



**unitar**

United Nations Institute for Training and Research

# Skills shortages in the global oil and gas industry

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## How to close the gap

### Part I

One year ago, the “Global Oil for Development” initiative was launched with the aim of enhancing the linkages between the oil and gas industry and socio-economic development in producing countries.

Conducted in close collaboration among two international organizations (UNDP and UNITAR), an oil company (AFREN) and a Swiss foundation (CRES), and in consultation with ILO, the study lays the foundations of the initiative.

The study is based on an analysis of the socio-economic and political environment of the two main sub-Saharan countries, Angola and Nigeria. It examines ways through which countries could implement local content policies in a realistic and optimized manner, and at the same time benefit from the "talent crisis" the oil industry is currently facing.

The study proposes orientations and recommendations that respond to local content challenges and opportunities. It is based on the importance of developing relevant and comprehensive training strategies that will support the emergence of local content.

Although the study was initiated before the financial crisis and the sudden oil price collapse, the topic is still relevant today for any organization or company that is looking for long term development.

Any local content policy, especially in the oil and gas sector, is however not an end in itself. Such policies should be considered a major leverage for industrial development in those countries where oil and gas represent the main resource in support of the Millennium Development Goals.

## ABOUT THE PARTNERS



The United Nations Institute for Training and Research (UNITAR) is making concrete contributions to developing the capacities of tens of thousands of people around the world. Since its inception in 1965, UNITAR has built sustainable partnerships acquiring unique expertise and accumulating experience and knowledge to fulfill its mandate. These accomplishments have enabled UNITAR to respond to the growing demand from UN Member States for training for capacity development in the fields of Environment; Peace, Security and Diplomacy; and Governance.

Over the years, UNITAR has kept a record of experiences in partnering with the private sector and foundations. Building on it, and in order to increase its capacity to achieve positive outcomes in relation to its mission, UNITAR has established a framework for developing long-term collaborations while promoting the goals and principles of the UN. Through the implementation of concrete programmes and projects it provides an avenue to increase private sector and foundations contribution to sustainable development at large.



Afren is an independent oil and gas exploration and production company that was founded in 2004 by a management team including Dr Rilwanu Lukman the former Secretary General and President of OPEC.

Since the Initial Public Offering, Afren has rapidly expanded its portfolio across six countries: Nigeria, Sao Tome & Principe JDZ, Gabon, Congo, Cote d'Ivoire and Ghana. The Group is expecting to produce 15 to 20,000 barrels per day by 2008 from its current portfolio. The vision is to become the premier pan-African independent exploration and Production Company, through partnering with indigenous companies and governments and acquiring equity stakes in exploration and development assets.



The *Centre de Recherches Entreprises et Sociétés* (CRES) is a foundation under Swiss law with headquarters in Geneva.

Its objective is to monitor the economic, political, religious and social environments of countries where companies might wish to operate. Its vocation is to offer concrete analysis of the changes going on at a time when profound geopolitical upheavals are occurring throughout the world. Regularly bringing together the world's leading specialists, CRES constitutes a permanent forum for meetings between experts and decision-makers coming from widely differing geographical and socio-professional horizons. CRES is at the centre of a network promoting dialogue and the exchange of ideas about oil and development.

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## FOREWORD

This study is about skills shortages in the global oil and gas industry. It examines the causes and it reviews options how to deal with this serious problem which has plagued the industry now for a number of years.

The study was carried out just before the October 2008 crash of global equity markets, and the dramatic plunge of the oil price. After having reached an all-time high of 147 US\$ in July 2008, the oil price fell more than 60 per cent by that date. Some observers have argued that the slowing down of oil and gas demand will not only mean a return to cheap energy but also the dissipation of the skills gap. However, this report takes the view that it is quite unlikely that the economic crisis will remove the skills shortage definitively from the list of challenges the industry will face in the future. There can be no doubt that oil and gas prices will rise again as demand increases. But it is improbable that this will make the skills gap a thing of the past. The problem as argued here is a structural one which, in the long run, is largely independent of up and down swings of the global economy.

It would therefore be short sighted to use the economic downturn as an excuse for non-action. The crisis will at most slow down, temporarily, the demand for skilled personnel in the oil and gas industry. It is almost certain that if nothing is done, the industry will be confronted with the same skills shortages it faced before the crisis.

Postponing action until the economic downturn has receded will prove costly. Identifying and implementing appropriate measures will require time. Once the skills shortage manifests itself again, policies and programmes need to be in place to redress the situation. Otherwise, valuable time will be lost.

This study also focuses on local content and skills training in the producing countries, particularly in sub-Saharan Africa. Local skills training is a powerful way of making local enterprises become suppliers to the oil and gas industry, not only large local enterprises but also small and medium ones. The oil and gas industry often looks at local content as an inconvenience imposed, by local authorities, which has many costs and few benefits. This study takes the opposite view, viz. that local content makes economic sense. The industry can gain substantially if it has local

suppliers that are efficient and competitive. Successful local outsourcing not only benefits oil and gas companies directly, it can also stimulate economic growth and extend the benefits of oil and gas production to the wider population. This can be a particularly effective strategy in situations, not found infrequently, where oil and gas production is hampered by local conflicts and civil strife resulting in large part from poverty and underdevelopment.

It would be shortsighted to use the current economic crisis as an excuse to forego the opportunity of supporting local companies, and to convert them into reliable and competitive suppliers of goods and services to the oil and gas industry. Several approaches – company sponsorships, incubator zones, etc. – have already been tested and they can serve as a model.

Today, the value of global companies is more and more linked to the effectiveness and reliability of their supply chains. One particular weak link will reduce the strength of the whole chain. This was clearly demonstrated recently by the subprime crisis influencing global financial chains and the melamine problem in China affecting global food chains. The oil and gas industry needs to ensure that its supply chains can weather the test of competition and reliability. In this effort, it should not overlook the option of building up an effective network of local suppliers.

This report is divided up into two parts. The first part includes two chapters with an analytical review of the skills gap. Chapter one takes a global perspective looking at the causes of the skills shortage, the impact of the shortage and the measures that may be taken to narrow the gap. Chapter two is focused on sub-Saharan Africa. It examines the reasons for the scarcity of locally-trained personnel, and how the shortage affects the capacity of the oil and gas industry to meet local content requirements. The chapter also proposes a number of initiatives to increase the number of African professionals employed in the industry.

The second part of the report includes two country case studies - Nigeria and Angola – the two main oil and gas producers in sub-Saharan Africa. Each of these studies describes the oil and gas sector in some detail: government policy for the oil and gas sector, the legal framework, relevant government institutions and their role, and the operations of each of the main oil and gas companies. In addition, the case studies examine the

local skills shortage, the schooling and training facilities and the measures taken to address the skills gap.

It is hoped that this report will help in reflecting not only on the immediate challenges the oil and gas industry is currently facing, but also on the issues that will defy the industry beyond.

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## **A. SKILLS SHORTAGES IN THE GLOBAL OIL AND GAS INDUSTRY: HOW TO CLOSE THE GAP**

### **SUMMARY**

The oil and gas industry is enjoying a major boom because of an unprecedented rise in energy prices. This has led to the exploration of potential oil and gas reserves that were previously considered uneconomical, and to the expansion of many existing sites. It is estimated that some \$200bn in planned investment is scheduled over the period 2005-2015.

While this is happening, the industry is undergoing dramatic change. Geopolitical relationships are rapidly changing, new competitors are emerging with many new start-up companies on the horizon and a flurry of acquisitions of companies and assets, global demand for energy is surging, environmental concerns are rising and, last but not least, the industry is increasingly facing shortages of skilled personnel.

Rising skills shortages have become one of the main problems facing the oil industry throughout the world. Increasingly there are delays and contracts have to be re-negotiated. Many producers face growing difficulty in meeting their schedules and it is not sufficient to simply pay higher salaries to secure enough qualified personnel. If nothing is done, there will be a slowdown in reserve replacements, a “capacity-shut-in”, and a major increase in operating costs within the next 5 to 10 years.

Currently there are 400,000 professionals employed around the world in the exploration and production of oil and gas. Will the industry be able to increase that number to meet future demand? In 2007, it was estimated that total world demand for petro-technical professionals would increase by more than 11,000 per year, which is up nearly 300 per cent on comparable demand a few years ago.

Another problem is that governments of oil producing countries are placing growing emphasis on national content quotas in an effort to ensure that a

significant number of their citizens are employed by foreign companies. This has created the challenge of identifying sufficiently large numbers of local staff with internationally recognized qualifications.

Three reasons are generally identified as the main causes of the skill shortage. First of all, there is the very significant increase in the demand for energy and the resulting hike in the price of oil. Secondly, the average age of professionals in the industry is one of the highest of any industry, with many people retiring in the next few years. Thirdly, student enrollment in petro-technical courses has been on the decline for many years. Although enrollment has picked up somewhat in the last 2-3 years, the level is still well below that of the early 1980s.

The talent crunch is not new to the industry. There were skills shortages in the North Sea oil and gas industry during the late eighties. But this time, a simultaneous interplay of different events is at work, and it is creating a situation in which the industry can easily reach a breaking point. This paper will argue that if stakeholders do not take concerted action, the boom this industry is now experiencing may fizzle out.

There is now a growing awareness that this problem is not a temporary bottleneck but something more serious which cannot be sorted out in just a couple of years. It is not simply a situation of riding out a storm. Strategies and new initiatives are required to provide long-term solutions. This will require addressing the root causes of the skills shortages.

Which measures are best suited to deal with the current crisis? Below is a list of recommendations which emerged from this study. Some of these are already being tried out by the industry, others not yet but are being discussed and evaluated.

Training facilities need to be expanded, and not only in Europe and the U.S.A., but also in low-income countries, particularly in those with oil and gas reserves. Training programmes in low-income countries are one of the three most important elements of an effective strategy to reduce the skills gap. Such action poses of course big challenges. The lack of an adequate infrastructure, scarce teaching personnel and little funding are all important obstacles that need to be overcome. But recently, a number of initiatives have been developed to establish new centres of teaching in low-income countries, often in close collaboration with oil companies,

universities and training institutions of high-income countries. It is recommended that more such initiatives are being taken.

Other measures needed are campaigns need to be organized to enhance the image of the industry and point the young generation to the benefits of a career in the oil and gas sector. Work methods and organization need to change taking into account that the young generation seeks different objectives than those of previous generation.

Recruitment needs to be intensified covering not only the traditional “search” regions (Western Europe and the U.S.A.) but also Asia, Africa and other developing regions. Recruitment policy also needs to change. Graduates with little or no experience should be given more consideration, and in-house training should be in place to enhance their employability. Recruitment strategies should be designed to attract more women to the industry, hiring beyond the retirement age should be given greater priority. The introduction of more labour-saving technology can also help in reducing the skills gap.

On the other hand, poaching of staff from competitors which is a growing trend, cannot be considered as a solution for the skills shortage. This mainly raises the costs of hiring staff, and does not resolve the main problem, i.e. a lack of supply.

There are however two important pre-conditions to make all this happen.

First, human resource planning has been, for many years, the step-child of the oil and gas companies. Being a capital-intensive industry, the boards of most companies focus on investment planning, marketing strategies and other key issues. Human resource planning is often relegated to lower echelons in the hierarchy.

This needs to change. Human resource planning needs to be upgraded to the board room. The proposals for closing the skills gap are unlikely to be implemented successfully unless they have the backing and support of the board room.

Second, another pre-condition for these policies to work is to set up mechanisms facilitating collaboration and coordination among oil and gas

companies. Companies are now responding individually, and without coordination, to the crisis. Some are providing more training, others have become more active in recruitment, and still others have postponed retirement of their personnel. But a strategy of “going at it alone” may not be the best. The impact will be larger if the industry takes joint action on any of these proposals.

There are many examples, from the past, of other industries facing serious challenges and deciding to join forces because the challenges are too big and individual responses not adequate. This study concludes that the skills shortage is a problem of similar magnitude and that collaboration is essential to find a way out. Companies have much to gain by joining forces and tackling the challenges such as the skills gap through coordination and collaboration. Joint action could start by establishing a mechanism to collect data from the companies and produce an accurate forecast of aggregated global demand and supply of talent. A forum could also be established to exchange views and insights on the skills crisis, and discuss initiatives.

## 1.0 Introduction<sup>1</sup>

The oil and gas industry is enjoying a major boom because of an unprecedented rise in energy prices. Oil and gas reserves that were previously considered not viable in economic terms, are now being explored and production on many existing sites is expanding. It is estimated that some \$200bn in planned investment is scheduled over the period 2005-2015<sup>2</sup>.

At the same time, the industry is undergoing dramatic, if not unprecedented, change<sup>3</sup>. Geopolitical relationships are rapidly changing, new competitors are emerging with many new start-up companies on the horizon and a wave of acquisitions of companies and assets, environmental concerns are rising and, last but not least, the industry is increasingly facing shortages of skilled personnel.

Rising skills shortages have become one of the main problems facing the oil and gas industry throughout the world. To meet rising demand, oil and gas exploration and production need to increase significantly in the coming years, and this requires more petroleum engineers, production engineers, drilling crews and geoscientists. However the supply of technical staff is by no means sufficient to meet demand. Increasingly there are delays and contracts have to be re-negotiated<sup>4</sup>. Many producers face growing difficulty in meeting their schedules as they have found out that simply paying higher salaries is not sufficient to secure enough qualified personnel.

A recent survey showed that nearly 90 per cent of the senior human resources executives at 22 top international oil and gas companies consider that their industry faces a major talent void and they call the problem one of the top five business issues facing their companies<sup>5</sup>.

The skills shortage is not simply the result of higher demand for oil and gas. Another factor is the high average age of professionals in the industry, with many having retired or about to retire in the next

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<sup>1</sup> Many thanks are due to Patrick Gantès for useful comments on an earlier draft.

<sup>2</sup> Financial Times: "Depleted talent reserves threaten oil companies" (Financial Times, London, March 28, 2005)

<sup>3</sup> Cazalot, Clarence : « The major challenges facing our industry » *Talent and Technology*, vol. 1, no. 1 (Society for Petroleum Engineers, 2007), p.1

<sup>4</sup> Financial Times : « A shortage of skilled staff hits oil projects » (Financial Times, London, October 4, 2007)

<sup>5</sup> Pyron, Dina: "Solutions to the recruitment and retention challenges in the oil and gas industry" *Talent and Technology* vol.2, no.2 (Society of Petroleum Engineers, 2008), p.1

few years. Moreover, student enrollment in petro-technical courses has been declining during much of the 1990s and early 2000s.

Currently there are 400,000 professionals employed around the world in the exploration and production of oil and gas. Will the industry be able to increase that number to meet future demand<sup>6</sup>? In 2007, it was estimated that total world demand for petro-technical professionals would increase by more than 11,000 per year, which is up nearly 300 per cent on comparable demand a few years ago<sup>7</sup>.

There is the added problem of a shortage of mid-career level talent in the industry. These are the 30 to 40 year-old experienced professionals who are essential to developing and managing projects. A recent study showed that the shortage of workers in this category is not less important than the overall shortage<sup>8</sup>.

Also, the skills shortage is not limited to professionals with technical skills. It also affects the availability of senior executives. With the growth in the number of companies, there is an increase in the need for executives to manage them<sup>9</sup>. This shortage is sometimes labeled as the “big crew change”, and insiders are taking this challenge as serious as the lack of technical staff.

Another problem is that governments of oil producing countries are placing growing emphasis on so-called national content quotas, in an effort to ensure that a significant number of their citizens are employed by foreign companies. This has created the additional challenge of identifying sufficiently large numbers of local staff with internationally recognized qualifications.

The talent crunch is not new to the industry. For example, there were skills shortages in the North Sea oil and gas industry during the late eighties<sup>10</sup>. But this time, a simultaneous interplay of different events is at work, and it is creating a situation in which the industry can easily

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<sup>6</sup> Ford Brett, J. :“The value of competent people” *Talent and Technology* vol.1, no.1 (Society of Petroleum Engineers, 2007), p. 3

<sup>7</sup> Abdul-Jaleel Al-Khalifa: “A changing dynamic: The need for collaboration on talent development and climate change in the E & P industry” *Talent and Technology* vol.1 no.3 (Society of Petroleum Engineers, 2007), p.1

<sup>8</sup> Schlumberger : « Surviving the skills shortage – 2006 » (Schlumberger Business Consulting, 2006)

<sup>9</sup> Hoffmann, Anita:“Just name your price” Special supplement: Working in the oil and gas industry (Financial Times, May 6, 2008), p.12

<sup>10</sup> Booz & Allen and Hamilton: “Facing the workforce challenge: the oil and gas industry dilemma” (London, 2007), p.17

reach a breaking point. This paper will argue that if stakeholders do not take concerted action, the boom this industry is now experiencing may fizzle out.

There is now a growing awareness that this problem is not a temporary bottleneck but something more serious which cannot be sorted out in just a couple of years. It is not simply a question of riding out the storm. Strategies and new initiatives are required to provide long-term solutions. This will require addressing the root causes of the skills shortages.

Sometimes one hears the argument that the skills crisis will blow over as energy demand will decrease because of the current slowdown of the world economy. But, a growing number of analysts are now saying that even if there will be a major global downturn, the industry will still have serious staffing issues<sup>11</sup>.

## **2.0 How large is the shortage ?**

There is a general understanding that the skills shortage in the oil industry is large and growing, but there is in fact little detailed information about the size of this deficit. Only a few studies have been carried out estimating the shortage under different scenarios of projected oil prices and production levels. Below are the main findings.

A study by Cambridge Energy Research Associates (CERA) estimated the expected shortage of engineering and project management staff<sup>12</sup>. It found that around 55,500 engineers will be needed to deliver the over 400 major projects expected to come onstream over the next five years. Its survey identified a current base of 55,100 engineers involved in upstream activities. However, with an average age of 51 years, CERA calculated that over 50 percent of this workforce will have retired by 2015, an attrition rate of six percent per year. This will create a significant gap between actual and

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<sup>11</sup> Ford Brett, op. cit., p.4

<sup>12</sup> Cambridge Energy Research Associates (CERA) (2007): "Engineering talent squeeze – "People Deficit"—likely cause further delay in some oil & gas production projects through 2010" (CERA, Cambridge)

required staff. While the industry is recruiting aggressively, there will only be a two percent influx of new entrants in 2008, forecasted to increase to five percent in 2010 as more graduates gain the experience necessary to work on complex projects.

According to the study, the net result will be a 10-15 percent shortfall of qualified, available staff by 2010. It concludes that this will lead to increased costs and further delays in project implementation with cascading effects in other markets (see Table 1).

Another study by the Society of Petroleum Engineers (SPE) concluded that, with a total workforce in the oil and gas industry of 375,000 technical workers in 2006, there will be an overall shortfall of around 30,000 professionals by the year 2012<sup>13</sup>. The study estimated that these shortages will be felt primarily in the following occupations: geologists, geophysicists, loggers, tool pushers, drillers, petrophysicists and production engineers.

Another study, by the Energy Institute, also concluded that there are going to be significant skills shortage but it pointed out that these will not affect all areas of competence equally. It is based on a survey among oil and gas company executives showing that most felt that the shortage primarily affected technical skills specific to the industry: petroleum engineers and geoscientists<sup>14</sup>. Four out of five of the companies interviewed stated that technical skills are the key shortage area. Financial skills were at the bottom of their list.

A 2006 study by Schlumberger is the only one which came up with a different finding. It concluded that there were enough petro-technical graduates in the world, but that many needed to be relocated to areas of high demand<sup>15</sup>. There are enough students in geosciences and petroleum engineering in Asia and Latin America but a large deficit exists in North America and the Middle East, and to a lesser extent in Russia.

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<sup>13</sup> PETROFED: "Workforce sustainability & talent management in the Indian oil & gas upstream industry" (PETROFED, 2006), p.6

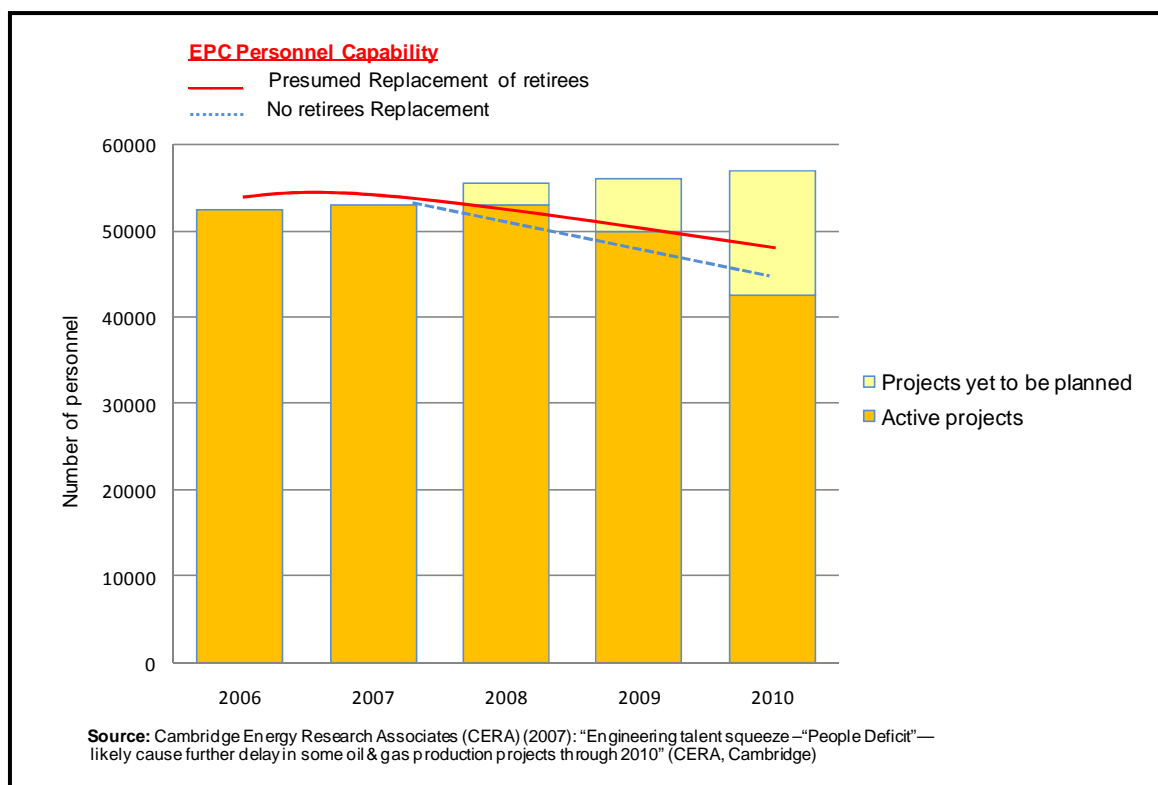
<sup>14</sup> Energy Institute: "Skills needs in the energy industry" (Energy Institute, London, 2008), p.9

<sup>15</sup> Schlumberger Business Consulting, op.cit.

Regional variations of the skills shortage have also been reported in other studies. They all conclude that not all regions suffer equally<sup>16</sup>. AMEC for example reported that skill shortages are most acute in Africa, the Middle East and parts of the former Soviet Union. Other regions such as South East Asia and the Far East do not have the same magnitude of problems. Companies operating in South East Asia obtain a ready supply of professionals from India, the Philippines and even Indonesia.

All these findings, however, should be considered with caution. They cover a limited time, 5 years in the CERA study, which may be too short a period to capture fully the supply and demand effects. Also, these studies were carried out based on scenarios with oil prices well above \$100 per barrel at the time of writing.

Table 1: Supply and Demand of Engineering and project Management Personnel with Forecasted Capacity Estimates



<sup>16</sup> AMEC: "The oil and gas services market" (2006), p.6

### **3.0 Why is there a skills shortage?**

Three reasons are generally identified as the main causes of the skill shortage. First of all, there is the very significant increase in the demand for energy and the resulting hike in the price of oil. Secondly, the average age of professionals in the industry is one of the highest of any industry, with many people having retired or retiring in the next few years. Thirdly, student enrollment in petro-technical courses has been on the decline for many years. Although enrollment has picked up somewhat in the last 2-3 years, the level is still well below that of the early 1980s.

It should also be kept in mind that the industry shed a huge number of jobs over the last few decades. In the USA alone, around 1.1 million jobs disappeared<sup>17</sup>. This was the result of a wave of mergers and acquisitions, during the early 1980s, which resulted in major job layoffs. The industry was also heavily under-invested during the 1990s, and that also affected skills demand<sup>18</sup>.

### **3.1 Unprecedented surge in the demand for energy**

There has been a very substantial increase in energy demand. Much of this is the result of many developing economies, but primarily China and India, now experiencing high levels of economic growth. Moreover, the increase is estimated to accelerate.

According to the Energy Information Administration, global energy demand rose by 63 quadrillion Btu during the 13 years between 1990 and 2003, an increase of nearly 20 per cent. It predicts a further increase of more than 100 quadrillion Btu during the ten years between 2010 and 2020<sup>19</sup>.

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<sup>17</sup> Deloitte: "The talent crisis in upstream oil and gas: Strategies to attract and engage Generation Y" (Deloitte, 2005), p.1

<sup>18</sup> AMEC, op.cit., p.6

<sup>19</sup> Energy Information Administration: International Energy Outlook 2008 (Washington DC, 2008), see <http://www.eia.doe.gov/oiaf/ieo/index.html>

### 3.2 High average age of professionals in the industry

There is ample evidence that the average age of professionals in the global oil and gas industry is high. For example, a global survey of 300 oil and gas companies carried out by the Energy Institute concluded that the median age of their staff was 45<sup>20</sup>. Around 50 per cent of professionals in exploration and production are aged between 40-50 years, while barely 15 per cent are junior recruits aged between their early 20s and mid 30s<sup>21</sup>. The Financial Times reported that the average age of oilfield engineers is 48 years, globally, and in the USA 50 years<sup>22</sup>.

The Interstate Oil and Gas Compact Commission (IOGCC) in the United States found that the average employee working for a major operator or service company in the USA is 46 to 49 years old<sup>23</sup>. Another study reported that this is the oldest of any industry in the USA<sup>24</sup>.

Because of the high average age, the industry has many professionals with extensive experience but a significant number of them will be soon retiring. And a study by Booz & Allen and Hamilton concluded that up to half the current work force (of professionals in the oil and gas industry) is likely to retire between 2007 and 2017<sup>25</sup>. Another study concluded that the average retirement age in the industry is 55 years<sup>26</sup>.

Why is the average age of the workforce so high? Data show that this is largely the result of labour shedding during the 1980s and 1990s. For example, in the U.S.A. oil and gas industry employment declined from a peak of 860,000 in 1982 to approximately 260,000 in 2004<sup>27</sup>. Few people entered the industry during the last 25 years, and this has created a

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<sup>20</sup> Energy Institute : « Skills needs in the energy industry » (Energy Institute, London, 2008), p.11

<sup>21</sup> Ibid. p.4

<sup>22</sup> Financial Times: "*Depleted talent reserves threaten oil companies*" (March 28, 2005)

<sup>23</sup> Booz & Allen and Hamilton, op.cit., p.17

<sup>24</sup> Deloitte : « The talent crisis in upstream oil and gas : Strategies to attract and engage Generation Y » (Deloitte, 2005), p.2

<sup>25</sup> Booz Allen & Hamilton, op.cit., p.4

<sup>26</sup> Ibid.

<sup>27</sup> Ryder, John:" Complex human resource challenges call for new approaches" *Talent and Technology* vol.1, no.1 (Society of Petroleum Engineers, 2007), p. 1

shortage, especially, of employees with 10 to 15 years experience.

Ironically, another reason is that pension benefits for professionals in the industry are much more favorable than in most other industries. Generous retirement packages have made early retirement a viable opportunity for a large segment of the workforce<sup>28</sup>.

### 3.3 Fewer students enrolling in petro-technical courses

As the number of experienced workers in the industry is now rapidly declining, the pool of possible replacement workers is shrinking<sup>29</sup>.

Booz Allen & Hamilton found that “graduate recruitment into the industry from established Western universities and business schools has been in decline, as has been the case for most companies looking for technical skilled labour”<sup>30</sup>.

The Financial Times reported that by 2002, the flow of potential recruits had halved from the last peak in 1983<sup>31</sup>.

Table 3 shows the decline in the number of petroleum engineering students enrolled in the U.S.A. between 1993 and 2007. But, in fact, the decline started much earlier. Fewer than 1,000 students obtained university degrees in petroleum engineering and geo-sciences in 2006. This is more than a 90 percent decrease since 1982<sup>32</sup>.

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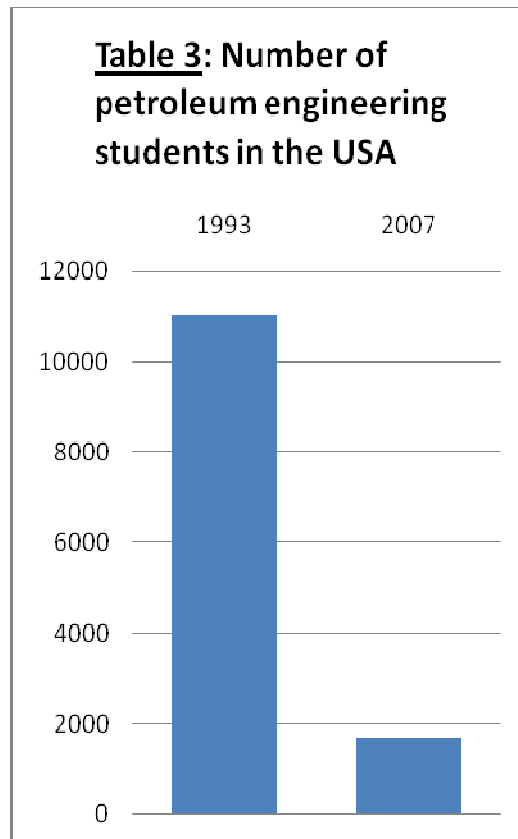
<sup>28</sup> Gould, Luke, et.al: “The workforce crisis in the upstream oil and gas sector” (Boyden, 2007), p.10

<sup>29</sup> Ryder, op.cit., p.1

<sup>30</sup> Booz Allen and Hamilton, op.cit., p.4

<sup>31</sup> Financial Times: “Depleted talent reserves threaten oil companies” (London, March 28, 2005)

<sup>32</sup> Deloitte: “The talent crisis in upstream oil & gas: Strategies to attract and engage generation Y” (Deloitte, 2005), p.3



**Source:** Booz Allen & Hamilton: "Facing the workforce challenge: the oil and gas industry dilemma" (London, 2007), p.18

It has also been reported that U.K. enrollment in related university courses has been on the decline for some years now<sup>33</sup>. The number of qualified graduates from geophysics courses is in steep decline. The number of students wishing to enter university to enter geophysics is equally in decline. Moreover, enrollment in physics courses has more than halved since 1997 and that of geography is down by 40 per cent over the same period.

There is also increased bidding from other sectors to attract young talent. The skills gap is not limited to the oil and gas sector, it is affecting many other sectors as well such as information technology, manufacturing, financial services,

<sup>33</sup> Bamford, David: "Oil and gas industry resourcing", p.3 at [http://www.oilvoice.com/ov\\_features/Oil%20\\_%20Gas%20Industry%20Resourcing.pdf](http://www.oilvoice.com/ov_features/Oil%20_%20Gas%20Industry%20Resourcing.pdf)

communication, medical services and banking. For example, only 56 per cent of students in the petro-technical education programmes in India join oil and gas companies after completing their studies<sup>34</sup>. Only approximately 8 per cent of engineering graduates became petroleum engineers in the U.S.A. during 2006<sup>35</sup>.

The fact that other sectors are able to attract petro-technical students may seem surprising given that salaries in the oil and gas industry are often above those of other industries. It was reported that starting salaries, in the U.S.A., were more than 20 per cent higher than the average pay for graduates with comparable training. Another study reported that petroleum engineers have an annual salary which is 45 per cent above that of other engineers and architects<sup>36</sup>. The same applies to geoscientists. Their annual earnings are on average 29 per cent higher than that of other scientists<sup>37</sup>.

Next to lower school enrollment, there is a related problem. Industry specialists are pointing out that graduating students increasingly lack job-ready skills. University education has become more theoretically-oriented with less focus on practical skills. The result is that students about to enter the labour market are less employable than those who finished their education 10-15 years ago. One training manager at one of the majors was quoted as saying, "for the first time we're seeing failures of basic introductory course pre-assessment tests...we have to rethink our boarding programs to bridge the gap"<sup>38</sup>.

Why are enrollment levels so low? Part of the explanation is purely demographic. The changing demographic profile of the high-income countries implies lower birth rates and fewer college graduates. Fewer engineers are receiving their degrees from universities.

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<sup>34</sup> PETROFED, op.cit., p. 9

<sup>35</sup> Gould, Luke, et. al., op.cit., p.12

<sup>36</sup> Herman Miller Inc.: "Change and challenge in the petroleum industry" (2005), p.5

<sup>37</sup> Ibid.

<sup>38</sup> Booz & Allen and Hamilton, op.cit., p.18

But there are other factors at work as well. Two of the main reasons are discussed below: the unfavourable image which the industry has, and the fact that the industry has not been very successful, so far, in “connecting” to the young generation.

### **3.3.1 Less recruitment because of the unfavourable image of the industry**

There is a perception among many students that petroleum exploration is not a respectable business to be in, much less so than the computer or biotechnology business. It has a public image as a pollution-prone industry, wracked by cycles of boom and bust, run by monopolies and engaged in price fixing. There is also the notion, unjustified, that the industry is technologically obsolete.

A recent survey among 300 oil and gas companies around the globe reported that 46 per cent were of the view that the recruitment was low because the industry is considered unattractive<sup>39</sup>. It has a serious image problem. Human resources managers were also asked about barriers to recruiting the right people, and many found that “the lack of skills was less of a problem as they had the capability to train in-house, but the lack of interest in the industry, together with an unwillingness to relocate to relatively remote exploration and refinery sites, was a barrier”<sup>40</sup>.

Another reason may be that students are not attracted because they find out that young engineers hit a “grey ceiling” soon after they join the industry<sup>41</sup>. As the average age is relatively high, young engineers are less likely to be given

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<sup>39</sup> Energy Institute: “Skills needs in the energy industry” (energy Institute, London, 2008), p.8:

<sup>40</sup> Ibid, p.16

<sup>41</sup> Marianne Lavelle : « Opportunity gushes : Engineering students might want to consider a future in oil » *U.S. News & World Report* (February 29, 2004)

responsibility for running projects. With a relatively large pool of more experienced workers, managers are less motivated to hand out responsibilities to younger people. In engineering and science firms, on the other hand, young engineers are “running projects in their 20s managing divisions in their 30s, but not much happens in the oil industry until 40”.

Many also consider employment in other sectors such as IT, more attractive. It has been reported that students have little information about the career paths and opportunities in the oil and gas sector. Many consider that the oil sector is at a disadvantage because many of the high-skilled occupations are field jobs with tough working conditions.

The industry has long been aware of these issues, but few efforts have been made to address them. Insiders have pointed out that human resource management has played second fiddle in the industry for a long time. It is very much a capital-intensive sector where, understandably, leadership has always given priority to manage its capital. Human resource management was not considered at the same level.

### **3.3.2 Oil and gas do not appeal to generation Y**

Bruce Bullock, Director of the Maguire Energy Institute, has pointed to some fundamental differences in priorities and preferences between the generation of professionals which is now exiting the industry and Generation Y<sup>42</sup>. Generation Y is the population in western industrialized countries that currently ranges in age from recent university

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<sup>42</sup> Bullock, Bruce:” Can the petroleum industry attract and engage Gen Y?” *Talent and Technology* vol.1 no.3 (Society of Petroleum Engineers, 2007) ,p.1

graduates to middle-school students (birth years 1982-1993). This generation, he pointed out, tends to seek work with an overriding meaning or purpose, it seeks an adequate work-life balance, and it is more driven by job challenges and meaning rather than just salary. This is a generation which values flexibility, balance, respect and feedback, and these principles should guide the recruitment drive. Generation Y tends to aim for long-term career development, variety of experiences, a sense of purpose and meaning in their work, open social networks and a favourable work/life balance.

He concludes that a recruitment drive which does not address these principles will fail to reach this generation. The industry needs to learn how to communicate to Generation Y.

### **3.4 How important are each of these causes?**

With so many explanations on the table, it is important to get a sense of their importance. An answer to the above question will certainly help in finding solutions.

The discussion in the public media gives the impression that the growth in energy demand, in large part from China and India, are the main drivers of the current skills gap. But several key leaders in the oil and gas industry have argued that the main reason is in fact the skewed demographic profile of the professionals in the industry with many retiring in the next few years<sup>43</sup>. In this sense, as they point out, the current skills gap is very much different from the one experienced during the boom of the late 1970s and early 1980s. At that time, it was growth in activity, not experienced people retiring that was the primary cause of the skills shortage<sup>44</sup>.

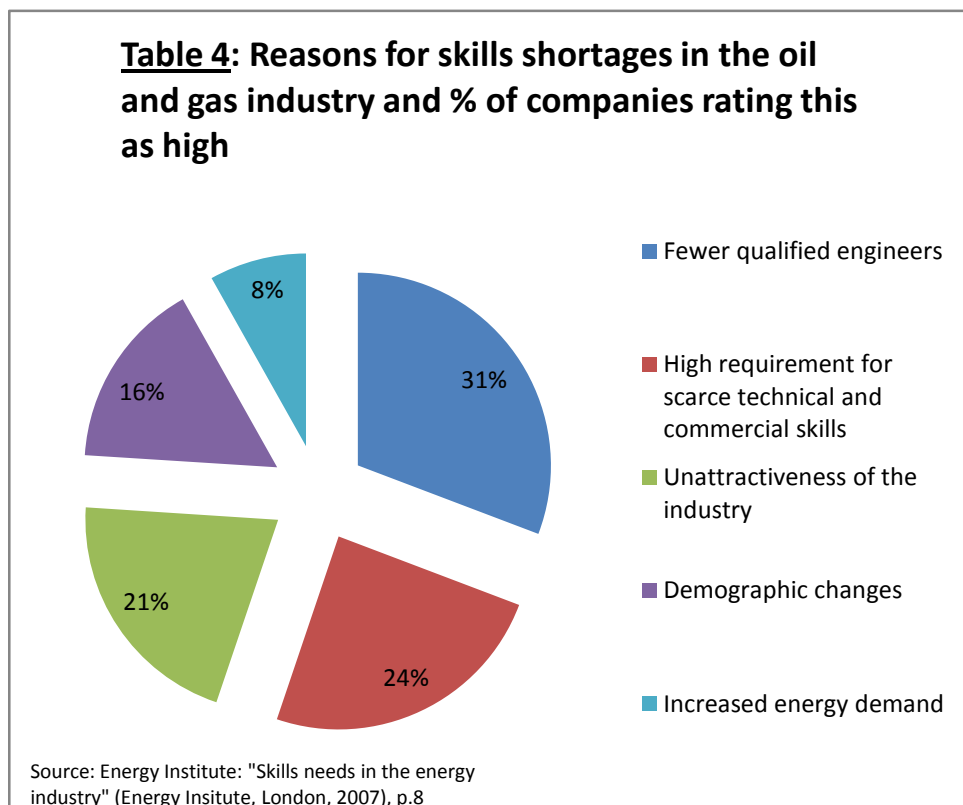
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<sup>43</sup> Ford Brett, op.cit, p.1

<sup>44</sup> Ibid.

Detailed empirical studies are lacking, but we do have information on what the industry itself considers as the main reasons for the skills shortages. The table below gives the responses by 300 oil and gas companies around the globe to the question of what they consider to be the most important cause<sup>45</sup>. The results are quite clear. Most put the emphasis not so much on the physical number of technical staff, but on the quality of their skills. Thirty-one per cent consider that there are fewer qualified engineers, and 24 per cent is of the view that the requirements for technical and commercial skills are high. On the other hand, higher oil prices and higher demand for oil is considered a main cause by only 8 per cent.

In other words, they consider that skills shortages are more the result of inadequate supply of qualified skilled workers, i.e. training, rather than increased demand for skills. It is quality more than quantity.



<sup>45</sup> Energy Institute, op.cit., p.8

#### 4.0 How costly is the skills gap for the industry?

Some analysts have pointed out that the skills shortage is already constraining the industry, pointing out to situations where projects are delayed, or run behind schedule<sup>46</sup>. Such delays are very expensive as oil rigs rent for around \$1.2m a day<sup>47</sup>. If nothing is done, they have argued, there will be a slowdown in reserve replacements, a “capacity-shut-in”, and a major increase in operating costs within the next 5 to 10 years. A recent Financial Times article reported in fact project delays in Algeria and Abu Dhabi<sup>48</sup>.

Clearly, the most direct and immediate cost is that of additional hiring and replacement, as well as the increased salaries required to attract sufficient staff. A 2007 survey of 80 U.S. oil and gas companies (operators and service companies) reported that 69 per cent expect to encounter difficulties hiring and retaining employees over the next year<sup>49</sup>. Nearly 80 per cent expect to pay significant increases in pay for geologists, engineers and other professionals. A recent survey of ten major companies by Boyden showed petroleum engineers, on average, received a 16 per cent annual increase in salary in 2006. Petroleum geologists received a 15 per cent increase on average, and the rise for field engineers amounted to 20 per cent<sup>50</sup>.

Boyden also carried out an important study estimating the overall cost of the workforce shortage to the industry<sup>51</sup>. The study quantified the increase in hiring and replacement costs (salaries and bonuses), resulting from the skills shortage, as well as the cost of extra training and lost productivity. It also calculated profits lost due to inexperienced staff. Their analysis was based on a survey of 10 oil and gas companies in the USA. The study concluded that the US oil and gas industry lost between \$4 and \$5 billion US dollars in 2006 as a result of the skills shortage<sup>52</sup>.

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<sup>46</sup> Little, Arthur D. : “Bridging the talent gap” (Arthur D. Little, London, 2008), p.5

<sup>47</sup> Financial Times : “Warning over oil industry skills shortages” (London, July 30 2008), p.2

<sup>48</sup> Financial Times: “Shortage of skilled staff hits oil projects” (London, October 4 2007), p.7

<sup>49</sup> Grant Thornton: “The 2007 Grant Thornton survey of upstream U.S. energy companies” (Grant Thornton International, 2007)

<sup>50</sup> Gould, op.cit., p. 15-17

<sup>51</sup> Ibid.

<sup>52</sup> Ibid.

This sum of money may appear not that large relative to the benefits of higher oil prices, but it is nevertheless rather substantial. An innovative study by Petroskills focused on the following question: What are the costs to the industry if the percentage of inexperienced people employed is high? The study starts with the observation that, currently, around 20 per cent of professionals in the oil and gas industry lack the necessary experience. The only other time in the past when this was the case was during the oil boom of the late 1970s and early 1980s. So the methodology of the study was to calculate the cost, at that time, of the industry having to rely on that many inexperienced people. It answers this question by focusing on drilling performance (or efficiency) for which it has good statistics on output and the number of staff since the 1950s. These showed that drilling performance declined during the earlier boom, and also during the current boom. The data for 2005, for example, showed the largest decline in drilling efficiency since the 1950s.

The study traces the lack of performance on the increasing lack of experience of professionals in the industry at that time: misdiagnosed projects, completions improperly designed, logs improperly analyzed and facilities over- or under-designed.

The Petroskills study estimated that a reduction of around 20 per cent in experienced personnel will result in a 20 per cent reduction in performance, which would entail a cost of U.S. \$35 billion to the industry per year<sup>53</sup>.

This is a much higher figure than that of the Boyden study. It is difficult to decide which one is closer to the real cost. But the important thing is that, whichever is more realistic, both figures represent very large sums of money.

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<sup>53</sup> Ford Brett, *op.cit.*, p.3

## 5.0 Measures to close the skills gap

Which measures are best suited to deal with the skills shortage? Below is a list of recommendations, seven in total. Some of these are already being tried out by the industry, others not yet but are being discussed and evaluated.

As is made clear here, there is not one single recommendation that will suffice to reduce the crisis to a manageable problem. The industry and other actors have to work on many fronts simultaneously.

### 5.1 Make human resources a strategic boardroom issue

First, human resource planning has never been an issue which is handled by the highest level of decision makers in the industry. The oil and gas sector is very capital-intensive, and much of the attention of company boards and top management is focused on investments. Human resources planning is often considered an issue of secondary importance, which can be dealt with by management at lower levels. Human resources planning played a relatively minor role in their overall operations because it was easy to secure the staff required<sup>54</sup>.

As shown here, the growing scarcity of qualified staff can have major, and very costly, repercussions for the industry. Thus it becomes essential for human resource planning to become an integral part of strategic planning.

The recent study of skills shortages in the oil and gas sector by the Energy Institute had as its most important recommendation that strategies to tackle skills shortages should be dealt with by board rooms not delegated to lower level management<sup>55</sup>.

It is increasingly clear to the industry that their human resources planning needs to be upgraded in the corporate

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<sup>54</sup> Booz & Allen and Hamilton, op.cit., p.5

<sup>55</sup> Energy Institute, op.cit., p.7

structure. A project can fail because of a human resource oversight. Companies like Total have already made human resources planning an integral part of their long-term strategic planning, and others may want to move in the same direction<sup>56</sup>.

## **5.2 More training courses everywhere**

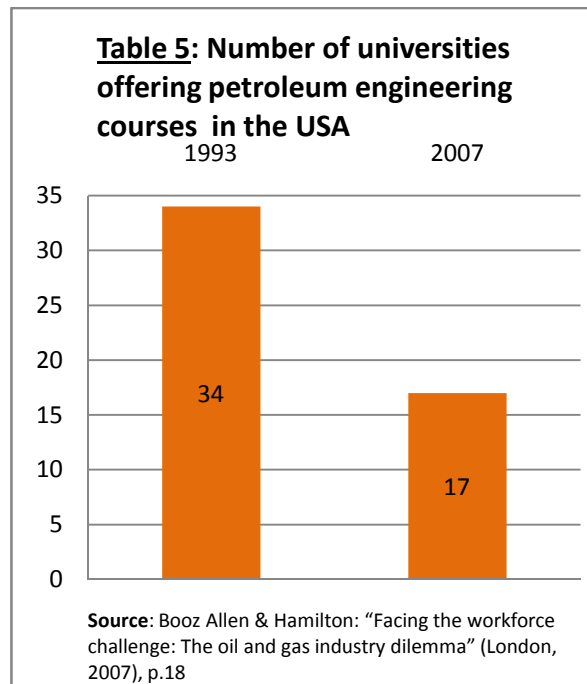
It is also clear that the supply of education and training facilities needs to increase. As shown here, there are not enough institutions to provide the education and training that is required. Such an expansion should not only be envisaged in the high-income countries, where the bulk of training is now taking place, but also in the low-income countries. Going that road is often seen as too much of a challenge because of a lack of funding and poor infrastructure. But the counter argument is that the skills crisis is too important to ignore the possibilities of offering training in countries with huge populations of young people eager to have access to training and jobs.

### **5.2.1 Training in the high-income countries**

Since the 1980s, the number of petroleum engineering courses in the high-income countries has declined substantially. With the slump in the industry, recruitment went down and a growing number of universities dropped these courses. For example, the number of U.S. universities offering petroleum engineering courses declined from 34 in 1993, to 17 in 2007 (Table 5).

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<sup>56</sup> Interview with Francois Viaud in *Talent and Technology*, vol. 1,no.1, (Society of Petroleum Engineers, 2007), p. 3



Some progress is already being made in setting up new courses to counter falling levels of university enrollment in the high-income countries. For example, a 2007 survey of student enrollment in geology, geophysics and petroleum engineering worldwide showed an increase of 30-40 per cent compared to 2004<sup>57</sup>. And 5,000 more students graduated in 2007.

Whether or not this increase will reduce the skills gap in a significant way depends on how many graduates will be siphoned off by other sectors. It has been reported that consulting and investment banking lure many graduates as do the nuclear, telecommunications, defense and other high-tech sectors<sup>58</sup>.

Another key issue is the quality of education. In a recent survey, company executives in Europe were asked the following question, "Which measure do you consider to be particularly effective in order to counter the growing scarcity of qualified specialist workers?" The results of the survey showed that the improvement of school education

<sup>57</sup> Abdul-Jaleel Al-Khalifa, op.cit., p.1

<sup>58</sup> Ibid.

is considered the most effective measure<sup>59</sup>. Sixty-nine per cent of the respondents believe that this is an effective means of tackling the skills shortage. On the other hand, only 35 per cent consider that increasing the number of students will be effective.

This finding is rather important. Companies are generally of the view that raising the quality of education is more important than raising the number of students. This is consistent with observations made here elsewhere, that many executives consider technical education often to be too theoretical, and less geared towards developing practical skills.

Another important finding from this survey is that more than half, 57 per cent, of the companies consider that the skills shortage can also be countered by improving training within companies. They consider it more effective to improve training than to keep older workers beyond their retirement (only 44 per cent reported this as being effective).

## **5.2.2 Training in low-income countries**

A recent survey of the skills in the oil and gas industry came to the conclusion that training programmes in low-income countries are one of the three most important elements of an effective strategy to reduce the skills gap<sup>60</sup>.

Such action poses of course big challenges. The lack of an adequate infrastructure, scarce teaching personnel and little funding are all important obstacles that need to be overcome. But recently, a number of initiatives have been developed to establish new centres of teaching in low-income countries, often in close collaboration with universities or training

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<sup>59</sup> Adecco: "Facing Europe's demographic challenge: The demographic fitness survey 2007" (Adecco, London, 2007), p.12

<sup>60</sup> Little, Arthur D., op.cit., p. 4

institutions of high-income countries. Established schools in high-income countries - such as Texas A&M University, Colorado School of Mines and Imperial College of London – have collaborated with institutions in countries such as Azerbaijan, India and Malaysia to produce many new graduates<sup>61</sup>.

A successful example of providing training of local professionals in a low-income country is the collaboration between the Institut Français de Pétrole in France and the Agostinho-Neto University in Angola<sup>62</sup>.

Different training models have been proposed for the low-income countries, each with different implications in terms of cost and the level of coordination<sup>63</sup>. There is the so-called *off-shore campus model* where a university based in an OECD country collaborates with a national oil company, or government, in a non-OECD country to set up a local campus specializing in petro-technical education. A second option is an offshore programme which involves direct collaboration between a university based in an OECD country and a university in a non-OECD country. This can involve either the award of a degree recognized by both institutions, or the oversight of a local programme by the OECD-based university. Finally, the third model is best characterized as a *visiting-academic programme*. It is the simplest model with a local university engaging a visiting academic to lecture at the host institution<sup>64</sup>.

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<sup>61</sup> Abdul-Jaleel Al-Khalifa, op.cit., p.1

<sup>62</sup> Ibid.

<sup>63</sup> Ibid.

<sup>64</sup> Ibid.

## 5.3 Make the industry more attractive to the young generation

### 5.3.1 Reaching out to Generation Y

As mentioned before, there are some fundamental differences in priorities and preferences between the generation of professionals now exiting the industry and Generation Y. Generation Y tends to aim for long-term career development, variety of experiences, a sense of purpose and meaning in their work, open social networks and a favourable work/life balance. A recruitment drive which does not address these principles will fail to reach this generation. The industry needs to learn how to communicate to them.

Deloitte has proposed a strategy for getting young people involved in the oil and gas industry<sup>65</sup>. It proposed a Develop – Deploy – Connect Talent Management framework to achieve this<sup>66</sup>. Companies can “develop” prospective young workers by providing them with active learning opportunities, “deploy” them by designing effective organizational environments, and “connect” them by creating infrastructure to foster collaboration.

The strategy should not be seen as a tactic to produce quick fixes, but as something which companies need to incorporate into the underlying values of their organizational culture.

It is not only that the industry needs to do work to change the image of the industry among the young generation. It also needs to adapt the corporate culture, job content and work methods more to the interests and concern of this generation<sup>67</sup>. The two should go hand in hand.

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<sup>65</sup> Deloitte : « The talent crisis in upstream oil and gas : Strategies to attract and engage generation Y” (Deloitte, 2005), p.1

<sup>66</sup> Ibid.

<sup>67</sup> Bullock, op.cit., p.1

### **5.3.2 Tackling the image problem**

Another important measure to increase the talent supply is to develop initiatives to enhance the image of the industry among the young. As pointed here, many people of this generation perceive the industry in negative terms, and prefer to start their careers elsewhere. The young generation today is more concerned about environmental issues than the previous generation, and the fact that the oil and gas industry is often seen as damaging the environment points to the need to develop an effective and balanced public relations campaign.

A proposal made recently is that universities, next to providing the traditional curriculum for petroleum engineers, also offer a new university curriculum for “future energy professionals”<sup>68</sup>. This would include the usual subjects of engineering but include as well other subjects that engage the younger generation. Courses such as alternative energy and carbon footprints/CO<sub>2</sub> sequestration would be part as well.

## **5.4 Changing recruitment strategies**

Traditionally, the industry has hired male graduates from petroleum engineering and related disciplines, with some years of experience, for the purpose of full-time and long-term employment, often as an expatriate. This pattern now has to be broken. Human resource planners need to contemplate recruitment which many would consider atypical.

### **5.4.1 Getting the inexperienced on board**

Industry executives are aware that new graduates in petroleum engineering and related subjects do not

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<sup>68</sup> Abdul-Jaleel3 Al-Khalifa, op.cit., p.2

have the same practical skills as those who graduated 10 or 15 years ago. In the past years, they have given less preference to hiring graduates straight from the university. But, it can be argued that to resist hiring the inexperienced is a luxury the industry cannot afford. It needs to reach out to these people, more than before.

As John Ryder, Vice-President of human resources at Champion Technologies, has put it aptly, “Basing a recruitment strategy on simply recruiting experienced professionals (from the competition) is not a recipe for success in today’s market”<sup>69</sup>.

More and more companies are now realizing that people with practical skills are simply not available, and they have started to hire more recent graduates from a variety of disciplines, and to expand their own training, combining classroom with on-the-job experience.

Well-focused training programmes have the potential of making recent graduates more employable in the industry. In 2007 Shell announced that it is returning to active university recruiting and it announced a target of 1,100 engineers (700 graduates and 400 mature recruits) for 2007<sup>70</sup>. Other companies have also stepped up their own training. Shell, Exxon-Mobile and BP have all set up new training initiatives in recent years. Shell, for example, has opened its Learning@EpiCentre in Rijswijk (The Netherlands) with a capacity to train 270 students per day (5000 per year).

Graduates with non-traditional backgrounds should not be shunned. The industry must broaden the range of educational majors it considers for future employment. Employers, unable to find trained petroleum engineers, are already recruiting civil engineers in fairly significant numbers<sup>71</sup>.

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<sup>69</sup> Ryder, op.cit., p.2

<sup>70</sup> Booz & Allen and Hamilton, op.cit., p.12

<sup>71</sup> Pyron, op.cit., p.2

## 5.4.2 Recruiting more women

Female engineering students who would qualify for employment in the industry, are little motivated to enter and seek a career. The industry is often seen as being male-dominated, probably more so than others. Women face extra difficulty in “breaking the glass ceiling”, and they take the view that they are less likely to make a successful career.

The oil and gas industry can reduce its skills shortages by developing and implementing a strategy to draw more professional women into employment. Few female professionals are employed at the moment. The oil services company Schlumberger reported that only about 15 per cent of its workforce was female in 2007 which, as it pointed out, was nevertheless a relatively high proportion by industry standards<sup>72</sup>.

Developing such a strategy will not be as difficult as it seems given that women constitute a significant proportion of students enrolled in engineering courses. This proportion remains low in Europe and the USA, below 20 per cent<sup>73</sup>. But the proportion is much higher in countries like Egypt, Indonesia, Libya, Malaysia and Turkey<sup>74</sup>. In some Asian countries, the proportion of women and men is approximately equal<sup>75</sup>. At Kuwait University, female students make up the majority of students working toward petroleum engineering degrees<sup>76</sup>.

Some companies have already adopted such a strategy and they have been successful in increasing the percentage of professional women hired. US based companies seem to have made more headway in targeting female recruitment. ExxonMobil, for

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<sup>72</sup> Schlumberger: 2007 Annual report (Schlumberger, 2007), p. 9

<sup>73</sup> Ibid.

<sup>74</sup> Sprunt, Eva: “Women will play a major role in the workforce of the future” *Talent and Technology* (Society of Petroleum Engineers, 2007), p.1

<sup>75</sup> Schlumberger, op.cit., p.9

<sup>76</sup> Sprunt, op.cit., p.1

example, reported that 42 per cent of its recruits in 2004 were women<sup>77</sup>.

#### 5.4.3 Hiring beyond the retirement age

Another means of reducing the shortage to retain staff beyond the normal retirement age. Early retirement can be limited, retirement dates can be postponed or retired employees may be called back. It has been reported that professionals stay current in their knowledge up to 10 years after leaving the industry<sup>78</sup>. If this is the case, it would appear that there is indeed a very large pool of potential talent from which to draw.

In an interview for *Talent and Technology*, Clarence Cazalot (then chairperson of London-based Texaco Ltd) stated that the foremost solution to the skills crisis was to retain older professionals past the normal 55-60 year retirement age<sup>79</sup>. This would buy the industry another 5 years, and give it the time to seek a more permanent solution.

#### 5.4.4 Recruiting elsewhere: Looking East

Many companies are already recruiting many of their staff outside the countries where they have their home base. ExxonMobil, for example, recruited more than 2,400 professionals in 2005. More than 70 per cent of the newly-hired were recruited outside the United States<sup>80</sup>.

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<sup>77</sup> McGill, Stuart: "Energy industry offers limitless opportunities for technical professionals" *Talent and Technology* vol.1, no.1 (Society of Petroleum Engineers, 2007), p.2

<sup>78</sup> Young, Cathy : » Bridging the age gap » *Talent and Technology* vol.1, no.3 (Society of Petroleum Engineers, 2007), p.1

<sup>79</sup> Cazalot, Clarence : »The major challenges facing the industry" *Talent and Technology* vol. 1, no.1 (Society of Petroleum Engineers, 2007), p. 2

<sup>80</sup> McGill, Stuart:"Energy industry offers limitless opportunities for technical professionals" *Talent and Technology* vol.1, no.1 (Society of Petroleum Engineers, 2007), p.1

A recent survey among members of the Society of Petroleum Engineers (SPE) found that more than 42 per cent of those working outside the U.S.A. did not work in their country of birth<sup>81</sup>.

Growing opportunities exist to expand recruitment in countries such as India, China and Russia.

Rich Ruggiero at Gaffney, Cline & Associates, a petroleum industry consultancy, was quoted in the Financial Times as saying China will produce as many as 500,000 energy graduates between now and 2010<sup>82</sup>. It is already apparent that the inflow of recent Chinese graduates has expanded the capacity of Chinese companies to offer their services in such places as the Middle East, Canada and parts of Africa.

The Moscow Institute of the Petrochemical and Gas Industry has an enrollment of 8,000 students and is adding 1,500 more each year<sup>83</sup>.

Petrofed reported that the Indian educational system produces each year more than 400 graduates in geo-science courses related courses<sup>84</sup>.

Many students in the developed world consider science and engineering too difficult. But in other parts of the world, particularly China and India, the hard subjects are still attractive to large numbers of very able students<sup>85</sup>.

Developing a recruitment strategy in these countries is of course not without its limitations and problems. Most of these graduates will make their first career stop in their country of origin. Besides, there is a

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<sup>81</sup> Daneshy, op.cit., p.1

<sup>82</sup> Financial Times, March 28 2005, op.cit.

<sup>83</sup> Booz & Allen and Hamilton, op.cit., p.18

<sup>84</sup> Petrofed, op.cit., p.9

<sup>85</sup> Meggs, Tony: "Inspiring the next generation" *Talent and Technology* vol.1 no.2 (Society of Petroleum Engineers, 2007), p.1

language problem. Many of the graduating students from China and Russia will not sufficiently master English which is an essential requirement for the industry.

Another issue is that many industry practitioners question the caliber of the training programmes and the quality of output in these countries<sup>86</sup>. However, there is a growing trend of IOCs developing partnerships with local institutions to improve quality. A number of operating and service companies have already established technology and engineering centres in India and are supporting petroleum engineering education in China<sup>87</sup>.

#### **5.4.5 Recruiting in other low-income countries**

There is now growing interest in exploring the possibility of extending recruitment in low-income countries, in particular those with important hydrocarbon deposits but where educational facilities are inadequate (e. g. Nigeria, Angola, Indonesia and the Sudan)<sup>88</sup>.

Most companies are still hesitating as they consider that such initiatives will face many stiff challenges. The educational infrastructure is poor in most of these countries, teaching staff is scarce and there is a serious lack of funding. But, as some have pointed out, it is a question of whether the industry can afford to ignore this option given the magnitude of the skills gap.

Also, there are growing pressures from the governments of these countries for the international oil companies to play an active role in expanding education and training opportunities.

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<sup>86</sup> Abdul-Jaleel Al-Khalifa, op.cit., p.2

<sup>87</sup> Daneshy, op.cit., p.1

<sup>88</sup> Abdul-Jaleel Al-Khalifa, op.cit., p.2

Adam Lomas, Director of Learning and Development for Shell EP, was quoted in a recent Booz Allen and Hamilton report as saying: “ Resource-rich countries, particularly in the Middle East where 50 per cent of the world’s remaining reserves are located, increasingly expect IOC’s to guarantee the development of the local workforce. Companies which recognize this as a major source of future talent will gain a competitive advantage, companies which do not will not be welcome in the future”.

A growing number of oil-rich, low-income countries are stipulating local content requirements for the oil and gas industry, for example by introducing targets and quotas for the training and hiring of nationals. While many companies have a rather skeptical view of local content requirements, it is increasingly recognised that an effective strategy for meeting these requirements generates several benefits. Companies which develop a good track record in fulfilling these requirements will not only be able to recruit more labour. Such training will also be beneficial in developing good working relations with local government. Also, employees with local knowledge are also of crucial importance when building business sustainability and working with local subcontractors, unions, and community stakeholders<sup>89</sup>. Another advantage is that a majority of the technical training in petroleum and other engineering disciplines can be provided in any part of the world and often at a much lower overall cost than in Europe or the U.S.A.

Oil and gas companies should explore the possibilities of extending recruitment to these countries. This could go hand in hand with an enhanced programme of in-house training to compensate for any weakness in the training of these workers.

Ernst & Young propose that regional recruitment

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<sup>89</sup> Booz & Allen and Hamilton, op.cit., p.14

directors are appointed to allow companies to recruit from a wider geographic area<sup>90</sup>.

Some oil and gas companies have an established policy to recruit in a wide geographical area, and in particular in the countries where they operate. For example Schlumberger, a major services company, reports that 40 years ago it adopted a policy to “hire engineers in every country in proportion to the size of its business within that country”<sup>91</sup>. In 2007, representatives of the company made more than 1,100 trips to nearly 280 universities in approximately 50 countries.

## **5.5 Introduce more labour-saving technologies**

Companies may also respond to the skills shortage by increasing automation so as to make work procedures more efficient. Some companies have already turned to new technology to minimize the number of skilled staff they require. For example, the “digital oilfield” is allowing projects to be operated with fewer engineers on the ground<sup>92</sup>. Others are developing partnerships with universities and service companies to increase their capacity to deliver.

Although labour-saving initiatives will reduce labour demand, it is unlikely that they alone are sufficient to close the skills gap. A recent study concluded however that, although substantial progress has been made to increase efficiency, the improvements are not nearly sufficient to reduce current skills shortages<sup>93</sup>.

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<sup>90</sup> Pyron, op.cit., p.2

<sup>91</sup> Schlumberger, op.cit., p. 7

<sup>92</sup> Financial Times, March 28 2005, op.cit.

<sup>93</sup> Little, Arthur D., op.cit., p.3

## 5.6 Poaching is not a solution

Finally, it is also important to mention what should not be considered as a solution to the skills crisis.

What we see often is that oil and gas companies poach top talent from competitors as their main response to the talent crunch. There is much anecdotal evidence of companies luring experienced engineers from their competitors with substantial increases in salaries and benefits. An Ernst & Young survey among 22 top oil and gas companies considered that talent competition from rival companies is “challenging or significantly challenging”<sup>94</sup>.

Another survey, among 300 oil and gas companies around the world, provides further insights<sup>95</sup>. The table below shows that luring professionals from competitors, and other industries, is considered one of the key solutions to the talent crisis. A high 68 per cent of the companies interviewed hold this opinion. A further 32 per cent said they would also consider recruitment from suppliers and customers. More training is also identified as a possible solution, but by a much smaller percentage of companies.

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<sup>94</sup> Pyron, op.cit., p.2

<sup>95</sup> Energy Institute, op.cit., p.8

**Table 6: Views of oil and gas companies around the world on the effectiveness of measures to counter skills shortages, 2007**

<b>Measures to counter skills shortages</b>	<b>Percentage of oil and gas companies considering it as a possible solution</b>
External recruitment from competitors and other industries	68
Internal cross skilling and leadership programmes	61
Greater use of remoter and virtual working places	50
Increase use of technology	46
External recruitment from suppliers and customers	32

**Source:** Energy Institute: "Skills needs in the energy industry" (Energy Institute, London, 2008), p.8

It is interesting to contrast these findings to those of another survey, across industries, including all others besides gas and oil. Adecco carried out a European survey on the skills crisis in 2007, interviewing 2,500 companies from all industries<sup>96</sup>. The results of this survey reveal quite a different picture.

Whereas oil and gas industries put the emphasis on hiring from competitors and suppliers, European industries stress the need to improve the quality of education. Sixty-nine per cent of the companies interviewed said that improving school education can be effective in reducing skills shortages. Only 37 per cent said that using the services of external employment agencies, i.e. one form of attracting staff from competitors, is useful.

<sup>96</sup> Adecco Institute : « Facing Europe's demographic challenge : The demographic fitness survey 2007 » (London, Adecco, 2007)

**Table 7: Measures to counter the global skills gap: Percentage of companies considering these measures as effective (data from 2,500 European companies, 2007)**

<b>Measures to counter the global skills gap</b>	<b>Percentage of companies considering this measure effective (%)</b>
Improve school education	69
Improve human resource development within companies	58
Keep the older work force longer in the job	58
Train more women in technical professions	53
Services provided by private employment agencies	37

Question: *“Which of the following measures/strategies do you consider to be particularly effective in order to counter the growing scarcity of qualified specialist workers?”*

**Source:** Adecco Institute: “Facing Europe’s demographic challenge: The demographic fitness survey 2007 (Adecco, London), 2007

This points out that oil and gas companies are more inclined to adopt poaching as a measure to deal with their skills shortages. However, is it a solution? It would seem that this might provide temporary relief to individual companies, but it cannot be considered a viable long-term solution. It does not address the fundamental problem that overall supply is insufficient. Poaching is more a strategy for “riding out the storm”, assuming that the problem will eventually go away by itself. It ignores the fact that action needs to be taken to increase the supply of skilled personnel. Without such action, it is unlikely that a solution will be in sight.

Ali Daneshy, Director of the Petroleum Engineering Program at the University of Houston commented that

“Faced with a meager crop of graduating engineers in the U.S., staff snatching has become the order of the day. But taking people from one another does not solve the problem – it prolongs and exacerbates it. The people shortage will persist as long as there is a supply shortage<sup>97</sup>. What is more, poaching leads to a more rapid rise of salaries and benefits that oil and gas companies can only continue to pay for so long as oil prices and income remain high.

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<sup>97</sup> Daneshy, op.cit., p.1

## 6.0 Summary and conclusions

The ultimate question really is: Should the industry continue to prospect and recruit employees as it did before? Is it only a question of doing more of what is already being done?

The conclusion emerging here is that it would be incorrect to argue that the current strategy is correct, all that needs to change is to do “more of the same” The industry cannot continue to hire employees in the same way as it did before, because the professionals required are simply not there. It is also clear from the above that the current skills shortage cannot be eliminated with a single response. A multi-pronged strategy is required.

Training facilities need to be expanded, and not only in Europe and the U.S.A., but also in lower-income countries, particularly in those with oil and gas reserves. Campaigns need to be organized to enhance the image of the industry and point the young generation to the benefits of a career in the oil and gas sector. Work methods and organization need to change taking into account that the young generation seeks different objectives than those of previous generation. Recruitment needs to be intensified covering not only the traditional “search” regions (Western Europe and the U.S.A.) but also Asia, Africa and other developing regions. Recruitment policy also needs to change. Graduates with little or no experience should be given more consideration, and in-house training should be in place to enhance their employability. Recruitment strategies should be designed to attract more women to the industry, hiring beyond the retirement age should be given greater priority. The introduction of more labour-saving technology can also help in reducing the skills gap.

On the other hand, poaching of staff from competitors cannot be considered as a solution for the skills shortage. This mainly raises the costs of hiring staff, and does not resolve the main problem, i.e. a lack of supply.

There are however two important pre-conditions to make all this happen.

First, human resource planning has been, for many years, the step-child of the oil and gas companies. Being a capital-intensive industry, the boards of most companies focus on investment planning, marketing strategies and other key issues. Human resource planning is often relegated to lower echelons in the hierarchy.

This needs to change. Human resource planning needs to be upgraded to the board room. The proposals for closing the skills gap are unlikely to be implemented successfully unless they have the backing and support of the board room.

Second, another pre-condition for these policies to work is to set up mechanisms facilitating collaboration and coordination among oil and gas companies. Companies are now responding individually, and without coordination, to the crisis. Some are providing more training, others have become more active in recruitment, and still others have postponed retirement of their personnel. This is understandable but does this amount to a durable solution? Individual oil and gas companies “going at it alone”, may not be the best strategy. The impact will be larger if the industry takes joint action on any of these proposals.

There are many examples, from the past, of other industries facing serious challenges and deciding to join forces because the challenges are too big and individual responses not adequate. Abdul-Jaleel Al-Khalifa, President of the Society of Petroleum Engineers, addressed this question in a 2007 policy statement<sup>98</sup>. He argued that the market alone is unlikely to offer a solution to the skills gap the industry now faces. The problem is so serious that collaboration is required to find a way out.

So far, joint action by companies is very limited; it exists only in an ad-hoc fashion, sometimes between companies and academic institutions. For example, there is no formal mechanism to collect data from the companies and produce an accurate forecast of aggregated global demand and supply of talent. Data on employment and skills are very limited. Nor is there a forum to exchange views and insights on the skills crisis, and discuss initiatives. Others have also argued that individual companies have failed to make adequate

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<sup>98</sup> Abdel-Jaleel Al-Khalifa, op.cit., p.1

predictions of future demand for professionals. Similarly, there is little coordination in the matter of the industry image, an important deterrent of university recruitment.

Companies have much to gain by joining forces and tackling the challenges such as the skills gap through coordination and collaboration. As one Canadian human resource specialist recently said, "There needs to be a collaborative approach. There is simply no point driving the costs up for each other, shooting each other in the foot"<sup>99</sup>.

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<sup>99</sup> Booz & Allen and Hamilton, op.cit., p.20

## **B. LOCAL HIRING AND TRAINING IN THE SUB-SAHARAN AFRICAN OIL AND GAS INDUSTRY**

### **SUMMARY**

During the last 15 years, sub-Saharan Africa has witnessed an unprecedented boom in oil and gas production. Rapidly rising oil demand, particularly in China and India, and new technologies in oil exploration have made it profitable to extract oil and gas in countries where up until recent extraction costs were considered too high. As a result, the continent has seen the arrival of many international oil and gas companies, particularly in the Gulf of Guinea, and Chinese companies have now joined Western companies in developing exploration and production.

There are now 10 major oil producing countries in sub-Saharan Africa with oil production exceeding 60,000 barrels a day. Other countries are to join soon.

While the prospects for the energy industry look excellent, there are a number of important challenges which the industry faces in the region. Political uncertainty, corruption and violence are among the most important ones. Underlying these is the poor performance of oil and gas production in generating economic development of which the benefits are broadly shared by the local population.

But there are also other key challenges which the industry needs to confront. First, rising skills shortages have become one of the main problems facing the oil industry throughout the world. Producers in many regions have embarked on ambitious plans to raise production and capacity in order to meet growing global demand and to respond to the very substantial price increases witnessed recently. However, many producers will face growing difficulty in meeting their schedules and it may not be sufficient to simply pay higher salaries to secure enough personnel that are sufficiently qualified. Increasingly there are delays and contracts have to be re-negotiated. Of all the oil and gas producing regions, sub-Saharan Africa is the most affected.

The second challenge to the oil and gas industry in sub-Saharan Africa is the growing difficulty of meeting local contents requirements. Guidelines and quotas are increasingly imposed to hire a given percentage of workers locally and to buy a proportion of inputs locally. However, qualified workers are not available to meet both these targets. Governments are however stepping up demands for local content. They see it as an important means of promoting national development. Many of them face growing political pressure to ensure that the population gets an adequate share of the benefits of oil and gas production. The experience, so far, in many countries has been that oil and gas have contributed little, if any at all, to economic development and that poverty levels have remained stubbornly high.

At the origin of both these challenges is the lack of adequately trained professionals on the African continent. Few statistical data exist on the skills gap but numerous industry leaders have voiced their concern about the difficulties in finding adequate technical personnel. But, while the industry has recognised this constraint, there has not been any major initiative to redress the situation. Companies continue to rely heavily on expatriate labour and the few ad-hoc initiatives to train and hire local professionals are unlikely to bring about a major improvement.

Quite clearly, the low level of development in sub-Saharan Africa is the principal cause for the lack of skilled workers. Governments dispose of insufficient revenues to finance an adequate educational system. The level of public spending on education is very low. Oil and gas producing countries spend even less on education than the non-producing countries.

Next to university education, technical and vocational training (TEVT) provides a good opportunity to increase the supply of skilled workers. However, with government funding in short supply, the public system for vocational and technical training has a shortage of institutions and a poor level of organization.

But there are still other reasons why few African nationals take up skilled positions in the oil and gas industry. Many jobs are filled by expatriates because insurance companies do not provide coverage if they are taken up by locals. These companies do not recognize the diplomas of the local schools from which they graduate, even from schools that are considered to provide a good education.

Another factor contributing to the skills shortage is that oil and gas production uses increasingly advanced technologies and production techniques which requires a workforce with a continually increasing level of skills. Demand for skilled workers at the higher end of the skills range is rising faster. But these are the professions where the skills shortage is the largest. Employment of semi-skilled local people, which is more readily available, has been declining as the demand for higher skills has increased.

To develop more local talent in sub-Saharan Africa, this paper proposes a two-pronged strategy. First, a major new effort is needed to increase education and training by three of the main stakeholders: the oil and gas companies, the national governments of the energy producing countries in sub-Saharan Africa and the international community, including donors.

Several oil and gas companies have developed training programmes specifically geared towards African professionals. However, the scale of these programmes is rather small, and more efforts are needed to make a difference.

Several modalities have already been developed, and these can serve as a model. Oil and gas companies can link up with local university and training institutions to develop courses specifically designed to meet the skills requirements of the industry. The emphasis is here on developing local capacity to educate and train. A few major oil and gas companies have taken such initiatives and the experience has been promising so far. What is needed is that more companies follow this example. Another modality is in-house training by the oil and gas companies. Several companies have expanded their in-house training programmes: sometimes in the African countries where they operate, while others have sent their African professionals to projects elsewhere to receive training. A third modality is to outsource training of African professionals to the growing number of training institutions around the world. Finally, oil and gas companies can also provide training within the framework of local content requirements. Partnerships may be developed with local service companies to provide targeted education and training programmes.

African governments also have a role to play in developing local talent for the oil and gas industry. Their funding capacity has been strengthened as a result of renewed economic growth, not only in the oil producing countries but also elsewhere on the continent. New opportunities are being created to set new priorities and strengthen the education and training system. The key challenge is to design programmes that are responsive to the labour market and that focus on the skills that are scarce.

Finally, there is a role to be played by the international community, and in particular donor countries. Technical skills development in Africa was a key sector for donor support in the 1960s and early 1970s. Since then, donors lost interest as they had other priorities. But this has changed now, and technical skills development is back on the international agenda. There is growing orientation towards the world of work and a growing emphasis on the need for employable skills. And there is renewed interest among governments and donors in developing both technical education and vocational training systems. To take advantage of this momentum, initiatives should be explored with the international community to develop new training programmes.

The second pillar of the strategy proposed here is to develop closer coordination between oil and gas companies to increase the pool of talent. The level of collaboration between oil and gas companies is not as strong as in other industries. A World Bank survey on collaboration and partnership among oil and gas companies showed that most had adopted a strategy of “going at it alone”. It also found that overlap and lack of coordination created problems that were hindering the effective implementation of training and other initiatives.

Oil companies need to explore the opportunities of initiating training and activities jointly with other companies in the industry, with public institutions and other relevant entities to seek an effective implementation of their projects.

In order to facilitate such coordination and joint action, it is recommended to establish a regional institution on energy production in sub-Saharan Africa. Such an institution, set up with financial support from the oil and gas companies operating on the continent, could be established in one of the oil producing countries. Its objective could be several. First, the

institute could act as a clearing house for information and statistical data on oil and gas in Africa. The lack of statistical data is a serious obstacle in planning future activities to address the skills gap. Second, it could serve as a catalyst to set up projects to expand education and training programmes which meet the demands of the industry. Initially this institution could focus on the skills gap, and later on address other challenges by facilitating a joint response by the oil and gas companies.

## Introduction

During the last 15 years, sub-Saharan Africa has witnessed an unprecedented boom in oil and gas production. Rapidly rising oil demand, particularly in China and India, and new technologies in oil exploration have made it possible to extract oil and gas in countries where up until recent extraction costs were too high. The continent has seen the arrival of many international oil and gas companies, particularly in the Gulf of Guinea. Chinese companies have now joined Western companies in developing new production sites. In 2007, the continent produced 12.5 per cent of the world's oil and it is estimated to account for around 30 per cent of the increase in global production during the next two years (Green, 2008).

At the moment, there are 10 major oil and gas producing countries in sub-Saharan Africa (table 1). Energy production was already well-developed in Angola, Gabon and Nigeria in the 1960s. The Republic of Congo and Cameroon joined in the 1970s, while Equatorial Guinea and Sudan became energy producers in the 1990s, with Cote d'Ivoire and Chad being the latest countries with oil production exceeding 60,000 barrels a day. Uganda, the Democratic republic of Congo, Ghana and Niger are to join soon.

**Table 1: Oil and gas production in Africa, 2007**

Country	Oil production (thousand barrels per day)	Gas production (billion cubic feet per year)
Nigeria	2352	996
Angola	1769	28
Sudan	466	--
Equatorial Guinea	400	46
Congo, Rep. of	250	4
South Africa	200	78
Gabon	237	--
Chad	144	--
Cote d'Ivoire	102	46
Cameroon	83	--

Source: United States Energy Information Administration: Country energy profiles at <http://tonto.eia.doe.gov/country/index.cfm>

While prospects for the energy industry look excellent, there are a number of important challenges which the industry faces. Political uncertainty, corruption and violence are among the most important ones. Underlying these is the poor performance of oil and gas production in generating economic development of which the local population gets a fair share.

But there are also other key challenges which the industry faces. Two of these challenges will be discussed here. These are the rising skills shortages in the African oil and gas producing countries, and the growing difficulty of meeting local content requirements. Both problems are related, in the sense that skills shortages are one of the main reason why local content requirements are not being fulfilled.

The growing skills gap has become one of the main problems facing the oil industry throughout the world, not only sub-Saharan Africa. With energy prices on the rise, producers in many regions have embarked on ambitious plans to raise production. However, many producers face growing difficulties in meeting their production schedules and many have found out that simply paying higher salaries is not sufficient to secure enough personnel. Increasingly there are be delays and contracts need to be re-negotiated (Financial Times, 2007). Some analysts have pointed out that the skills shortage is seriously constraining the industry and that there are a growing number of situations were projects have been delayed, or run behind schedule (Little, 2008).

To meet growing energy demand, the rush is on to find and exploit additional oil and gas reserves. Oil exploration and production is likely to increase significantly in the coming years, but this requires more petroleum engineers, production engineers, drilling crews and geoscientists.

The global skills shortage affects in particular sub-Saharan Africa. Other regions can rely more on locally trained professionals to meet skills demand. But this continent has few people sufficiently trained in the oil and gas industry and companies have traditionally resorted to expatriates to fill most of their positions. Its oil and gas industry is more dependent on expatriate labour than that of any

other energy-producing regions. Expatriate workers have always been part of the scene in sub-Saharan Africa, but with the growth of the oil and gas industry, this reliance is likely to become more even important.

The second challenge to the oil and gas industry in sub-Saharan Africa is that the lack of skilled personnel is making it more difficult for companies to meet local content requirements. Guidelines and quotas are increasingly imposed to hire a fixed percentage of workers locally and to buy a certain proportion of inputs locally. Governments are now stepping up demands for local content as part of a wider strategy to enhance the contribution of oil and gas to economic development. Many of them face growing political pressure to ensure that the population gets a fair share of the benefits of oil and gas production. The experience in many countries has been that oil and gas have contributed to economic growth but not to economic development, in the sense that poverty levels have remained stubbornly high. As table 2 below shows, the oil-producing countries of sub-Saharan Africa have indeed experienced much higher levels of GDP growth in recent years, but poverty levels have continued to be higher than elsewhere on the continent. Annual GDP growth was an average 6.5 per cent in the ten oil and gas producing countries during 1999-2007, as compared to only 3.8 per cent in the non-producing countries. But, the percentage of the population below the national poverty line has remained higher in the producing countries, 52.0 versus 48.6 per cent.

**Table 2: GDP growth and poverty levels**

<b>Sub-Saharan region Oil and gas producing countries</b>	<b>Annual real GDP growth (average 1999-2007)</b>	<b>Population below the national poverty line (%)*</b>
Angola	10.8	68.0
Cameroon	3.7	40.2
Chad	8.3	64.0
Congo, Rep of	3.4	50.1
Cote d'Ivoire	0.0	38.4
Equatorial Guinea	21.7	76.8
Gabon	0.5	33.0
Nigeria	4.9	54.4
Sudan	7.4	...
South Africa	4.0	43.3
<i>Average</i>	6.5	52.0
<b>Sub-Saharan region Average non-oil and gas producing countries (38)</b>	3.8	48.6

\*Latest figures are reported

**Source:** African Development Bank: Statistical Database (various tables) at [http://www.afdb.org/pls/portal/docs/PAGE/ADB\\_ADMIN\\_PG/DOCUMENTS/STATISTICS/SELECTED%202008\\_WEB.PDF](http://www.afdb.org/pls/portal/docs/PAGE/ADB_ADMIN_PG/DOCUMENTS/STATISTICS/SELECTED%202008_WEB.PDF)

Local content requirements can result in more employment generated for local workers. As table 3 shows, the percentage of total employment generated by the oil and gas industry is extremely small compared to the percentage of GDP it produces. The extractive industries generate much less employment than nearly all other industries in developing countries. For \$1 million of outward foreign direct investment stock, the extractive industries generate 2.5 jobs whereas manufacturing creates 23.8 jobs (UNCTAD, 2007, p.11).

**Table 3: Employment and Output (% GDP) of the oil and gas industry, selected African countries, 2005-06**

Country	% labour force employed in the oil and gas industry	% GDP generated by the oil and gas industry
Equatorial Guinea	4	86
Angola	5	54
Nigeria	0.17	37

**Source:** Data for Equatorial Guinea are from UNCTAD, 2007, p.134; Angolan and Nigerian data are from (Amadi, Germiso, & Henriksen, 2006) and the US Department of State, at <http://www.state.gov/r/pa/ei/bgn/2836.htm>

The oil and gas industry has recognised the skills constraint, but so far it has not initiated any major initiative to redress the situation. Companies continue to rely heavily on expatriate labour and new initiatives to train and hire local professionals are too few, and ad-hoc, to bring about a major improvement.

This paper will examine the shortage of trained professionals from sub-Saharan Africa and how this affects oil and gas production. It will also analyze how the shortage affects the implementation of local content requirements. The next section presents data on the magnitude of the shortage, while section 3.0 focuses on the causes. Section 4.0 focuses on local content requirements and the problems to implement quotas and targets. Section 5.0 makes a number of recommendations to increase the number of trained professionals from the continent.

## 1.0 Magnitude of the local skills gap

There is hardly any quantitative information on the magnitude of the skills gap in sub-Saharan Africa. One possible indicator is the percentage of the labour force in the industry which is expatriate, but even that information is difficult to find. Table 4 gives those data for the Angolan oil industry in 2002, and it shows that the percentage of expatriates is quite low among the lower-skilled technical workers, 18

per cent. It is much higher among the engineering workforce; more than half of the engineers were expatriate workers in 2002. These data go back six years ago and it is quite probable that the percentage foreign workers has increased since. Oil production in Angola has more than doubled since 2002 (Energy Information Administration, 2008), and with demand for skilled workers rapidly rising it is very likely that the percentage of expatriate workers increased as well. BP Angola, for example, reported that out of the 820 people it employed in Angola in 2007, only 360 were nationals (British Petroleum, 2008).

**Table 4: Employment in the oil sector by nationality and occupation\*, Angola, 2002**

	<b>Total number</b>	<b>Angolan nationality (%)</b>	<b>Other nationalities (%)</b>
<b>Skilled workers</b>			
Operators	2364	79	21
Mechanics	701	91	9
Electricians	588	74	26
Construction	496	96	4
Welders	2371	85	15
<i>Sub-total</i>	6520	82	18
<b>High-skilled workers</b>			
Operators	353	4	96
Mechanical	139	45	55
Electrical	178	54	46
Engineering	265	65	35
Geology	298	63	37
Others	245	41	59
<i>Sub-total</i>	1478	47	53
<b>Finance and administration workers</b>	1854	88	12
<b>Other</b>	3821	90	10
<b>Grand Total</b>	13673	82	18

\*Upstream activities only

**Source:** Pereira da Costa Barroso Mangureira, José, 2004: "Políticas de formação e endogeneização de capital humano em países em desenvolvimento: O caso de indústria petrolífera em Angola" Masters dissertation in engineering and management of technology, p.52, Universidade Técnica de Lisboa, at [http://in3.dem.ist.utl.pt/master/thesis/02files/jmangureira\\_tese.pdf](http://in3.dem.ist.utl.pt/master/thesis/02files/jmangureira_tese.pdf)

It is likely that the lack of local talent affects national oil and gas companies more than international ones. The international companies operating in sub-Saharan Africa have most of their

employees based outside the region, where the supply of skills is of course less restrictive. National oil companies in Africa have most of their operations based in the country of origin. For example, the Norwegian oil company Statoil has substantial operations in Angola and Nigeria but the proportion of its total staff located there is very small (table 5).

**Table 5: Investment and staff employed of Statoil, selected countries, 2006**

Country	Investment (NOK million)	Staff employed (at 31.12.2006)	Ratio of investment to staff employed
Angola	5,016	19	264
Nigeria	2,074	49	42
Norway	37,981	18,102	2

Source: Statoil: Mastering challenges: Statoil and sustainable development 2006 (Statoil, Stavanger, 2006), p.65

Another reason why national oil companies are more exposed to the skills gap is that they have production processes that are more labour-intensive. They have less capital-intensive technologies than international companies (UNCTAD, 2007).

The percentage of oil and gas production in Africa which comes from national companies is high. The 2007 World Investment Report estimates that these companies produced more than 40 per cent of oil and gas in Africa in 2005 (UNCTAD, 2007, p. 106).

## 2.0 Causes of the skilled workers shortage in sub-Saharan Africa

### 2.1 Lack of educational facilities

The low level of development in sub-Saharan Africa is no doubt the principal cause for the lack of skilled workers. Governments dispose of inadequate revenues with the result that there is a lack of infrastructure and qualified teaching personnel. They do not only have little revenue, they also spend a small portion of that on education. Other priorities are crowding out education. Table 6 shows that the percentage of public funds spent on education is quite low. The data further show that, despite higher economic growth, oil and gas producing countries spend even less on education than the non-producing countries, 2.6 versus 4.9 per cent.

**Table 6: Public expenditure on education, sub-Saharan Africa, 2007**

<b>Sub-Saharan Africa</b>	<b>Public expenditure on education (% GDP)</b>
<i><b>Oil and gas producing countries</b></i>	
Angola	2.8
Cameroon	3.0
Chad	3.2
Congo, Rep of	1.9
Cote d'Ivoire	4.6
Equatorial Guinea	0.6
Gabon	3.9
Nigeria	...
Sudan	1.7
South Africa	4.6
Average	2.6
<i><b>Average of non-oil and gas producing countries (37)</b></i>	4.9

Source: African Development Bank: Statistical Database (table 18) at [http://www.afdb.org/pls/portal/docs/PAGE/ADB\\_ADMIN\\_PG/DOCUMENTS/STATISTICS/S-ELECTED%202008\\_WEB.PDF](http://www.afdb.org/pls/portal/docs/PAGE/ADB_ADMIN_PG/DOCUMENTS/STATISTICS/S-ELECTED%202008_WEB.PDF)

It is therefore not surprising to find that enrolment rates are low. Table 7 indicates that the gross enrolment ratio for the non-producing countries is a low 42.5 per cent and even lower for the countries which produce oil and gas. South Africa stands out in this list as the country with high enrolment rates, even approaching European levels.

The pupil/teacher ratio, in the second column, is generally considered a good indicator of the quality of education. A lower ratio means smaller classes, with more individual attention given to students. The third column in the table shows that these ratios are very high, with Nigeria reaching an average of more than 40 students per class. Again, it is shown that the non-producing countries do better. Average class size is 27, compared to 30.7 for the countries without oil and gas.

**Table 7: Key education indicators, sub-Saharan Africa, 2007**

<b>Sub-Saharan Africa Oil and gas producing countries</b>	<b>Secondary School Gross Enrolment Ratio</b>	<b>Secondary School Pupil/Teacher Ratio</b>	<b>Enrolment ratio in technical and vocational programmes</b>
Angola	...	...	...
Cameroon	41.4	24.7	32
Chad	15.2	34.2	1
Congo, Rep of	42.9	34.3	18
Cote d'Ivoire	...	29.4	27
Equatorial Guinea	...	...	...
Gabon	...	...	...
Nigeria	32.4	40.2	0
Sudan	22.1	21.5	1
South Africa	94.7	30.8	6
<i>Average (without South Africa)</i>	30.8	30.7	13.2
<i>Average (including South Africa)</i>	41.5	30.7	12.1
<b>Sub-Saharan Africa Average non-oil and gas producing countries</b>	42.5*	27.0*	5.4**

\* Average for 31 countries

\*\* Average for 29 countries

Source: African Development Bank: Statistical Database (table 19) at [http://www.afdb.org/pls/portal/docs/PAGE/ADB\\_ADMIN\\_PG/DOCUMENTS/STATISTICS/SELECTED%202008\\_WEB.PDF](http://www.afdb.org/pls/portal/docs/PAGE/ADB_ADMIN_PG/DOCUMENTS/STATISTICS/SELECTED%202008_WEB.PDF)

## **2.2 Lack of vocational and technical training**

Next to university education, technical and vocational training (TEVT) can also play a role in increasing the supply of skilled workers. Technical and vocational skills development focuses on providing more practically-oriented training, complementing university education. However, with government funding in short supply, vocational and technical training facilities are equally limited. A recent survey by the African Development Bank and the OECD showed there is a serious lack of such facilities in nearly all the major oil and gas producing countries, and that these institutions were not functioning in an efficient manner (African Development Bank/OECD, 2008).

For example in Equatorial Guinea, only 5 per cent of the budget of the ministry of education is allocated to technical and vocational training (African Development Bank/OECD, 2008). Gabon is another example where technical and vocational training does not figure importantly in the educational system. The African Development Bank reports that such training only represents 8 per cent of the educational system (African Development Bank/OECD, 2008). Chad drafted an educational reform programme to run until 2015 but there is only a passing reference to technical and vocational training (African Development Bank/OECD, 2008).

The figures in the last column of table 7 above give the enrolment rates in TEVT. The enrolment rates are quite low, with less than 1 per cent in Nigeria. But the oil and gas producing countries score better than the non-producing countries.

Another problem is the low quality of education and the relevance of the curriculum (African Development Bank/OECD, 2008). In Cameroon, for example, 13 per cent of students enrolled in public higher education attended technical education programmes. Each year, 200 engineers and 1000 technicians are trained by these institutions. But many of the school courses do not include the subjects that are needed by the oil and gas industry. As a result, companies resort to expatriate labour in order to fulfil their labour requirements.

A recent survey by the African Development Bank showed that the TEVT teaching programmes were poorly adapted to the needs of the labour market (African Development Bank/OECD, 2008). Angola and Equatorial Guinea are among the very few countries where TEVT schemes are directly linked to the oil and gas sector.

Several industry observers have questioned the calibre of training institutions in sub-Saharan Africa and the quality of output (Al-Khalifa, 2007). This might help explain why African-trained professionals experienced more difficulty in finding their first employment, compared to Africans who received most of their post-secondary education outside the continent (Table 8)<sup>100</sup>.

**Table 8: African professionals employed in the oil and gas industry (by geographic origin of post-secondary education): Perception of degree of difficulty in obtaining first job in the oil and gas industry**

	Where they were educated (1)	
Degree of difficulty	Sub-Saharan Africa	Elsewhere
Not difficult at all	65	87
Somewhat difficult	18	13
Rather difficult	10	0
Very difficult	7	0

(1) Where they received most of their post-secondary education

Source : AFREN/UNITAR/CRES survey : Compétences locales et lacunes dans l'industrie du pétrole et du gaz 2008 (Geneva, Switzerland)

<sup>100</sup> These data are from a small, non-representative survey carried out by AFREN (Nigerian oil company), UNITAR (The United Nations Institute of Training and Research) and CRES (Swiss non-governmental organization) in 2008. Close to 30 young African professionals were interviewed about their work experience. Half of the persons interviewed received most of their post-secondary education on the African continent, whereas the other half received such education mostly outside the continent (mainly Europe and the USA). The survey included both African professionals currently employed on the continent, and others working in Europe or the USA.

However, recent years have witnessed a few important government-funded initiatives to develop education and training geared towards the oil and gas industry. One government initiative in Nigeria has been the creation of the Petroleum Technology Development Fund (PTDF) in 1973 which makes public funds available for training Nigerians (Petroleum Technology Development Fund, 2007). These funds have been used to provide scholarships to train Nigerians at universities in Nigeria and abroad. They have also been used to make endowments to educational institutions in Nigeria to strengthen their petro-technical course programmes. In addition, PTDF has an overseas scholarship programme to enable academic specialists from Europe and the USA to teach at Nigerian universities.

Given Nigeria's ample petroleum revenues, it is not surprising that PTDF has received generous funding over the years. During 2002-07, PTDF enabled close to 600 Nigerians to receive training at graduate level in European and US universities (Petroleum Technology Development Fund, 2007).

In 2004, PTDF commissioned an industry-wide skills audit to identify gaps. Now, PTDF is engaged in the training of some 2,600 Nigerian engineers in an effort to cover these shortfalls in the skills supply.

A promising initiative has been developed in Equatorial Guinea. The government adopted a decree in 2004 to establish the Institut Technologique du Pétrole, the technological oil institute, to provide training in skills that are demand in the oil sector.

Also, oil and gas companies have developed a few initiatives to improve education and training on the continent. A few centres of teaching were created recently, sometimes in collaboration with governments, universities and training institutions of donor countries.

For example, BP is collaborating with Agostinho Neto University to increase the number of qualified engineers and geoscientists that graduate each year (British Petroleum, 2008). Moreover, it

is funding a Master's of Law degree (LL.M) in Oil & Gas which had 40 candidates for the 2007 course (Petroleum, ,2008). The Schlumberger Foundation developed an initiative called the Africa Science Programme which, in collaboration with the French Institut des Hautes Etudes Scientifiques and Clare College Cambridge (UK) supports postdoctoral and senior scientists (Schlumberger, 2007, p.11). This is a small programme which seeks to enhance local teaching capacity in Africa.

There are also examples of collaboration with other institutions, abroad and locally. One such example is a joint programme between Chevron and the United Nations Development Program (Chevron, 2008).

Companies are also linking up with governments to expand technical and vocational training. For example, the government of the Republic of Congo is envisaging a radical overhaul of technical and vocational training, and to develop a national vocational training development fund. Companies will be asked to contribute so as to "facilitate employment through a new work/training approach (African Development Bank/OECD, 2008).

Oil and gas companies have also initiated training programmes for local services companies, to develop the quality of their personnel so as to enhance their capacity to buy supplies locally and meet local content requirements.

For example, the oil services company AMEC organized a Houston-based internship programme for Angolan engineers working for a local company, Paragon Angola (AMEC, 2006). The training covered various engineering disciplines and it enabled the trainees to carry out a number of tasks involving site audits, site-survey support, detailed engineering design and construction support.

Oil companies sometimes develop business support centres through which they provide technical and vocational training to the staff of local companies.

In 2006, Sonangol, the Angolan oil company, and other oil companies have launched an initiative called “Formacao di Fornecedores”, training of suppliers, which aims to increase the capacity of small and medium-sized enterprises to become suppliers of goods and services to the oil industry (African Development Bank/OECD, 2008). Menas reports that, in 2007, the Centro do Apoio Empresarial (CAE) had collaborated with some 300 companies and that it had assisted more than 20 companies in winning substantial contracts with international oil companies.

BP Angola has set up a programme to support and train local companies to help them increase their productivity and quality and to make them more capable of working with the oil industry (Commonwealth British Council, 2007). This includes training to develop the skills of local companies how best to bid for projects with the oil industry.

BP is working with local Angola companies to help them develop the skills they need to bid competitively for contracts in the oil industry. BP has set up and launched a Business Support Centre (CAE) as part of an industry-wide initiative to help Angolan small and medium-sized enterprises to develop their capabilities. Representatives from more than 200 companies have attended CAE sessions so far, and 22 have been awarded contracts in the oil industry (British Petroleum, 2008).

A survey was carried out in Nigeria evaluating the prospects of Nigerian companies becoming suppliers to the oil industry (Amadi, Germiso, & Henriksen, 2006, p. 13). It concluded that the Nigerian manufacturing and mechanical industries offered the best possibility. Five companies were selected and training was provided to their staff to prepare them for certification as suppliers to the international petroleum industry.

In summary, companies as well as governments have reacted to the skills gap by increasing their support for training. But it is

not clear whether these initiatives are significant enough to produce an important reduction of the skills gap. It is not even clear whether they will be sufficient to meet only the increase in the demand for skilled workers on the continent. As mentioned earlier, production and exploration is expected to increase very significantly in the near future.

### **2.3 School accreditation is not provided**

There are still other reasons why few African nationals take up skilled positions in the oil and gas industry. In Nigeria, lower-skilled jobs are sometimes taken by expatriates although locally-trained workers are available. Such jobs as cold welding, scaffolding and cementing are filled by expatriates because insurance companies do not provide coverage if they are taken up by locals. These companies require that local schools and universities are accredited internationally. As a result, graduates in geophysics, petroleum engineering and petroleum chemistry from Nigerian universities and the Petroleum Training Institute in Warri are not deployed in oil rigs but, if they get hired, they work in back offices.

The lack of international accreditation of African learning and training institutions may help explain why African professionals consider that, in the oil and gas industry, they are at a disadvantage, compared to expatriates with a similar educational background. Table 9 below has data from the earlier mentioned survey of young African professionals employed in the oil and gas industry. They indicate that around two-thirds have the view that African-trained professionals are at a disadvantage in developing their careers, compared to workers trained elsewhere.

**Table 9: Question “Do you consider that African-trained professionals are at a disadvantage in developing their career in the oil and gas industry, compared to professionals with a similar educational background but trained elsewhere?”: Responses by African professionals in the oil and gas industry<sup>101</sup>**

Responses	Percentage distribution
Yes	64
No	26
No opinion	10
Total	100

Source : AFREN/UNITAR/CRES survey Compétences locales et lacunes dans l'industrie du pétrole et du gaz 2008 (Geneva, Switzerland)

## **2.4 Ever increasing demand for higher- skilled workers**

Still another factor contributing to the skills shortage is that oil and gas production uses increasingly advanced technologies and production techniques which require a workforce with a continually increasing level of skills (UNCTAD, 2007). Demand for skilled workers at the higher end of the skills range is rising faster. But these are the professions where the skills shortage is the largest. Employment of semi-skilled local workers, which is more readily available, has been declining as the demand for higher skills has increased.

## **3.0 Fulfilling local content requirements through training**

As mentioned earlier, the lack of skilled workers in sub-Saharan Africa also affects the capacity of oil and gas companies to meet local content requirements. Training local workers can help in meeting these requirements. But that is not the only advantage. Employees with local knowledge can be of crucial importance when building

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<sup>101</sup> A brief description of the survey is found in footnote 2.

business sustainability and working with local subcontractors, unions, and community stakeholders (Booz Allen & Hamilton, 2007, p.14). Another advantage is that a majority of the technical training in petroleum and other engineering disciplines can be provided in any part of the world and often at a much lower overall cost than in Europe or the U.S.A.

The number of producing countries with local content requirements has increased significantly in recent years. Such requirements often include not only hiring quotas but also targets for training local workers. Training can include either programmes to provide locals with the training required for employment in the oil and gas companies, or programmes for the staff of local service companies.

There are very few countries, other than Nigeria, where local content requirements have received more attention. Local content provisions set target dates for the employment of Nigerians in the oil industry. As table 10 shows, 75 per cent of staff must be Nigerian citizens 10 years after the effective date of starting operations, and 80 per cent five years later (Msimang, 2006).

**Table 10: Local content provisions for hiring Nigerians in the oil industry**

<b>Years after the effective date of operation</b>	<b>Percentage of employees which must be Nigerian citizens</b>
10 years	75
15 years	80
20 years	85

Source: Alex Msimang: "Global local content: Legal issues and practical results" (Vinson and Elkins, London, 2007)

Another measure is that each company operating in Nigeria must submit a detailed programme for recruitment and training of Nigerian personnel for the following calendar year (Msimang, 2006).

Angola was among the first countries to introduce legislation on local hiring. In 1982 it adopted Decree 20/82 on the mandatory hiring and training of Angolans by foreign companies operating in the oil industry (Government of Angola, 1982). This says that oil companies cannot hire foreigners unless qualified Angola workers are not available in sufficient numbers. It also states that training must be provided “in a way that progressively the rule of proper employment of national workers can be applied at all hierarchical levels” (Government of Angola, 1982). Training plans need to be submitted to the government for approval.

Like Nigeria, Angola set targets to increase Angolan staffing in oil companies (table 11).

**Table 11: Targets set by Angolan government for percentage Angolan staff in oil industry, 2002**

<b>Category of skilled workers</b>	<b>2010 Targets: Percentage Angolan staff</b>
Unskilled workers	100
Mid-level workers	80
Higher level staff	70

**Source:** Ministry of Petroleum, Angola, 2002

In Equatorial Guinea, the 2006 law regulating oil production stipulates that companies not only provide training for their employees, but also for government officials who have dealing with the oil sector (Menas Associates, 2007). However, it did not set any targets.

In the case of Cameroon, the local content provision is that “contractors must favour the employment of Cameroonian workers” (Msimang, 2006). This is a more general provision which does not have targets attached as in Nigeria and Angola.

Do countries actually achieve compliance with recruitment targets by the specified dates?

Nigeria did set an overall target of 45 per cent local content for 2006. Several studies indicate that the percentage achieved was well below this level. Government estimates put the 2006 local content level at around 35 per cent but there are several other estimates which put the level achieved much lower, ranging from 9 to 27 per cent (Odein, 2008).

Oilfield services account for the largest share of the total cost of oil production. UNCTAD estimates this market to generate more than \$30 billion per year (UNCTAD, 2007, p. 140). However, in Nigeria, it was estimated that only one tenth of these services were contracted to local companies. Training can play a useful role in creating a large pool of skilled workers and in capturing this market.

At the 2007 seminar on Nigerian local content policy referred to earlier, participants blamed the slow pace of implementing the Nigerian content policy in the oil and gas sector on the absence of legislation. The policy was introduced several years ago, but the government has yet to come up with the implementing legislation that would provide a legal basis for the policy (Odein 2008).

Menas Associates concluded that the local content initiatives in Nigeria have led to an increase in the number of contracts awarded to indigenous oil companies by the international oil companies (Menas Associates, 2007). However, most projects failed to meet provisions for the use of national staff in top level positions, and they have pointed out that “local capacity remains constrained by a lack of experienced personnel with adequate technical competency to carry out complex and highly technical assignment” (Menas Associates, 2008).

Companies in other countries also appeared to have encountered difficulties in complying with local content requirements. In Equatorial Guinea, for example, the law on employment prioritises the domestic workforce and it stipulates that in all enterprises, not only oil and gas, at least 65 per cent of professionals must be Equatorial Guinea nationals, with an even higher percentage for non-professionals. A recent survey by the African Development Bank showed however that many companies in Equatorial Guinea

complained that it was difficult to comply with this quota due to the lack of available skills (African Development Bank/OECD, 2008). As a result, many foreign workers were hired and migration policy became a key instrument for reducing the gap between supply and demand.

A 2003 study by the World Bank concluded that many companies operating in Angola had already achieved compliance with the unskilled worker targets, but that they were having difficulty in complying with the targets for higher level staff (Shyne, 2003).

In contrast, it appears that oil and gas companies did meet some degree of success in meeting local content requirements on other continents. Brazil, for example, kept its petrol sector “closed” for many years. Government legislation aimed to protect companies from foreign competition while they developed skills and capabilities. The lack of competition led to higher costs and some delayed technological development, but it ensured that the benefits from the petroleum sector were “internalized”. Menas Associates have argued that “both in terms of increasing indigenous technical skills and job creation, the Brazilian local content program can be said to have worked” (Menas Associates, 2008). The Malaysian experience with local content requirements has also been described as successful, as well as that of Russia in the Sakhalin region (Amadi, Germiso, & Henriksen, 2006).

In the case of sub-Saharan Africa, it would be difficult to blame the failure of achieving local content targets fully on the skills gap. Other factors played a role as well – the lack of security (e.g. in the Niger Delta), political instability, a poor industrial base and poor infrastructure.

#### **4.0 What may be done to reduce the skills shortage?**

This paper proposes a two-pronged strategy to reduce the skills shortage in sub-Saharan Africa. First, a major new effort is needed to increase education and training by the main stakeholders: the oil and gas companies, the national governments of the energy producing countries in sub-Saharan Africa and the international community,

including donors. Second, closer collaboration and coordination is needed among the oil and gas companies. Better results can be expected when companies act jointly, rather than “going at it alone”.

Several oil and gas companies have already developed training programmes specifically for African professionals. However, the scale of these programmes is rather small, and more efforts are needed to make a difference.

Several modalities have already been developed which can serve as a model. Oil and gas companies can link up with local university and training institutions to develop courses specifically designed to meet the skills requirements of the industry. The emphasis is here on developing local capacity to educate and train. A few major oil and gas companies have taken such initiatives and the experience has been promising so far. What is needed is that more companies follow this example. Another modality is in-house training by the oil and gas companies. Several companies have expanded their in-house training programmes; sometimes in the African countries where they operate, sometimes they have sent their African professionals to projects elsewhere to receive training. A third modality is to outsource training of African professionals to the growing number of training institutions around the world. Finally, oil and gas companies can also provide training within the framework of local content requirements. Partnerships may be developed with local service companies to provide targeted education and training programmes.

African governments also have a role to play in developing local talent for the oil and gas industry. Their funding capacity has been strengthened as a result of renewed economic growth, not only in the oil producing countries but also elsewhere on the continent. This has created new opportunities to set priorities and strengthen the education and training system. The key challenge will be to design programmes that are responsive to the labour market and that focus on the skills that are scarce.

Finally, there is a role to be played by the international community, and in particular donor countries. Technical skills development in Africa was a key sector for donor support in the 1960s and early 1970s. Since then, donors lost interest as they had other priorities.

But this has changed now, and technical skills development is back on the international agenda. There is growing orientation towards the world of work and an increasing emphasis on the need for employable skills. And governments and donors have a renewed interest in developing both technical education and vocational training systems. To take advantage of this momentum, initiatives should be explored with the international community to develop new training programmes.

A priority for action by the international community is the strengthening of curricula. This will help in getting schooling facilities accredited which will encourage companies to hire more local talent.

The above recommendations are not very different from those made by African professionals themselves, those that have found employment in the oil and gas industry. The employee survey, referred to earlier, included a question about the measures which should be taken to enhance education and training. As table 12 shows, 46 per cent of those interviewed said that training facilities need to increase and 29 per cent was of the view that the quality of the teaching staff needs to be enhanced. Partnerships with oil and gas companies was also listed as an important measure.

**Table 12 : Question “Which measures should be taken to enhance the education and training of professionals for the oil and gas industry in sub-Saharan Africa?”: Responses by African professionals in the oil and gas industry**

<b>Proposed measures</b>	<b>Distribution of Responses (1)</b>
Increase the number of facilities	46
Improve the quality of the teaching staff	29
Better equipment (laboratories, libraries, etc.)	27
Partnerships with companies For internships, etc.	19

(1) The percentage of respondents who listed this measure among their recommendations

**Source:** AFREN/UNITAR/CRES survey Compétences locales et lacunes dans l'industrie du pétrole et du gaz 2008 (Geneva, Switzerland)

The second pillar of the strategy proposed here is to develop closer coordination among oil and gas companies. Collaboration between oil and gas companies is not as strong as in other industries. A World Bank survey on collaboration and partnership among oil and gas companies showed that most had adopted a strategy of “going at it alone”. It also found that overlap and lack of coordination created problems that were hindering the effective implementation of training and other initiatives.

Oil companies need to explore the opportunities of initiating training and activities jointly with other companies in the industry, with public institutions and other relevant entities to seek an effective implementation of their projects.

In order to facilitate such coordination and joint action, it may be envisaged that a regional body or institution on energy production is set up in sub-Saharan Africa. None of the existing institutions in the oil and gas sector has a mandate which could cover such activities in sub-Saharan Africa. Such an institution, set up with financial support from the oil and gas companies, could be established in one of the energy producing countries. Its objective could be several. First, the institute could act as a clearing house for information and statistical data on oil and gas in Africa. The lack of statistical data is currently a serious obstacle in planning future activities to address the skills gap. Second, it could serve as a catalyst to set up projects to expand education and training programmes which meet the demands of the industry. Initially this institution could focus on the skills gap, and later on address other challenges by facilitating a joint response by the oil and gas companies.

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