the oil and gas industry
 - by addressing the gender issues with regard to inclusion of female participation
 - by leveraging on R & D and innovation as a magnet to attract Youths
- *By definition, the study/project defines Youths as age between 5 and 30 years*

The Four Contextual Forces of Talent Supply..

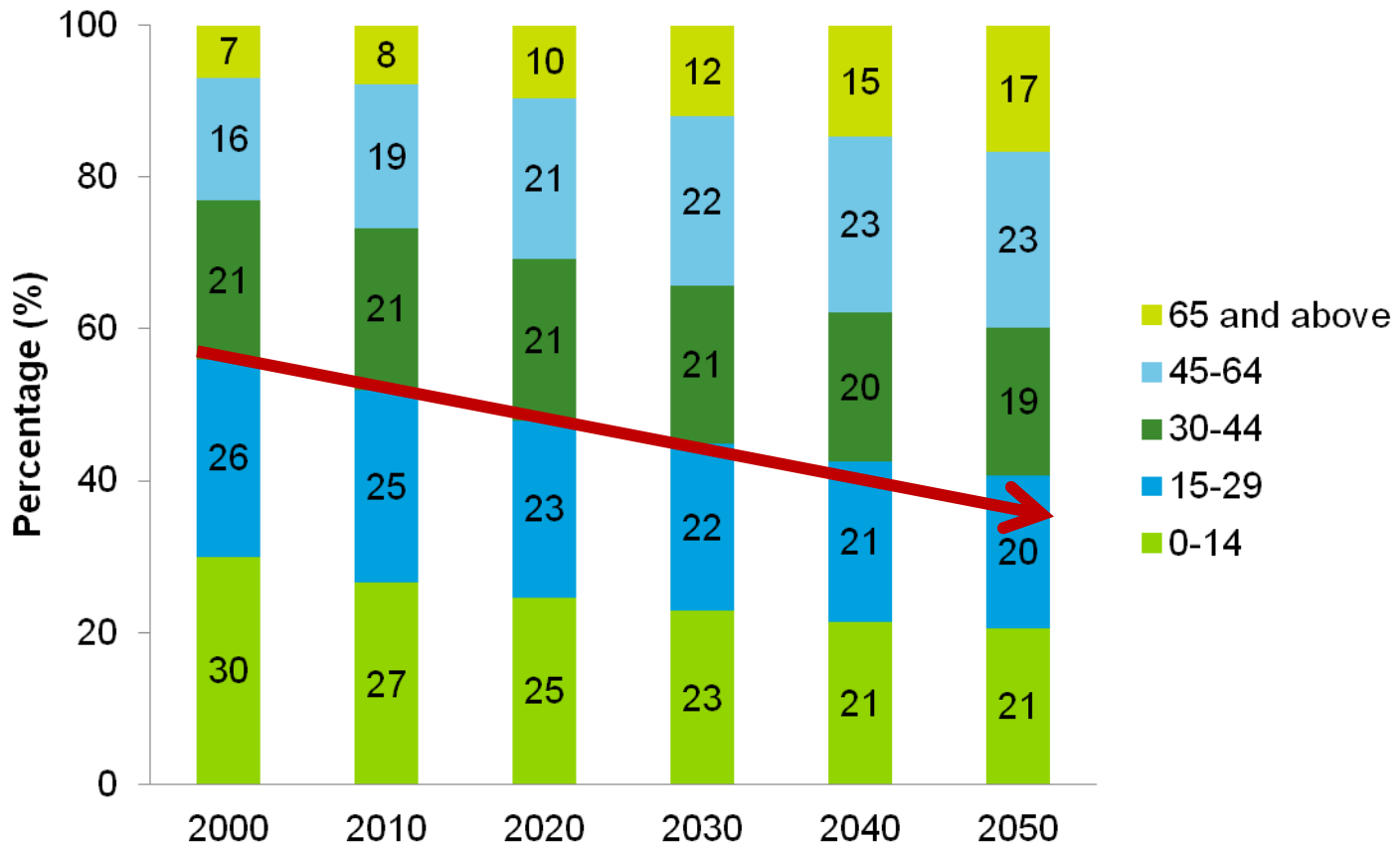


Knowing The Realities ...

DEMOGRAPHICS

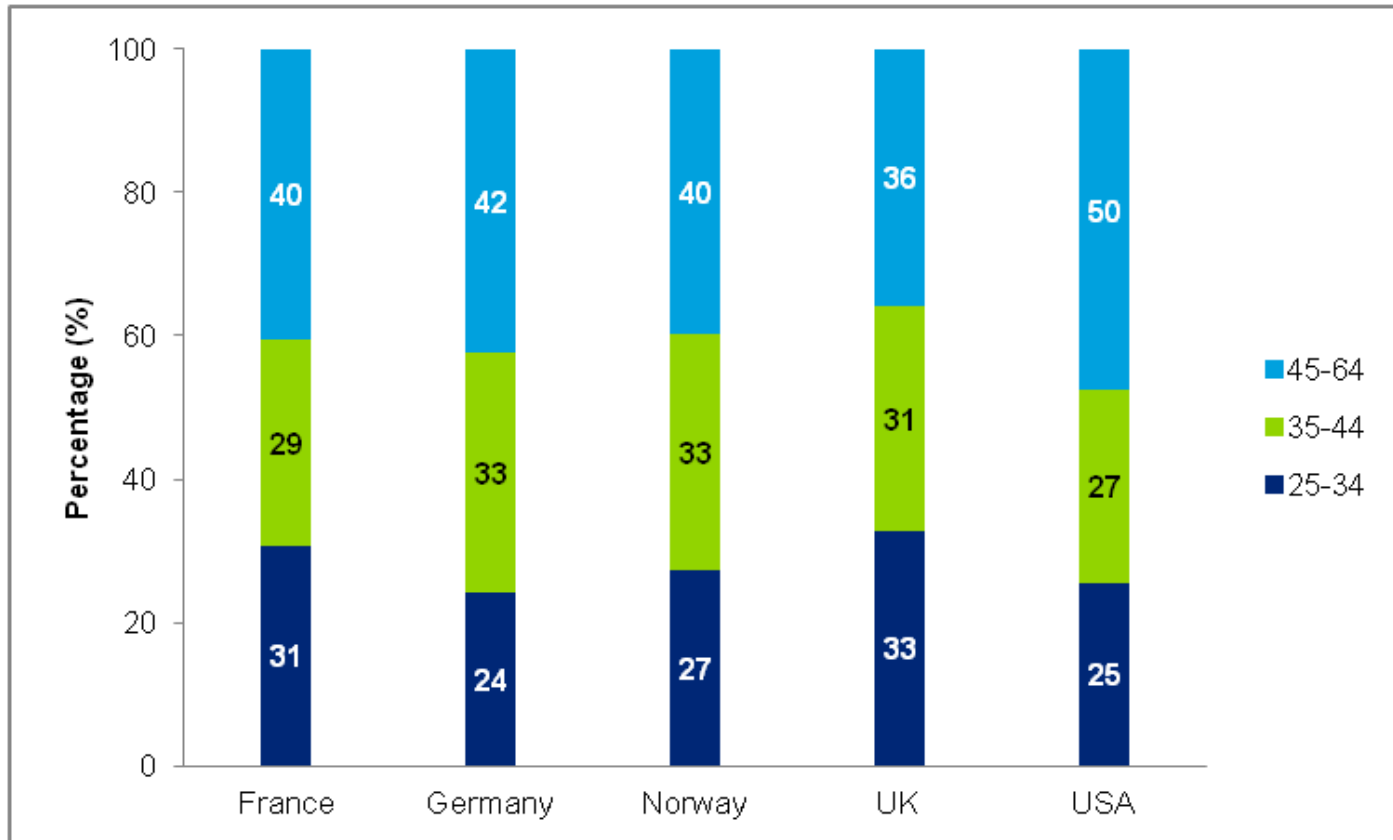
While world population will continue to grow, young generations (age groups '0-14' and '15-29') are declining...

This ageing demographic trend indicates future losses and lack of talent supply for the future workforce.



Mirroring the ageing global population trend, age distributions in the current STEM workforce shows that ~ 42 percent of scientists/engineers are in the '45-64' age group

The vacuum left behind by the retirements will be difficult to fill...

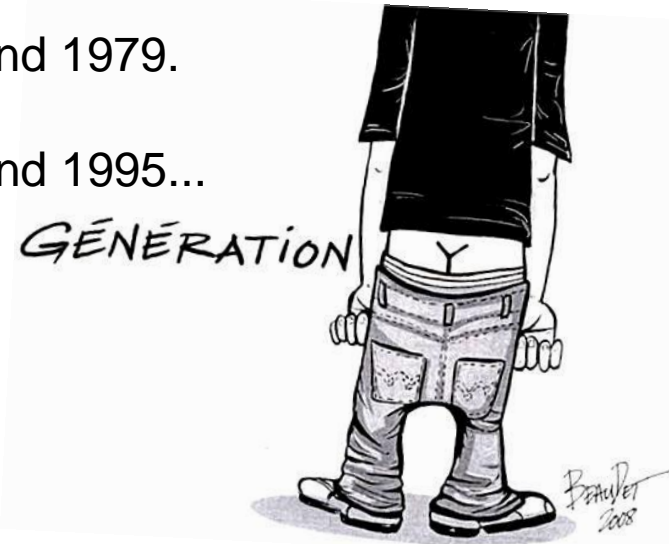


As the STEM industries face the exodus of Baby Boomers, the need to attract and convert young generations (Gen Y and Z) into potential future workforce increases ...

Employers must first understand Generation Y and Z's manner of thinking, values, learning styles, and career selection criteria

The Generational Alphabet Soup...

- **The Silent Generation** are people born before 1946.
- **The Baby Boomers** are people born between 1946 and 1959
- **Generation X** are people born between 1960 and 1979.
- **Generation Y** are people born between 1980 and 1995...
- Generation Z are people born after 1995...



Before we knew it, Gen C is coming this way.....

- Born after 1990...
- They have grown up under the influence of Harry Potter, Barack Obama, and i-everything – iPod, iTunes, iPhones
- On the grid 24/7
- Connected, communicating, content centric, computerised, community-oriented and always clicking
- Urban and suburban
- Their reality is defined by the internet , mobile devices, social networking
- Heavy reliance on mobile communications



Gen Y and Z grow up in the digital world and are extremely savvy at adapting to technologies, just imagine how digital it can get....



A: APPLE



B: BLUETOOTH



C: CHAT



D: DOWNLOAD



E: E MAIL



F: FACEBOOK



G: GOOGLE



H: HEWLETT PACKARD



I: IPHONE



J: JAVA



K: KINGSTON



L: LAPTOP



M: MESSENGER



N: NERO



O: ORKUT



P: PICASSA



Q: QUICK HEAL



R: RAM



S: SERVER



T: TWITTER



U: USB



V: VISTA



W: WiFi



X: Xp



Y: YOU TUBE



Z: ZORPIA

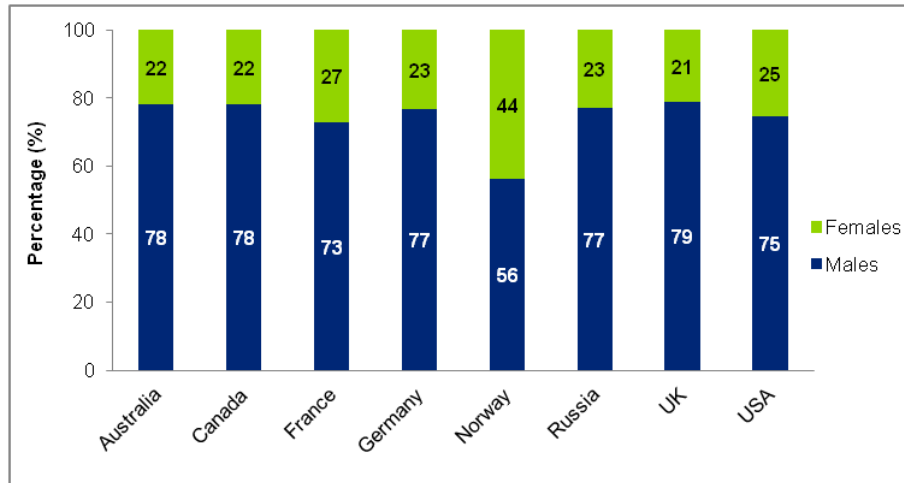
Generational differences ...

- **Flexibility and balance** between work and family life
 - Baby Boomers are the most **work-centric** - 22 percent placed higher priority on work than family compared to 13 percent for Gen X and Y.
 - Gen X and Y are more likely to be **family-centric**, with 50 and 52 percent respectively placing higher priority on family compared to 41 percent of Baby Boomers
- **Respect and authority** - Gen X and Y prefer a collaborative and inclusive management style compared to command and control careers and are more comfortable asking questions and do not feel intimidated
- **Use of technology** - Baby Boomers are not as technologically savvy while Gen Y is the leader of technology usage with 90 percent owning a computer and 82 percent a mobile phone

In most countries, women make up less than 30 percent of the STEM workforce, and the disproportionate gender distribution is also observed in the O&G industry...

In a York University survey of those age 9-14, 72 percent who said they did want to become a scientist were boys and just 28 percent were girls.

Gender distributions in the **STEM workforce** by country, 2008



Note: Units for France, Germany, Norway, UK and USA, 2006 are scientists and engineers.

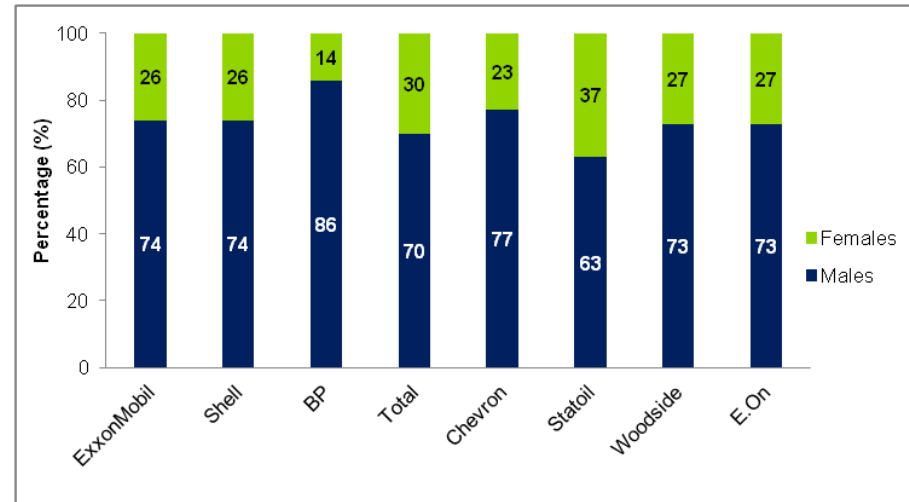
Unit for Russia is Russians with high qualification in natural and engineering sciences.

Unit for Australia is full-time professionals in design, engineering, science and transport, 2009.

Unit for Canada is employees in natural and applied sciences and related occupations.

Source: Eurostat, HRST (2009); Russia in Figures (2009); Women, Minorities, and Persons with Disabilities in Science and Engineering, National Science Foundation (2008); Jones, C.(2009), Australian Women Cool to Careers in Science, ScienceInsider.

Gender representation of the **O&G workforce** by company



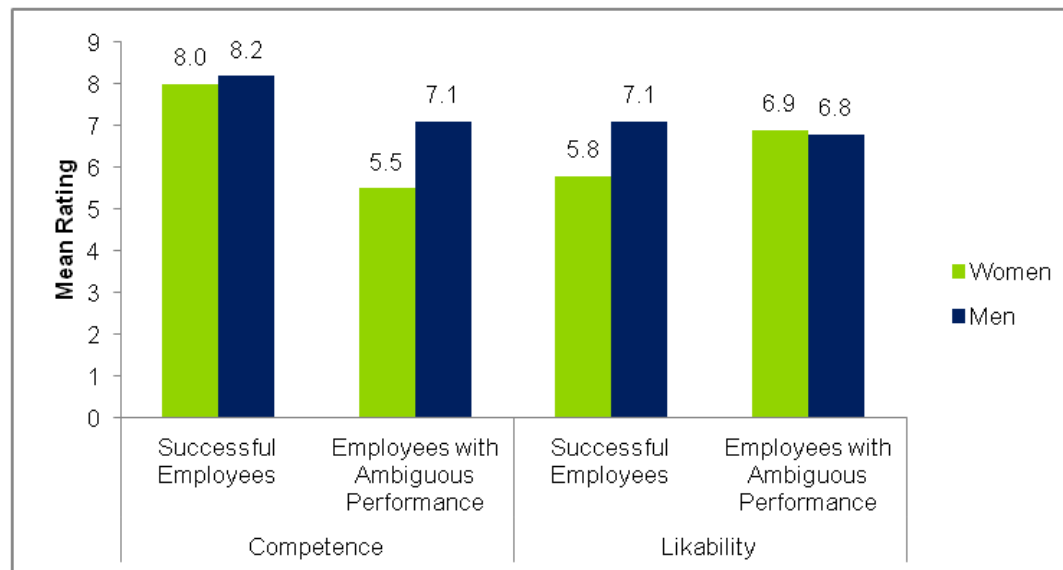
Source: Annual reports of select O&G companies (2009).

Only 27 percent of the women who graduated with a 1st degree in science, engineering or technology, pursue a career in STEM fields compared to 54 percent male

- Fewer women pursue their studies in STEM due to **lack of encouragement** from the environment
- Women who are already in the STEM pipeline eventually decide to leave - **family obligations** and work-life balance are among the factors – difficult choice between being a scientist or a mother.
- **lack of networking and mentoring opportunities** -Women in STEM faculties receive fewer opportunities from collegial networks to participate in the commercial marketplace.
- The **biases and discriminations** that women face also influence their participation in the STEM workforce

Perception of women's competence in "male" professions according to performance

Source: Heilman et al., (2004). Penalties for success: Reaction to women who succeed in male gender-typed tasks, Journal of Applied Psychology.

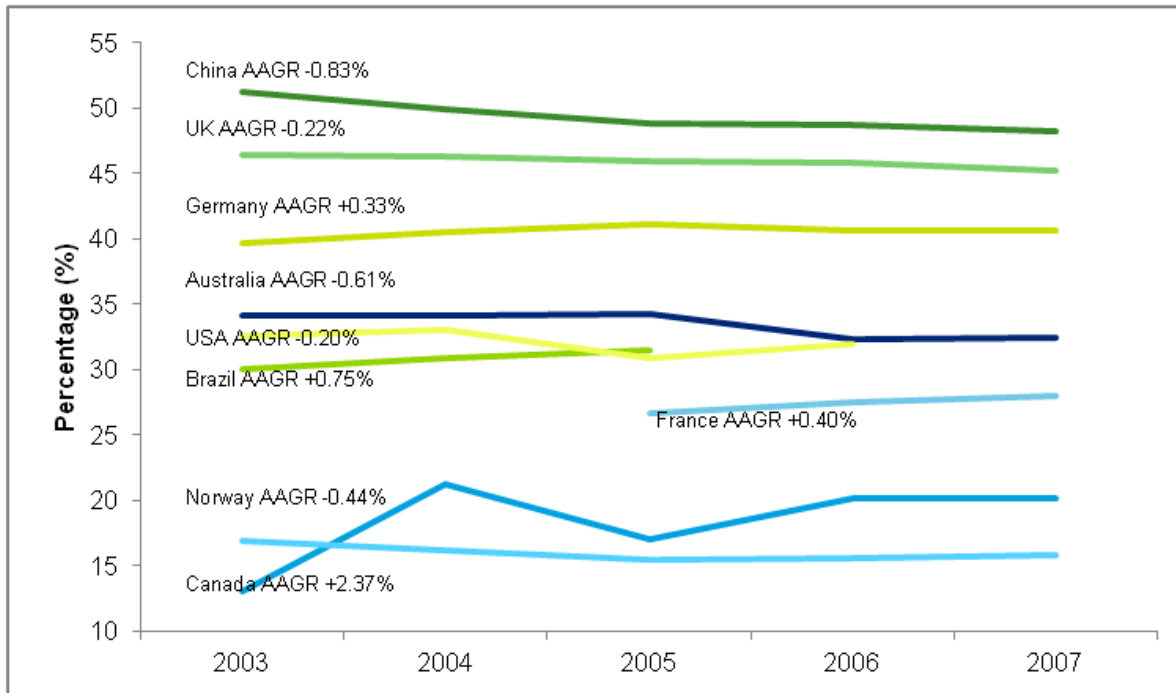


Knowing The Realities ...

TALENT SUPPLY

In 7 out of 10 countries studied, only about 30 percent of the enrolled tertiary students opted for STEM majors, consistently from 2003 to 2007 ...

Percentage of STEM enrolment from total enrolment, by country: 2003-2007



- **STEM majors are generally perceived as confusing and difficult**
- **Students today have a preference for a less fact-laden curriculum and a learning environment which allows for expression of personal opinions**
- **Perception of Scientists as boring and eccentric**

To Build The Talent Pipeline For O&G, Young Generation's Interest In STEM Needs To Be Nurtured First....

- In some countries, less and less number of young people are enrolling in science and mathematics courses...



The stagnant STEM enrolment and graduation rates indicate the likelihood of a global shortage in STEM workforce...

- However, the unemployment scenario among STEM graduates worldwide paints a different picture.
 - Pure science and applied science graduates in Canada experience a relatively higher unemployment rate as compared to social sciences and humanities graduates.
 - In China, graduates majoring in computer science and technology as well as information technology also recorded one of the highest unemployment rates from 2007 to 2009.
 - France recorded a very high rate of unemployed graduates in the fields of science, mathematics and computing, as well as engineering, manufacturing, and construction.

This disparity between workforce demand and supply implies the poor quality of STEM graduates produced globally

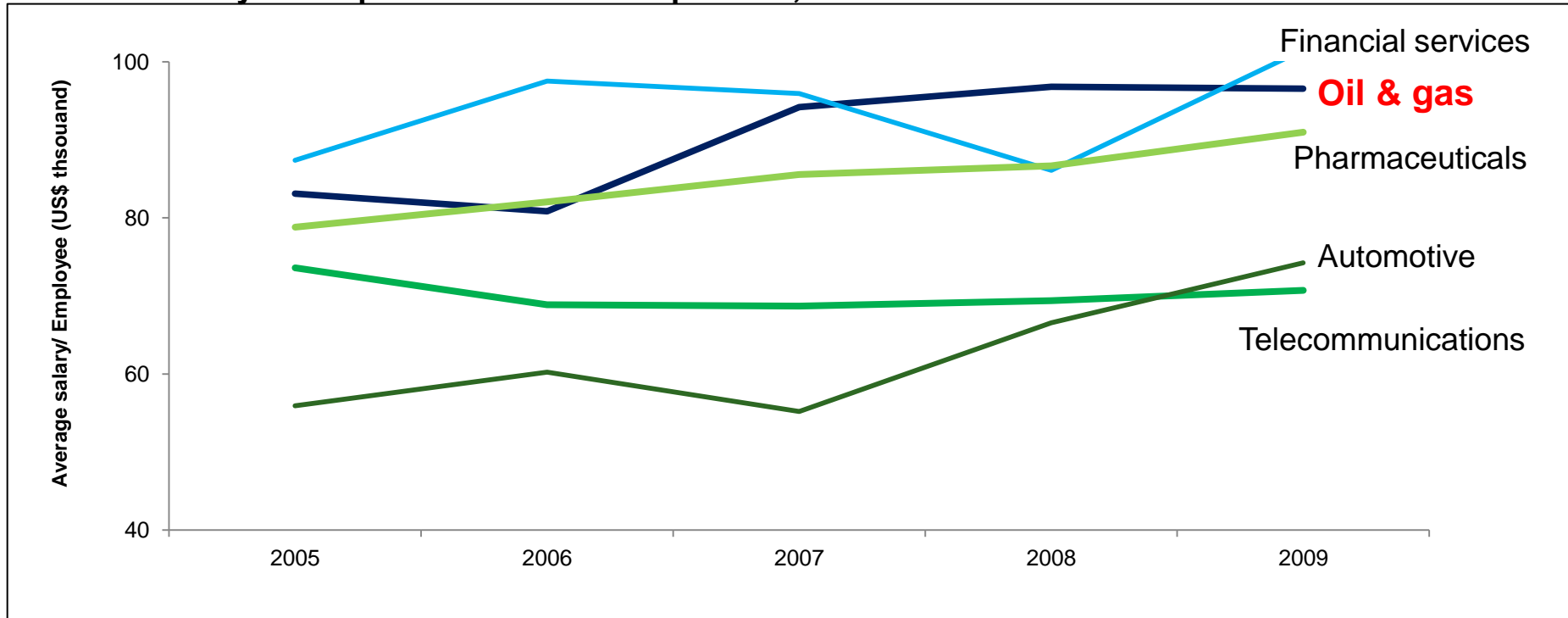
- **Microsoft reports that only 14 percent of students graduating with bachelor's degrees in Washington State have the skills that they need.** [Source: E-School News (2008). *Fewer students seek tech-related degrees.*]
- **Nearly one-third of 39,000 employers in 39 countries were experiencing difficulty in filling vacant jobs, with technicians and engineers among the top of the list. This comes to about 2 million unfilled jobs in the USA, and nearly 2.3 million vacancies in the European Union.** [Source: Manpower Inc. 2009 worldwide talent survey.]
- **The persistent global unemployment trend is attributed to the lack of critical employability skills, including proactive behaviours, analytical skills, time management skills, and leadership skills, all of which are highly valued by employers**
- Employers in Norway and Germany are said to be less concerned about technical skills as compared to personal skills.

Knowing The Realities ...

GLOBAL GAS INDUSTRY OUTLOOK

While compensation and benefits in the O & G industry fares better than other industries.....

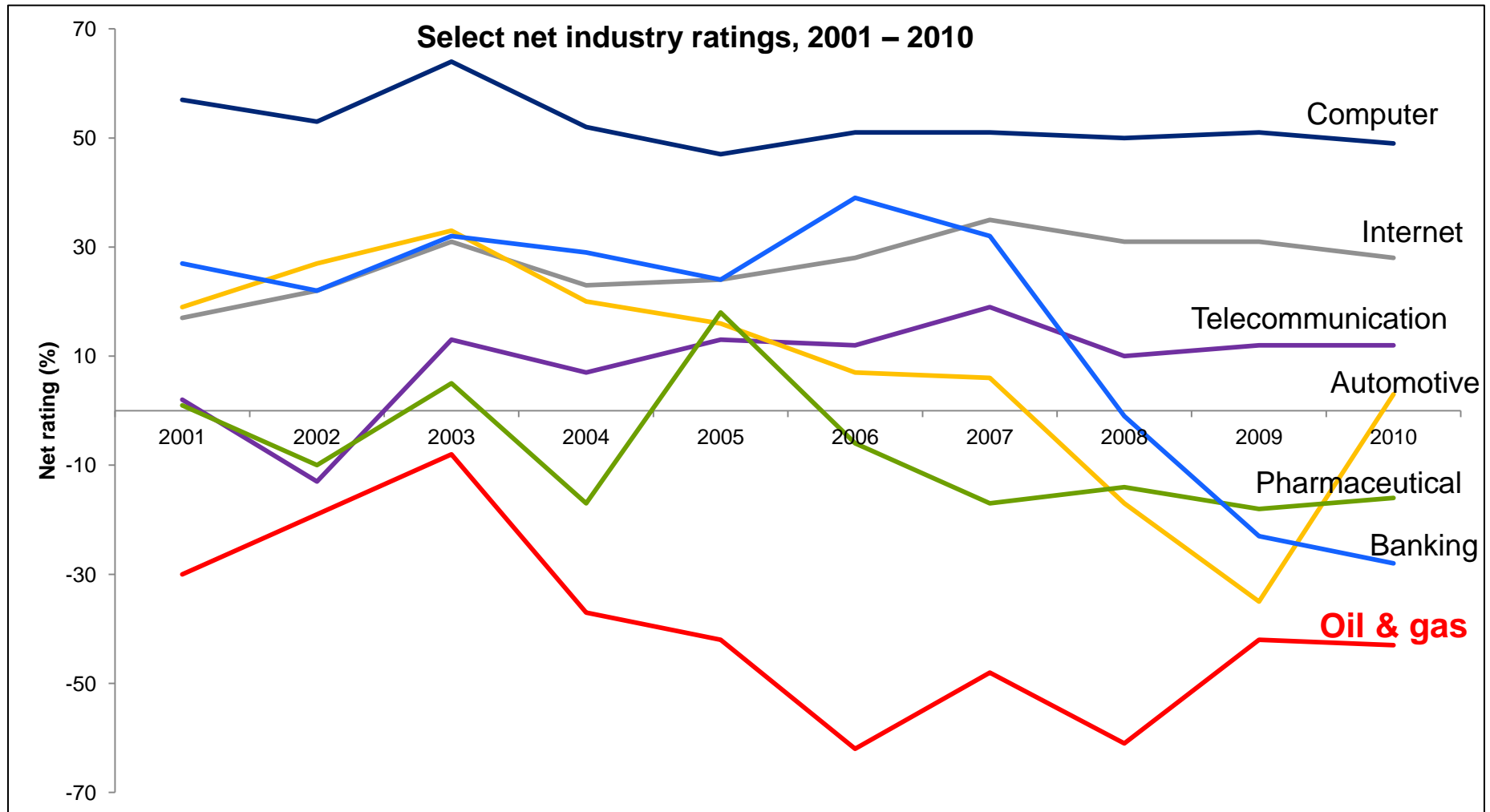
Select industry's Compensation & Benefits practice, 2005 – 2009



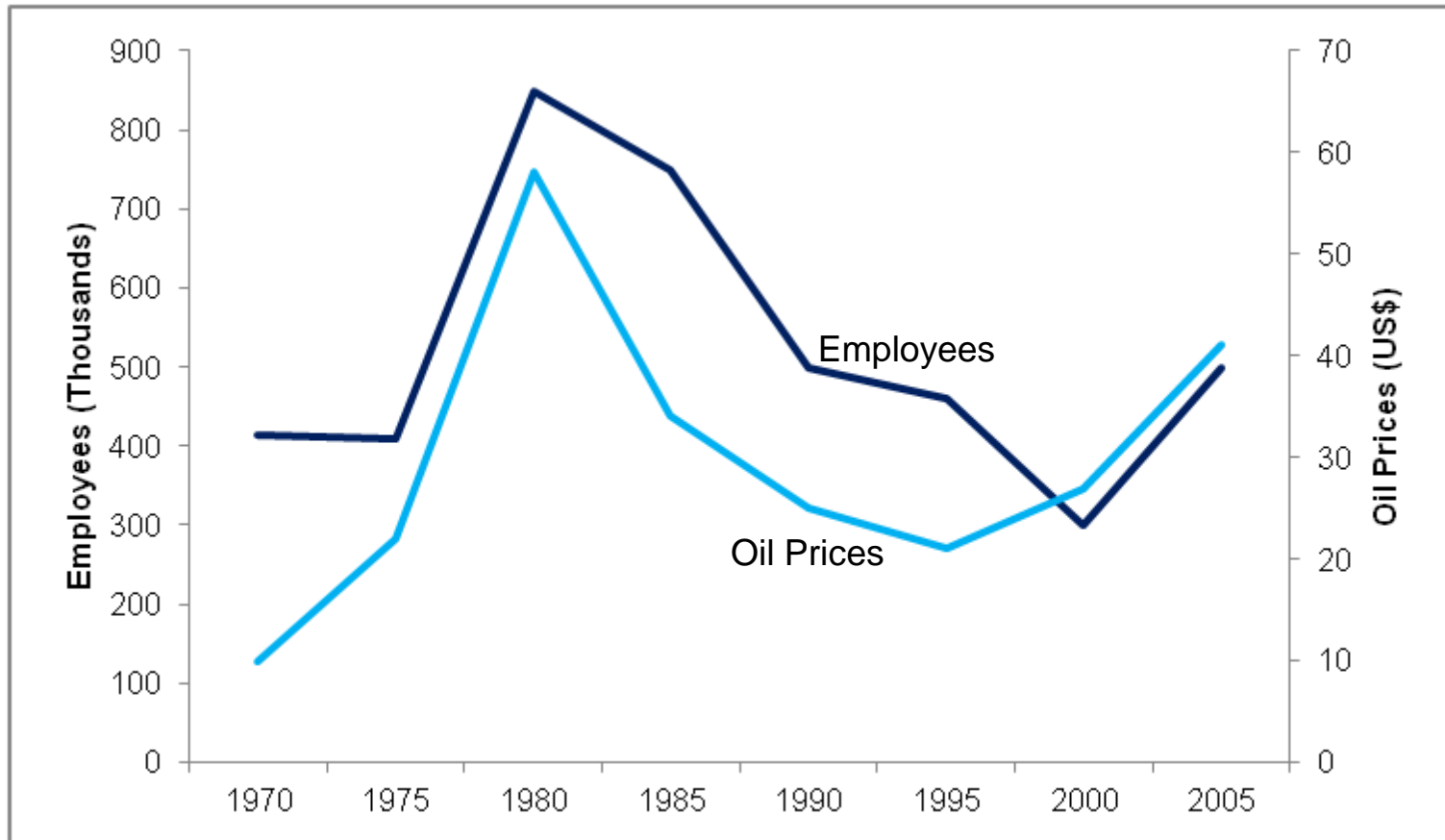
Source: Annual Reports of select companies* (2009).

*Select Global 500 companies; Oil & gas industry also contains companies from countries studied under TF2.

Youths' perception of the O & G industry however is less positive compared to other industries...



Another factor contributing to the negatively perceived image of the industry is the **cyclical nature of the industry**.



Drastic layoffs during the bust cycles of the eighties and nineties were widely publicised by the media, causing the industry to be viewed as one which provides low job security

Knowing The Realities ...

GOVERNMENT INTERVENTION

Governments are in a strategic position to stimulate industry growth and human capital development by making them its national agenda ...

- **“Our nation’s success depends on strengthening America’s role as the world’s engine of discovery and innovation, and the leadership of tomorrow depends on how we educate our students today – especially in science, technology, engineering and math.” – President Barack Obama**

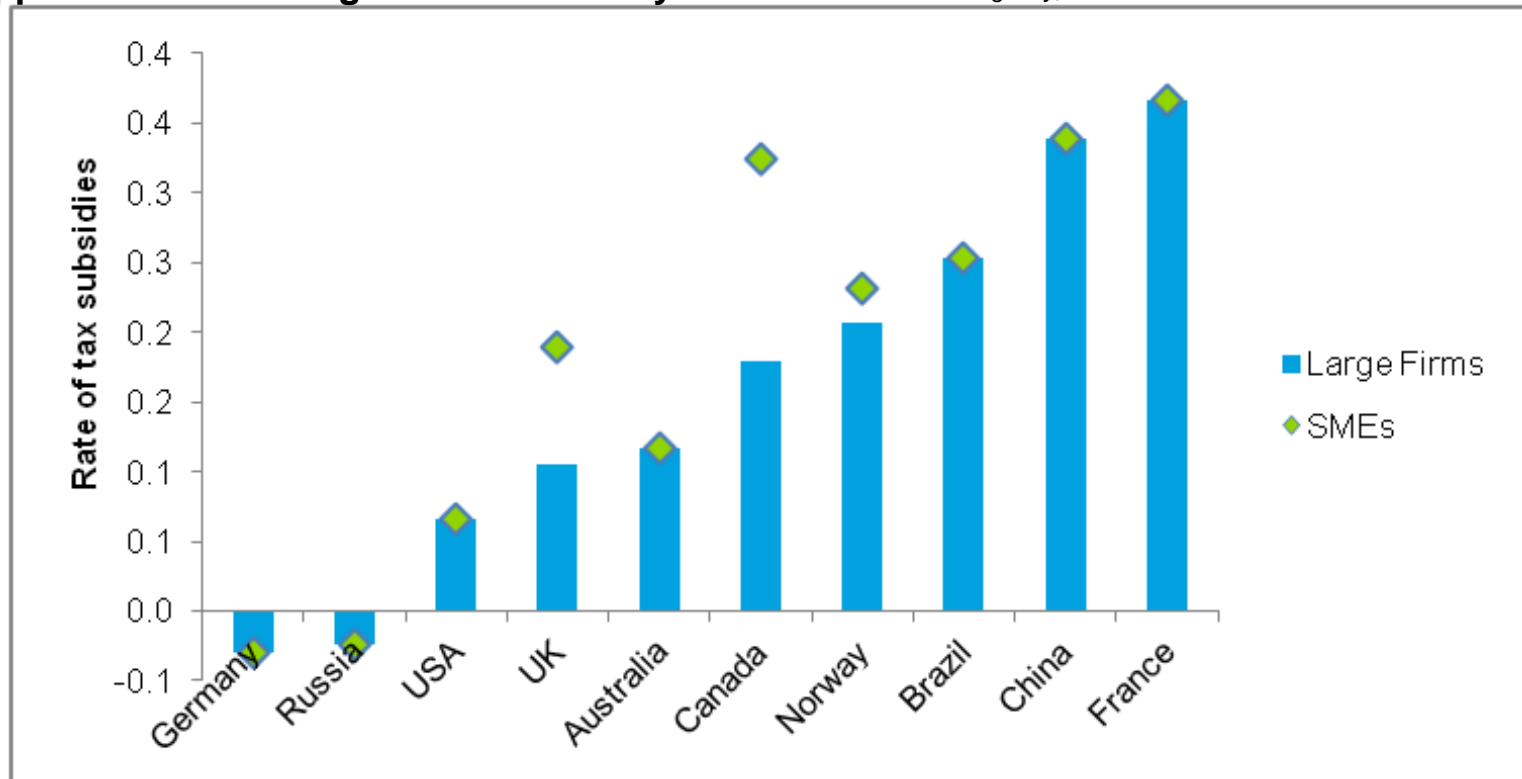
Source: The White House Blog, 2010

R&D has been regarded as a key driver in enhancing the necessary knowledge and technology for the industry ...

- Countries such as Australia, Canada, France, the UK, and the USA have attractive R&D tax regimes
- With the exception of Germany and Russia, other countries have been offering favourable tax treatments to ease the burden of R&D expenditures and to encourage R&D investments.

Distinctively, France has one of the most generous R&D tax incentives in the world due to its multiple tax reforms over the years

The twofold increase of research tax credit taken on by the French Government from US\$1.8 billion in 2005 to approximately US\$3.9 billion in 2008 is a sign of the government's strong support for a knowledge-based economy. *Source: Invest in France Agency, 2008.*



Note: Tax subsidies are calculated as 1 minus the B index. For example, in Spain, 1 unit of R&D expenditure by large firms results in 0.39 unit of tax relief. Positive value = tax subsidy. Negative value = tax burden.

Source: OECD (2008). *Science, Technology, and Industry Outlook*.

War for Talent

KEY CONCLUSIONS

Five major issues that affect availability, interest and attraction of STEM skills to the oil and gas industry

- Quality of the education system
- Mobility of the highly skilled
- Changing demographics pattern
- Government-industry relationships
- Perceptions and misconceptions, especially relating to environmental concerns and work-life balance

Post recession competition for talent rages on...

There is no short cuts to Nurturing and Attracting and Retaining talent...

- **Nurture STEM interest of young generations**
- **Address senior employees – eg Poland – Age Management**
- **Engaging women as part of the talent solution – eg ExxonMobil**
- **Promoting career awareness in the gas industry**
- **Breakdown national barriers in recruitment – eg GDF Suez**

Introduce a Girl to Engineering Day (Girl Day) is celebrated internationally during Engineers' Week each year.

Girl Day 2011 was made possible through generous grants or donations from 3M, Bechtel, Caterpillar, Chevron, ExxonMobil, Fluor, General Motors, Halliburton, IBM, National Instruments, and Time Warner Connect a Million Minds.



Families and educators were invited to join their students at UT for an afternoon of engineering fun.

Is the global gas industry doing enough to attract talent?

- Many companies are already making efforts to address Youth and promoting awareness of career opportunities
- However, these efforts are not sufficient to signal and beckon Youths of today to join the gas industry
- Only 8 % of the TOP 50 most attractive employers to “engineering” graduates are oil and gas companies

WHY?

- (Qualified STEM-educated) Youths of today have endless list of career options
- Negative image of the industry?

Today's Youths Have Incredible Opportunities For A Diverse Array Of Careers...



Pharmacy
Biotech
Zoology
Veterinarian
Investment banking
Social worker

Law
Policy-maker
ICT and television
Bio-engineering
Venture capitalist
Work from home...

A concerted effort will be needed by the global gas industry, with the IGU in the position to take the lead....

- Commonly held negative perceptions of the industry should be challenged by better communicating the reality of the modern oil and gas sector as a high-tech, diverse, and environmentally conscious entity, integral to the long-term future of the global economy
- Companies must resist short-term economic pressures to implement cuts in workforce.
- Long-term commitment to maintain skills development is necessary to reverse the insecurity bred by historical response to downturns.
- Cooperation between industry and academia, wider provision of scholarships targeted at key disciplines, the sponsoring of academic programs and support for internship schemes were cited as examples of proactive initiatives with the potential to attract, develop and retain interest in the sector as a career path of choice.