

WPC YP MAGAZINE
**THE GAME
CHANGERS**



BY WPC YOUNG PROFESSIONALS
2019





WPC YP MAGAZINE

THE GAME CHANGERS

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WELCOME TO SAINT PETERSBURG!

A memory I will always cherish is the exciting days of 22nd World Petroleum Congress in Istanbul, such a beautiful city with a romantic culture. Two years later, I am glad we are going to gather together again in another city filled with wonderful scenery and a charming history – St Petersburg. The 6th WPC Youth Forum: Future Leaders Forum, will be a great event for the young professionals!

Time flies, and the world is always changing and presenting new challenges. The shale gas revolution makes the oil price drop dramatically. It can seem that the past high profits will never reappear. The development of electrical vehicles has influenced the petroleum industry hugely and many countries plan to stop producing the traditional vehicles. The issue of our environment is becoming more and more important. Stronger restrictions have been implemented in the petroleum industry and in the world. Gradually we have found that some of our colleagues have left the industry and fewer students would like to choose the petroleum relating majors as their first choice. People seem to lose confidence in the oil industry. Is that true? I think the answer is definitely no! The shale gas revolution addresses the energy shortage problem and supplies enough cheap resource to improve our life. The development of electrical



Tao Liu

YPC China Representative & WPC YP Magazine Editor, WPC China Representative, Senior Engineer, SINOPEC



Jamie Anne Vaughan

YP Magazine Proofing Editor & Senior Digital Communications Advisor Public Affairs, Communications, and Sustainability, Enbridge Inc

vehicles helps to decrease the carbon emission and enables us to use more oil and gas for valuable chemical products. The digitalisation revolution has been applied in the oil industry to make exploration and production technology more efficient and powerful. More energetic and enthusiastic young professionals are wanted for a prosperous future of our petroleum industry!

The WPC Young Professionals Committee (YPC) is dedicated to promote the connection and collaboration of young professionals in the world. This magazine aims to supply a stage for sharing ideas and experiences with each other. There are several interesting topics in the edition. It will give you a view of the YP events held over the last two years, such as

the mentoring program and the survey outcome which focuses on the relationship between industry and academia. You will get to read the opinions on sustainability and legacy including the topic of climate change and a low carbon economy and the influence that the technology innovation has on our future life. The experience which senior members of the industry have provided in their articles will also give you some advice to help with your professional path, and the dialogue between young professionals and senior experts will bridge the boundaries of different generations.

We hope you will enjoy these marvellous articles and the perspectives they present! Welcome to St Petersburg! 💧



WELCOME MESSAGE FROM WPC YOUNG PROFESSIONALS COMMITTEE CHAIR & VICE CHAIR

EDITORIAL

Since we last met in Istanbul for the 22nd World Petroleum Congress in 2017, the transformations of the energy landscape have been accelerating. Aware of the central role that plays in climate change, the energy industry is changing to embrace its responsibility to continue supplying more energy to an increasing population while lowering its carbon intensity, with an increasingly complex geopolitical environment.



Stephane Rousselet
YPC France Representative & Chair of the YPC



Laura Garcia Chiquero
YPC Spain Representative & Vice Chair of the YPC

These transformations call for an accelerated adaptation of our generation. They invite us to be innovative and broaden the scope of our knowledge and expertise in business or academia, to become professionals able to take a step back and master the complexity of our environment. They also ask us to bridge geological boundaries and build broader and more international networks. More importantly, these transformations call for sharing our passion for this industry,

being advocates of the critical role our industry and especially us, young leaders, play in preparing for the energy future.

As “nothing great in the world has ever been accomplished without passion”, the World Petroleum Council Young Professionals Committee continuously deploys its energy to empower our generation to share our differential vision, experiences and knowledge,

in initiatives such as our local and digital networks, our mentoring programme and our global survey. The extension of our footprint to around 30 countries, the diversity of our members, the multiplication of local and global events to foster the debate – for instance, the 3rd Tomorrow’s Leadership Symposium in Belgrade in 2018 – demonstrated the role we collectively can play in these transformations.



With the 6th WPC Youth Forum: Future Leaders Forum in Saint Petersburg, we bring this passion even further. We would like to firstly thank our Russian friends in welcoming the world to Saint Petersburg for this major industry event designed by and for students and young professionals. Through this unique event, we hope to nurture the debates and invite our generation to rethink the future of our industry and how young professionals

can contribute to the role we should collectively play.

This debate will continue up to the 23rd World Petroleum Congress in Houston in 2020, the biggest industry event of the history. Our generation will be there in the spotlight to share its view on our industry transformations and our proactive contribution to the global agenda. We would like to take this opportunity to invite all of you to the

United States and foster the innovation across our industry.

Finally, and while looking for our future interactions, we would like to also thank the magazine team, the volunteers and experts, who put together this unique piece of knowledge to shape the global energy future, by bringing together the passion and talents of industry students, young professionals and emerging leaders. We invite you to enjoy this 6th WPC Future Leaders Forum. 💧



SHAPING THE GLOBAL ENERGY FUTURE

How do you recall your first career steps?

I started working in the industry 39 years ago, and I still work within the same company. Not many do that today. The workforce is more dynamic, shifting jobs more frequently reflects our society in general.

What was the most difficult challenge?

As for most coming from university into their first job, you will experience the industry and business quite differently from being a student. Regardless of your job and position, be yourself, become accepted based on doing a respectable job professionally; be curious, honest and open as a basis for building good collegial relations and trust.

What are the similarities and the differences between your generation and the generation of today's young professionals in petroleum industry?

Relationships and communication are different, as the use of social media as an important platform for communicating is very different, but I believe that engaging professionally in our daily job has not changed that much. It will always be about doing the best possible professional job. Today students experience more

competition, at university, in getting a job and in work-life.

Based on your own life experience, which recommendations would you give to young people working in the petroleum industry nowadays?

When joining, start building a solid basis over some years in your professional area – don't be too impatient about other opportunities too early. When offered new jobs or positions – take them, you will normally not regret this and you will gain valuable experience. Engage in voluntary tasks, e.g. WPC YP Committee, mentoring, etc. – a fantastic way to learn more about the industry and the context we operate within. Establish a balanced life – it is about more than the job.

What is the main goal of the professional youth forums and to what extent do the discussed issues reiterate the agenda of the World Congresses?

The St. Petersburg Forum is the 6th in a row of WPC Youth Forums held every 3 years and led by the WPC Young Professionals Committee. It will provide a platform for the next generation of the oil and gas sector to present their views alongside senior industry experts. The forum will contribute to shaping the



Tor Fjaeran
President, World Petroleum Council

global energy future by bringing together the passion and talents of industry students, young professionals and emerging leaders. Some of the qualities young people offer, such as active thinking, sensitivity to new issues and their innovative potential, are important to the future of the petroleum industry.

The theme of the World Petroleum Congress in 2020 is "Innovative Energy Solutions", and from what I have seen so far, the St. Petersburg programme very much reflects this theme by looking forward for new and innovative solutions and what role the future leaders can play in this context. ♦



WELCOME MESSAGE FROM THE MINISTER OF ENERGY, RUSSIAN FEDERATION



HE Alexander Novak

*Minister of Energy of the Russian Federation and
Chairman of the Organising Committee of the 6th
Youth Forum of the World Petroleum Council*

Dear Colleagues and Dear Friends! I am deeply grateful to the World Petroleum Council for supporting our proposal to hold another meeting of young specialists of the oil and gas industry in Saint Petersburg, a Russian city with a rich history, and cultural and educational traditions, that play an important role in the modern petroleum industry in Russia.

The tasks facing the world energy sector today are becoming increasingly complex and wide in scale. In conditions

of competition with other energy sources, the key to successful development of the industry is innovative technologies, environmental responsibility and economic efficiency. We need fundamentally new solutions, a fresh look, and non-standard approaches.

The 6th Youth Forum of the World Petroleum Council, which will be held in Saint Petersburg on June 23-28, 2019, will provide young experts with a large authoritative platform for communication and discussion of topical professional issues.

It is very important that this Forum is an international platform, that allows us to conduct a dialogue between representatives of different countries and continents, to exchange experiences and to think about the future.

I am confident that this will be a landmark professional event with a rich business agenda, an interesting cultural programme and fascinating informal communication.

Welcome to Russia and to Saint Petersburg! ♦



THE 22ND WPC: HIGHLIGHTS FROM ISTANBUL

The 22nd World Petroleum Congress welcomed participants from all over the world in Istanbul, covering all aspects of the industry, from upstream to downstream, including management, sustainability and social responsibility. The theme, "Bridges to Our Energy Future", attracted widespread domestic and international attention with more than 12,000 participants from 102 countries; covering over 4,000 delegates, 7 Heads of State, 38 Ministers, more than 500 CEOs, Presidents and Heads of International Organisations, 105 exhibiting companies, 18 sponsors, and many representatives of governmental and non-governmental organisations and the oil and gas industry. There was an extensive young professionals programme that aimed to utilise the energy and dynamism of the young professionals, as well as to further engage youth into the ongoing industrial activities and provide a platform to have their say.

The Young Professionals (YP) Lounge had the theme "Bridges to a new competitive energy industry" and served as a meeting point for young people. The YP Lounge offered many activities; technical tours, mentoring meetings, oil talks that provided a perfect atmosphere for networking opportunities. The Young Professionals Special

Session was about "Breakthroughs: The Intersection of Industry and Technology". In a world that is ever more connected and interdependent, fast changes in one area have wider and deeper consequences than ever before. This special session looked at potential ways the future may unfold and how the oil and gas industry is equipped to deal with those changes.

The Turkish Young Professionals Committee (TYPC) came up with a new concept, "Oilympics Istanbul" to increase interaction between youth and seniors through oil-oriented games and activities. All students and young professionals nominated as Young Volunteers by the WPC National Committees had the opportunity to participate in the *Oilympics* Istanbul just before the Congress started, and the goal was to team up representatives of the young generation in the oil games, to develop the skills needed, as well as providing a two-way industrial learning. Participants worked in teams to solve mini puzzles, industrial questions and quizzes, while visiting major attractions around the city and discovering the fascinating Istanbul highlights. The teams were named after the most popular historical places in Turkey such as Ephesus and Cappadocia and in total, 49 young people from all over the world participated in this unique activity.



Ümmügülsüm Uğurluer
WPC YPC Turkey Representative

Another amazing opportunity for students and young professionals was to participate in the "Young Volunteers Programme". The Programme was designed to ensure a successful event and to leave a lasting legacy. From the design of the application form to the process for training sessions, the Programme aimed to achieve lasting benefits, by leaving a pool of well-trained and motivated volunteers in the community. The Programme had ensured that promotion of social inclusion and industry specific volunteer legacies were achieved.

As a country believing deeply in the dynamism of a young generation, it was a great honour for us to host the 22nd WPC. 💧



WPC Young Professionals Committee members and Special Session speakers together after the session



Olympics winner team getting their medals at the Bridge Auditorium



WPC SURVEY OUTCOMES: WE ASKED YOU... HOW TO BOOST OIL & GAS INDUSTRY AND ACADEMIA COOPERATION?

There are many successful examples of synergic cooperation between industry and academia globally, that vary considerably among universities, businesses and countries. Collaborative partnerships with academic institutions contribute to the competitiveness of the Oil & Gas industry through developing qualified graduates profiles and technological innovation in the continuously changing energy landscape.

Continuing the good WPC practice, the WPC Young Professionals Committee have conducted the Survey "From University Campus to Workplace: Boosting Oil & Gas Industry - Academia Cooperation". It aims to get a sense of students who aspire to have a career in the Oil & Gas industry and question Young Professionals as industry insiders. The Survey also focuses on understanding the respondents' perception of the Oil & Gas industry and academia partnerships. This Survey addresses the general



Tamara Šereš
WPC YPC Member from Serbia (alternate),
Serbian Committee YP Secretary General

awareness of programmes and support mechanisms and the track-record of participation in joint programmes. It also investigates the views on the needs and willingness to contribute to industry-academia initiatives.

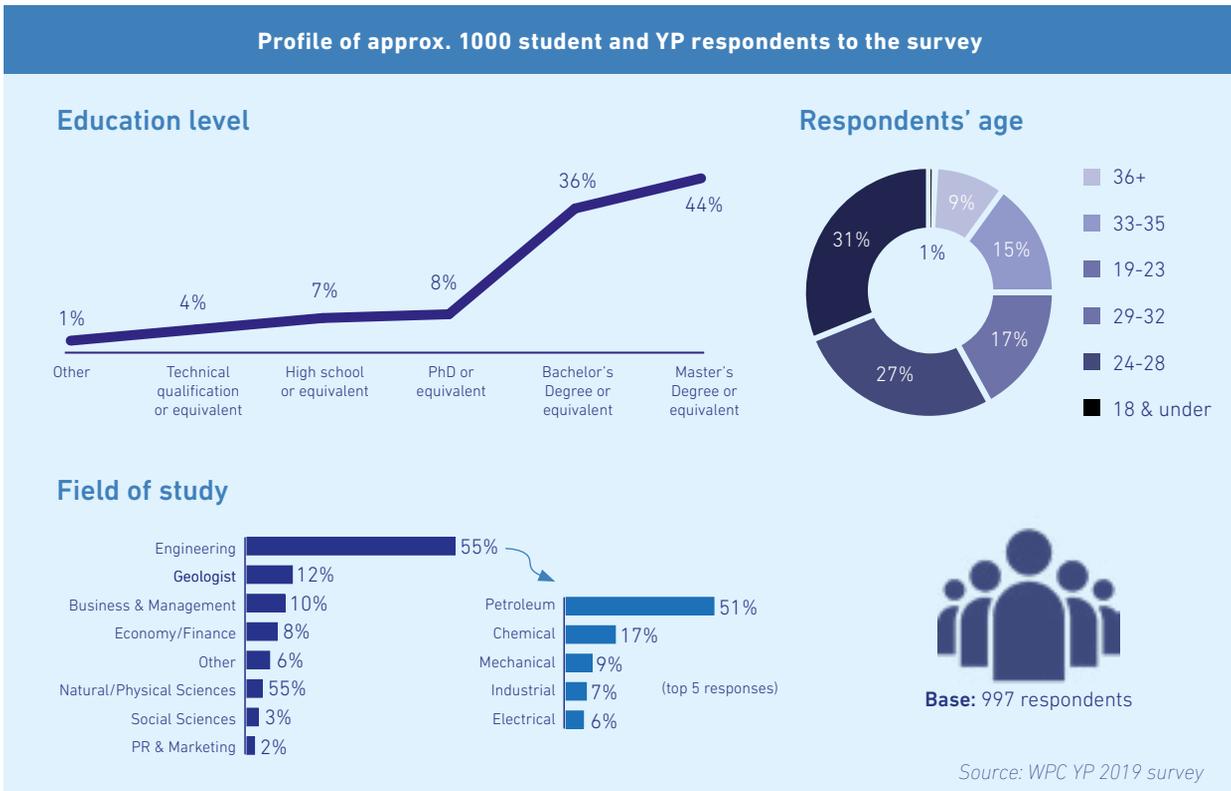
As part of our commitment, this report based on the Survey findings intends to serve as a tool for decision-makers in the WPC network to foster



Zaid Al Khateeb
WPC YPC Member, Kuwait

industry-academia collaboration and give a fresh boost for innovative initiatives that will prepare a talent pool for the Oil & Gas industry of the future.

With the support of Survey Ambassadors in the WPC global network, the online survey reached nearly a thousand respondents, representing 74 countries across six continents. Engineers, half of which are



petroleum engineers, dominate in the respondents' profile. The majority of respondents are young professionals employed in the Oil & Gas industry, while the remaining 30% are students and recent graduates or those who are unemployed and looking for employment in the industry. A significant proportion of respondents (38%) are female, which is encouraging, as the WPC Gender Study "Untapped Reserves" shows currently only 22% female employees in the Oil & Gas industry.

Internationalisation and mobility in higher education are highlighted in the fact that more than a quarter of respondents have completed either their university graduate or post-graduate studies abroad or have combined home-based and international education. Currently, 16% of respondents are based outside their home

countries, most of which in France and Norway. More than half of the respondents are affiliated to (inter)national professional associations.

The Survey looked into the overall awareness of cooperation of the Oil & Gas industry and their place of study. The top five models of cooperation that respondents are aware of in their place of study include internship programmes, guest industry lectures, conferences, scholarships and joint R&D projects.

A majority of student respondents and those currently employed confirm they have participated in and benefited from a form of cooperation between the Oil & Gas industry and their university (see Chart 1). It is important to highlight that 60% of employed respondents state that this engagement was decisive

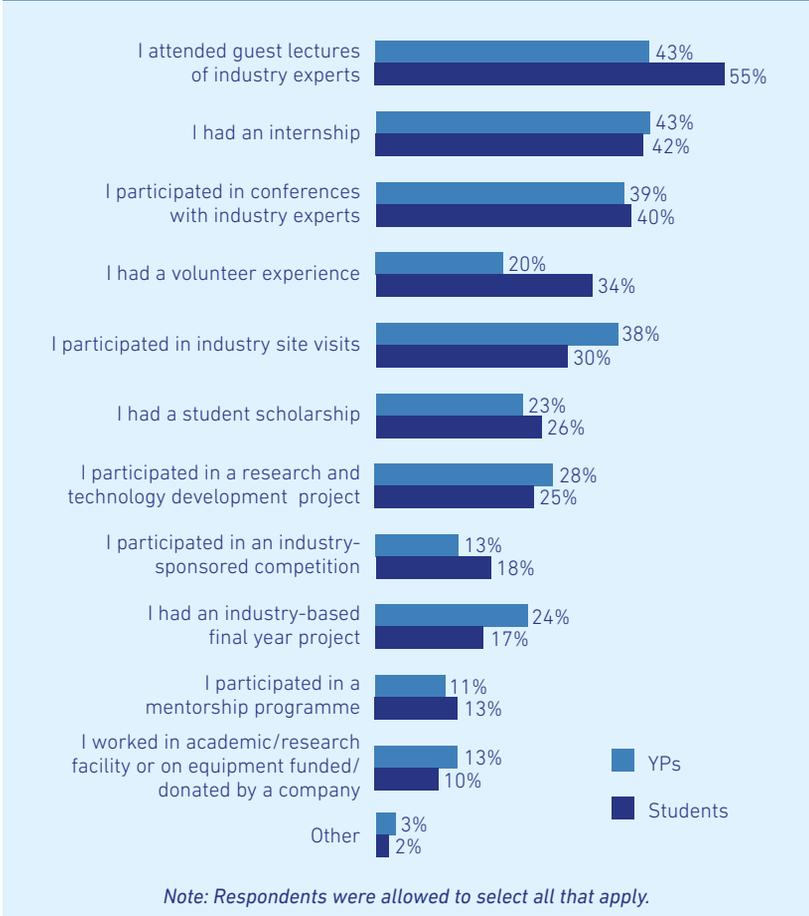
for their subsequent employment in the Oil & Gas industry.

The 34% of current students and 45% of employed respondents that have not benefited from industry presence at their home universities, require special attention. According to respondents, corporate programmes have not reached them due to general lack of awareness or the lack of given opportunity. Social networks, university channels and professional associations are the top communication channels where students learn about corporate presence.

Membership in professional associations increases participation in industry-academia initiatives – 76% of those that have participated in these initiatives are members of professional associations, reaffirming their potential



Chart 1: What types of programmes have you participated in?

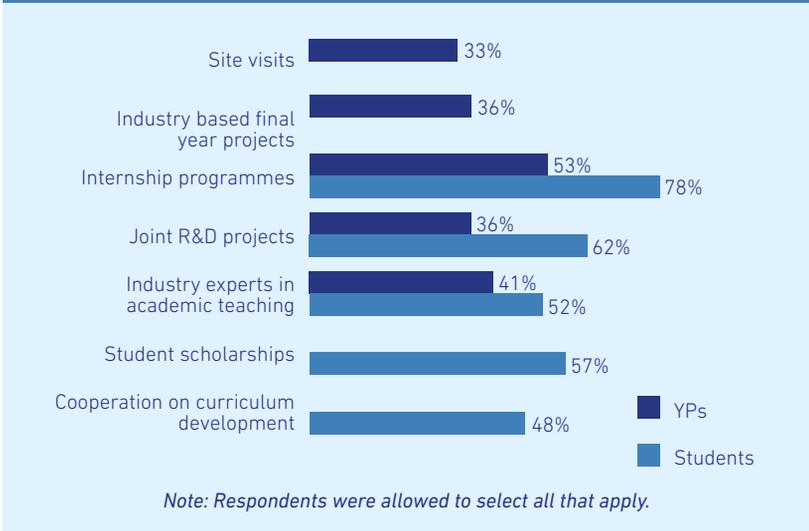


for enhancing industry-academia cooperation.

Internship programmes lead among the desired list of corporate initiatives - the majority of respondents highlight internships as the most rewarding opportunity they can gain during studies (See Chart 2).

To better understand the concerns and expectations on this topic, the Survey investigated views on students' confidence on finding a job placement in the Oil & Gas industry. While they express general confidence in chances for employment, they simultaneously anticipate the lack of job opportunities and lack of necessary skill-sets as major concerns. More than a half of the student respondents (59%) highlight that work experience during studies will have a major influence on their future employment.

Chart 2: Most beneficial programmes – top five responses by students vs. YPs employed in the industry



The majority of young professionals (64%) admit they did not have realistic expectations of employment, and encountered hurdles when entering the labour market. Almost half of them point out that internships and volunteering during their studies were key for a career in the Oil & Gas industry.

Respondents demonstrated a high willingness to get involved and contribute to industry-academia programmes. The need to acquire job-related skills, an increased chance for future employment and the willingness to deepen an understanding of the industry are the top three drivers for students to take part in initiatives with Oil & Gas companies. The top three motives young professionals employed

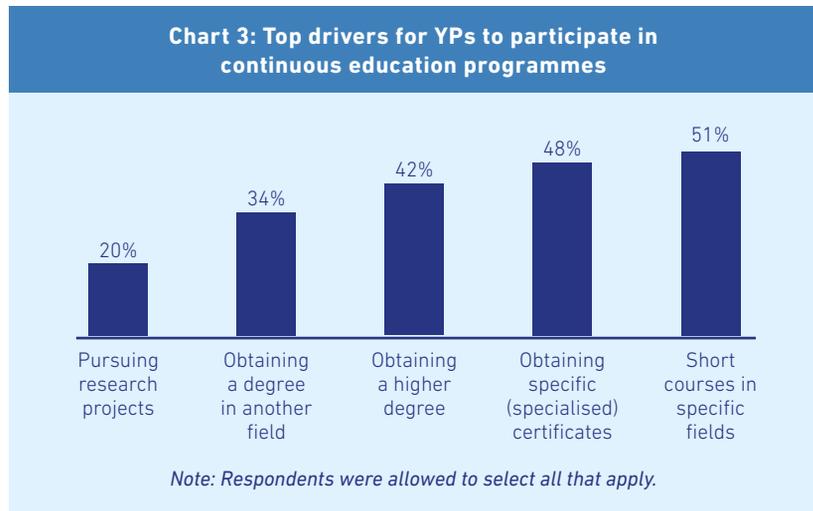


in the Oil & Gas industry have for ties with the academic sector are expansion of professional networks through cross-sectorial networking, acquisition of additional knowledge applicable to their workplace and finding solutions to job-encountered problems.

The survey looked into views on the university curriculum and its alignment with technology developments and the changing Oil & Gas landscape. Compared to 70% of students aspiring for a career in the Oil & Gas industry that are confident that the curriculum they are attending follows industry trends and developments, only a third of employed young professionals share this view on the curriculum they attended.

Investing in R&D to innovate and create new technologies is vital in enabling the industry to meet global energy demand and ensure competitiveness. Around half of respondents confirm they have had the opportunity to take part in R&D projects within the industry. The top needs recognised in relation to enhanced R&D cooperation are combining the skills of industrial practice with academic knowledge, increased understanding between industry practitioners and university research, more support to early stage research and more internship opportunities related to R&D.

A question that deserves special attention in view of talent attraction and retention in the industry is "Given the chance to start over, would you choose to do the same academic studies" – a vast majority of student respondents (73%) and those employed (67%)



would choose to pursue the same educational path again.

The survey shows that young professionals employed in the Oil & Gas industry demonstrate a high interest in life-long learning programmes in cooperation with universities - 95% of employed respondents would be willing to benefit from university-tailored further education courses. However, a significant portion – 38% of respondents – have not had this opportunity after completing their studies (see Chart 3).

In view of notable mobility and internationalisation of education, a significant number of respondents highlighted the need for industry to take into account international students when tailoring corporate programmes.

The overall general sentiment of respondents shows that students are more optimistic in relation to young professionals when asked about the quality of cooperation between their university and the Oil & Gas industry.

When asked about the most important stakeholders and contributors to economic development, respondents believe that the industry has the leading role in economic development in society, indicating trust and reliance on the industry for academic empowerment and on their future at large.

We look forward to further discussing the Survey insights during the 6th WPC Future Leaders Forum in Saint Petersburg! 💧





ENHANCING TALENT RECOVERY: AN OVERVIEW OF THE WPC GLOBAL MENTORING PROGRAMME

The generation gap is one of the key challenges for oil and gas companies globally. After a sharp downturn (2014-2016), frozen recruitment and massive layoffs, resulted in about a half-million jobs cuts - core upstream disciplines such as geosciences, drilling or reservoir engineering, have been particularly hard-hit. Hence, addressing the workforce shortage and retaining talent has become even more crucial as the energy sector faces new structural challenges (energy transition, digitalization, etc.).

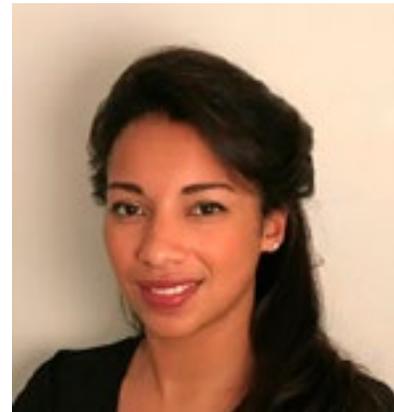
Although companies should be at the forefront to tackle this challenge, the WPC Young Professionals (YP) are also strongly committed to this end. The global mentoring programme is one of the flagship initiatives aimed at bridging the generation gap and fostering an inter-generational dialogue within the industry. It is also pinpointed as an efficient way to attract and retain talent by providing the participants with the unique opportunity to build

a comprehensive vision of the industry challenges on technical or business-related issues. The mentoring programme, as well as other YP activities, seeks to empower the next generation by allowing them to share their views, develop leadership skills, and lead YP projects at a national or global level.

“After 3 years as a Mentee from India, I am excited to coordinate the global mentoring programme and to see it grow.” – Vijay Anne, CGI Business Analyst and Mentoring programme coordinator.

Leveraging talent diversity

In May 2018, the programme entered into its 4th cycle connecting students and young professionals under the age of 35 with senior leaders or executives from different backgrounds. The cohort gathers 50 highly motivated participants from 26 countries who have been through a selection process. The programme puts together profiles from all the segments of the value chain: engineers, academics, consultants,

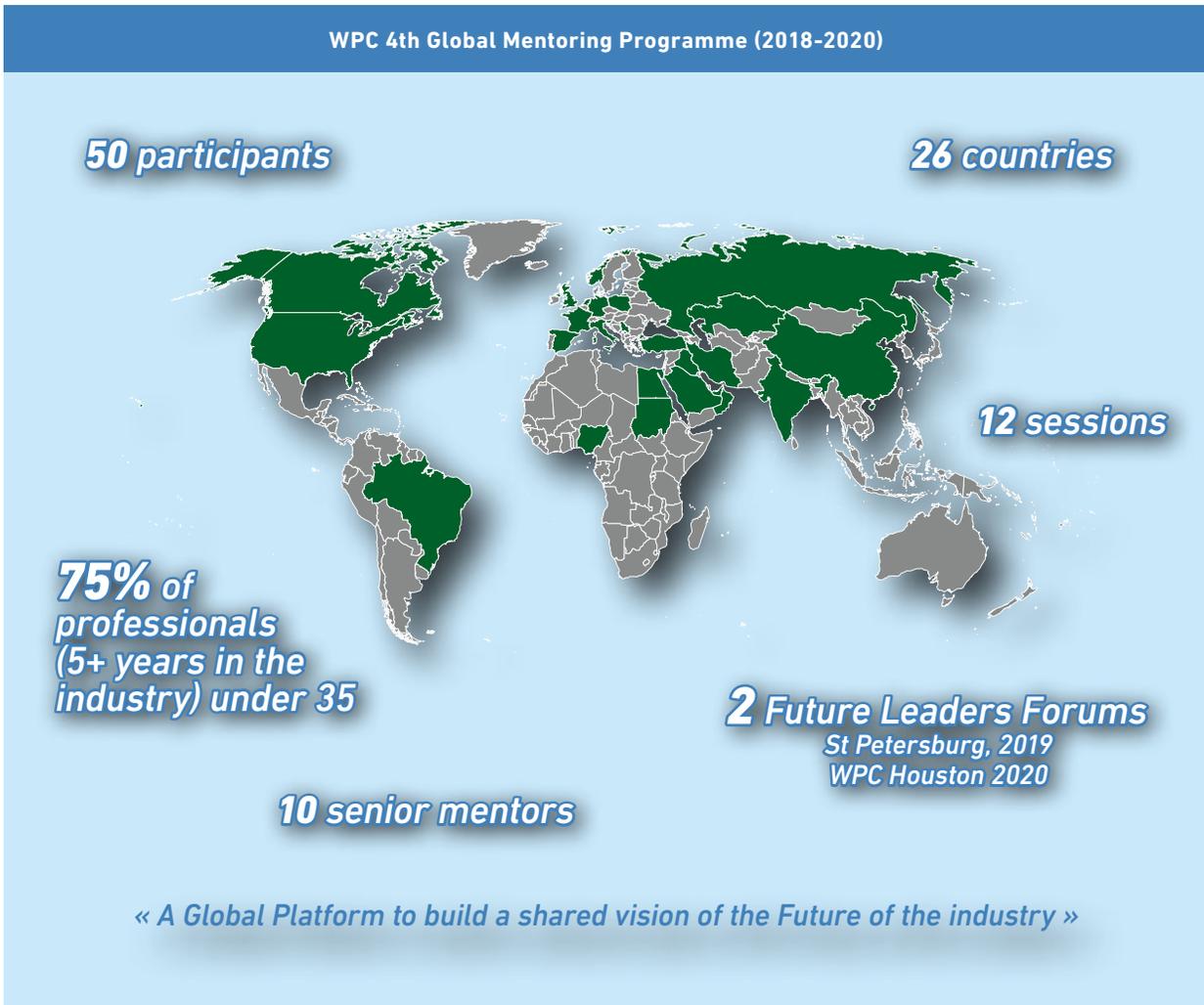


Ambre Eyoum
French WPC YP Representative & Lead
WPC Global Mentoring programme
Multilateral & Corporate Affairs Manager, TOTAL

financial or business specialists, working for NOCs, Big Oil, Independents or contractors. The top topics of interest for discussion are the energy transition, innovation, and leadership skills.

A scalable network within and outside the WPC

Participating in the WPC mentoring programme offers significant opportunities to connect with



YP HIGHLIGHTS

young professionals who share the same passion for the energy industry. Most of the participants are, or will become, key players for their YP national committee and ambassadors for their generation. Some National Committees also implemented local mentoring programmes to cope with the demand of their members, such is the case in Kazakhstan or Iran. Companies can also replicate the programme and offer their most pro-active participants the opportunity to join any of the WPC events, such as the 2019 WPC Youth Forum: Future Leaders Forum which will be hosted in St Petersburg.

A stimulating platform for newcomers and seniors from the industry

Currently 75% of the mentees have 5 to 10 years of experience. The feedback from the past cycles and current participants demonstrates that the programme is particularly rewarding for students and newcomers who can develop their career plans or make decisive connections for their future. The level of commitment from executives from the WPC is another key success factor. Indeed, it is quite telling to currently have 4 members of the Executive Committee

involved as mentors.

“I see the mentoring programme as a valuable contribution to WPC’s understanding of global issues, and I strongly believe that this is rewarding for both mentees and mentors.” – Tor Fjaeran, President WPC

All the mentors are willing to empower the next generation and are keen on mutual learning, also enjoying some reverse mentoring from digital natives. This is what the programme is all about, building a shared vision of the future of the industry. 💧



DEVELOPING THE 6TH WPC YOUTH FORUM - FUTURE LEADERS FORUM IN SAINT PETERSBURG: WHO, IF NOT US?

YP HIGHLIGHTS



Vlada Streletskaya

Director of the WPC Russian National Committee



Lesana Kurbonshoeva

Master Student, Offshore Field Development Technology, Gubkin Russian State University of Oil and Gas, WPC YPC representative from Russia



Anna Illarionova

PhD, Sustainability and Communications Expert, WPC YP representative from Russia (alternate)

We were at the WPC Council Meeting in Bahrain in December 2016, studying the nomination process for the next WPC Youth Forum, wondering if we were ambitious enough to be the next host. Did we want to be on the list with China, France, India, Canada, and Brazil – the countries that have successfully hosted this event before? Are we

representing a young generation in oil and gas that would like to be game changers and put their mark on a global energy agenda? Who, if not US?

All these thoughts came to mind while we were talking inside the WPC Russian National Committee about the possibility of applying to host the next WPC Youth Forum – Future Leaders

Forum in Saint Petersburg and we decided 'YES!'. So now we are proud to welcome everyone to the Forum in one of the most beautiful cities in Russia - rich in history, culture, and oil and gas professionals that are working and studying in the major governmental, business, academic institutions on the Neva River.

The Forum could not have



happened without the strong support from the Organising Committee, set up by the Russian institutional, business and academic partners, and chaired by the Minister of Energy of the Russian Federation HE Alexander Novak. Being one of the major oil and gas producers in the world, Russia has set records in the global petroleum industry, and the future of petroleum specialists, their attraction, development and retention remains one of the top priorities for the industry and the country in general.

The selected venue has also made the Forum very special. The Saint-Petersburg Mining University is one of the world's leading and largest universities for higher mining technical education with over 16,500 students and also represents the cultural heritage of Russia.

Finally, we would of course

like to thank the team that made this event happen! The International Programme Committee, formed from the WPC Young Professionals and including nine countries (Canada, France, Hungary, Iran, Russia, Saudi Arabia, Spain, Turkey and the USA), that developed the Forum's technical programme based on three key pillars: Leadership, Innovation and Sustainability. The youth team of the Russian National Committee, who are responsible for different areas and tasks, and have leveraged their expertise from working on the 21st World Petroleum Congress preparation in Moscow in 2014 and contributed to the Forum's organisation with all their passion and creativity.

Now you know what helped us accept the challenge in December 2016 and prepare an event that will engage around

1,200 young specialists and students in a unique platform to share ideas, gain knowledge and mentorship, and continue to grow an international network of young energy professionals.

What will make this Forum a real success? Undoubtedly, active participants and inspiring speakers! Who, if not YOU? Please stay tuned and enjoy the 6th WPC Youth Forum – Future Leaders Forum in Saint Petersburg. 💧

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TACKLING CLIMATE CHANGE & REDUCING THE ENVIRONMENTAL IMPACT

Global phenomena such as the fast growing global population (estimated to increase by approximately 1.7 billion by 2040), improvements in living standards (particularly in India, China, and across Asia)¹, and constantly rising demand for energy (with still approximately 1 billion people without access to electricity)² that will be provided primarily through fossil fuels undeniably impacts the energy landscape in the long run.

As a result of these global trends, carbon emissions continue to grow, causing long-lasting changes to the climate and representing an acute social and environmental challenge that requires urgent collective action.³

Carbon emissions and their environmental impact will continue to be a challenge as the use of hydrocarbons continues to be a dominant choice for consumers and in high demand for industrial operations.

Oil and gas directly contribute to 57% of global carbon emissions (production and consumption).⁴ This results in human impact and economic losses from climate-related and geo-physical disasters.

However, climate action represents an opportunity to raise the public perception of the industry and to diversify the energy mix, fostering sustainable natural resource management and preserving the stability of our ecosystem. Bringing all stakeholders into action triggers collaboration and strategic partnerships in the petroleum industry that allow the introduction of low-emission energy technologies (ex. flare mitigation), increased energy efficiency, improvement of waste management, and development of circular business models. Oil and gas companies are working to increase the use of natural gas in oil production by removing technical and regulatory barriers to stop flaring and by deploying carbon capture and storage technology, particularly for thermal power generation, with the objective of reducing emissions.

The urgency of tackling climate change, boosted by technological progress that affects price mechanisms in the sector, has rapidly increased the availability and affordability of unconventional energy resources, opening a path for new skills, innovations, expertise and jobs. By producing, transporting



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and delivering energy in a more sustainable, efficient and responsible manner, the petroleum industry can make a significant step towards the energy transition process, proving affordable and reliable access to energy, mitigating possible environmental and social impacts and creating new opportunities for inclusive growth. 💧

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THE ROLE OF THE PETROLEUM INDUSTRY IN LOCAL COMMUNITY EMPOWERMENT AND SOCIAL IMPACT

The energy industry has a unique relationship with our world as the power and resources provided by the petroleum industry are completely integrated with modern life. The sustainable development of resources and enrichment of local communities has become a global expectation. To support the growing demand for reliable energy, the industry must place an emphasis on educated leadership, innovation, and community stewardship.

Valuing education, companies across the world have heavily invested in educational programs. In the U.S.A., museum exhibits, science, technology, engineering, and mathematics (STEM) education classes for children, university partnerships, and other programs are regularly supported by the petroleum industry to promote STEM and higher education across gender and economic boundaries. Abroad, energy company partnerships with local communities have created education opportunities

for rural children in underserved communities, connected isolated communities to electrical grids, and created shared value by directly engaging with local stakeholders to meet their needs. This value of care is essential and is practiced across the world by petroleum exploration companies, service companies and production companies.

Professional organisations like the World Petroleum Council (WPC), Society of Petroleum Engineers (SPE), and American Association of Petroleum Geologists (AAPG) also work to support a culture of sustainability. One of the themes at the AAPG Annual Conference and Exhibition is dedicated to Energy Sustainability and the Environment. The SPE has launched a sustainability initiative focused on supporting Women in Energy. The WPC, through its member countries, the 6th WPC Youth Forum: Future Leader's Forum, World Petroleum Congress, and other initiatives is a center for the



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development of discussions regarding social responsibility and community development.

At each level, the petroleum industry is dedicated to community empowerment, education, and positive societal impact: bringing new opportunities and innovation to the industry as companies and stakeholders work together to find solutions to new challenges globally. 💧



CHALLENGES & OPPORTUNITIES FOR YOUNG PEOPLE IN THE PETROLEUM INDUSTRY AS THE WORLD TRANSITIONS INTO A LOW CARBON ECONOMY

One of the main challenges that the petroleum industry will face in the next three decades is to adapt to a world that will inevitably transition into a low carbon economy. In this evolving energy landscape, the industry will have to meet increasingly higher efficiency and transparency standards in order to gain social license to operate, access the large amounts of capital necessary to develop existing and new petroleum resources, and attract and retain young talent.

There is a talent attraction and retention issue in the industry, that is becoming increasingly more difficult to resolve - not only because the industry is suffering from a bad reputation with respect to

transparency and health, safety and environmental standards, but it is now also being perceived by many as doomed and hopeless for young professionals pursuing a fulfilling career. Nothing could be more wrong.

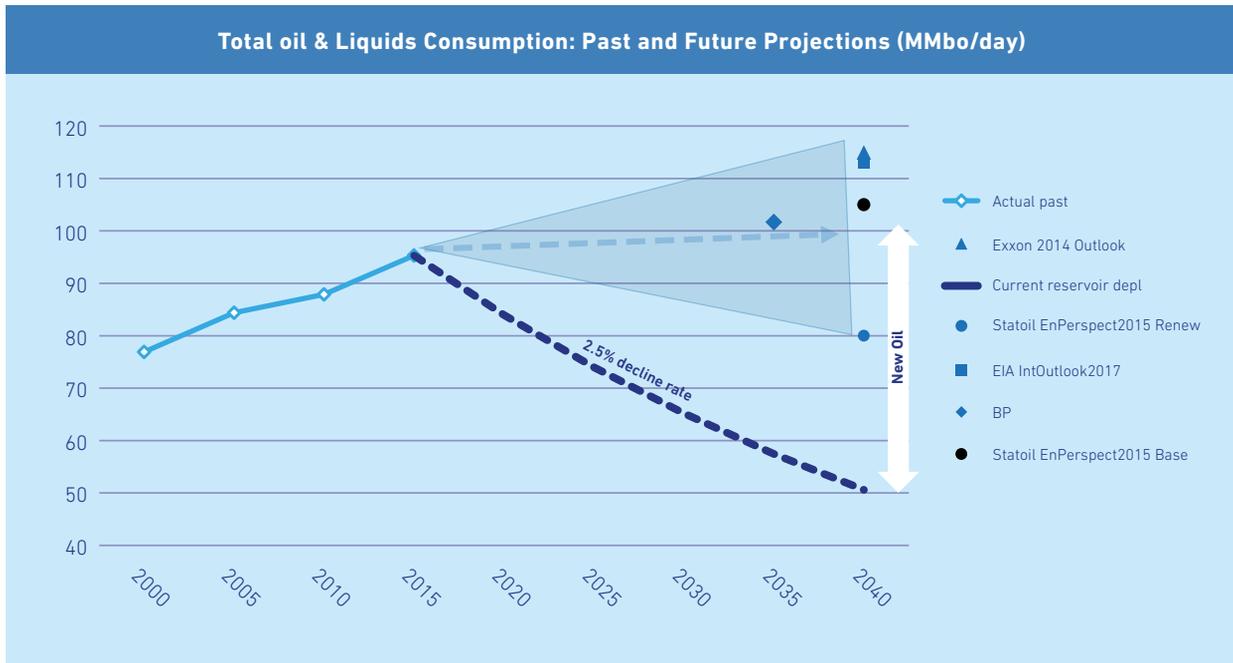
Firstly, it is important to point out that a large scale, global substitution of oil and natural gas for other forms of renewable sources of energy will take many decades to be implemented. It may also be that a low carbon system could still use significant amounts of hydrocarbons, as new technologies to increase energy efficiency and reduce the carbon footprint are developed and introduced in the global economy.

Secondly, there will still be a need to develop existing and new oil and gas resources in



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the foreseeable future to offset the supply shortfalls that would inexorably occur if the existing producing reservoirs were simply depleted without any additional investments. The



graph above indicates that, even for a modest yearly decline rate of 2.5% per year, the current production of existing reservoirs would decline to about half of the current level by 2040, to approximately 50 mmb/day, if no additional investments were made. On the demand side, though harder to predict, various scenarios prepared by oil companies and energy think tanks indicate that the total demand by the middle of the century could be in the range of 80mmb to over 100 mmb per day.

The above figures show that even if a significant level of uncertainty is factored in, there still is, and there will continue to be, an economic and social rationale for the industry to continue operating over the next few decades, so young professionals should not worry about longevity of the industry. And even if they do, for the reasons explained below, they still should see a career in the petroleum industry

as a stepping stone to achieve excellence and competitiveness in any other economic sector.

This leads me to a second, and probably more compelling argument that, in fact, young professionals should favor the oil industry as a top career choice. There are few, if any, activity sectors that are as broad, complex and technology intense as the petroleum industry, as illustrated below:

- The search for, production, transportation, refining, and distribution, of oil and its products impacts and inter-relates with the economic and social fabric of people and countries around the world. Not a single person on the globe lives without benefitting in many ways from the industry's activities, its products, and the energy supply that it yields
- The level of uncertainty that the industry faces, the risks inherent to the exploration for new oil fields and reservoir performance,

market volatility, and the typical long-term time frame required for the remuneration of massive investment, makes it imperative to adopt the most sophisticated tools for corporate governance, community relations, HSE and project and capital management;

- Because oil reserves may sit in the most harsh and unreachable sites, and their processing and delivery to the consumers may impact people and the environment, the industry is constantly stretching its limits and developing cutting edge new technologies, and through that process is bringing together the brightest professionals in the oil and services companies, academia, research institutes and governmental agencies.

In conclusion, the opportunities for young professionals are huge. Careers in the oil industry still promise a life of innovation, adventure, global exposure, personal and professional fulfillment. 💧



E.S.G. COMPLIANCE IN ARCTIC PETROLEUM PROJECT MANAGEMENT

In 2015 the environmental, social and corporate governance (ESG) assessment was acknowledged as a fiducial duty of petroleum industry investors by the United Nations¹ member states through the report *Fiduciary Duty in the 21st Century* by the Principles for Responsible Investment. Consequently, it is now both a public commitment and a financial interest for a company to integrate best ESG practices during project planning and development.²

The Arctic region, which has outstanding resource potential, is known for its harsh climate, fragile ecosystems and Arctic indigenous communities. Considering ESG criteria, Russian, American, Canadian and Norwegian companies involved in the development of Arctic petroleum resources were studied to identify best management practices. This was accomplished through investigating national and international legislation, corporate public accountability reports and semi-structured interviews with responsible business representatives.³

These direct interviews

gave a chance to get an inside perspective on the ESG and compliance matters and allowed us to distinguish several general trends in the field. It was observed that since 2015 many companies have increased their ESG expenditures. They have also introduced special ESG-oriented KPIs (for example one of the major Russian Arctic industrial companies has recently integrated a new "social stability" KPI into its management evaluation system).

However, some ESG-oriented solutions, widely applied in Arctic petroleum project management, are still not properly tracked and associated with these practices. For example, an important part of corporate environmental programs in the Arctic are climate change resilient technologies with a special focus on permafrost conservation and oil spills prevention. It should be noted that the budget for these programmes, allocated to relevant technological eco-innovations, is traditionally not considered as an ESG expenditure.

While this research is still ongoing, initial results show that approaches to harmonise



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management approaches with modern ESG requirements still continue to evolve. Moreover, the ESG criteria are being currently developed and specified by international organisations and expert society. I believe that the VI WPC Youth Forum will be a great platform to share our research and spark valuable discussions with peers and industry leaders. 💧

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ENERGY INDUSTRY THROUGH A PRISM OF CHANGE

The energy industry is a complex integrated system of technical, social, economic, and political elements. It is being transformed under a variety of trends and the changing needs of society. On one hand, there are sustainability and climate change issues, on the other hand – a growing global energy demand and a need to sustain economic growth. The energy industry transformation is facilitated by advanced technological development and challenged by geopolitical issues. Those challenges are radically transforming the oil and gas industry, where the 'business-as-usual' mode is no longer possible.

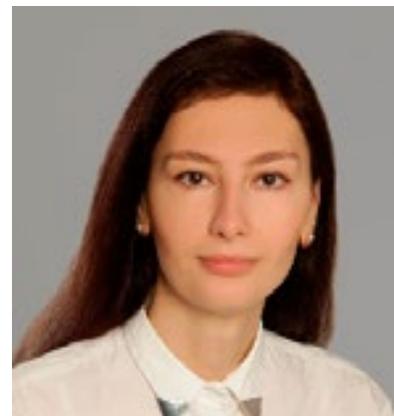
Many factors are opposing each other or having a converse effect on the energy system. Therefore, the system's nonsynchronous complexity creates unnecessary constraints for the transformation processes. It is crucial to understand how the oil and natural gas industry can contribute to the change, and to understand the most influential factors facilitating the transformation.

The oil and natural gas industry is an incumbent player with a much longer history than is often presumed. The industry has passed through different development stages,¹ currently satisfying more than 50% of the

global energy demand. This means that the global oil and gas industry is huge and also possesses a significant resilience as any large technological system does². Thus, transformation processes can be expected to proceed at a slower pace. At the same time, the industry has great potential and the resources to facilitate the transformation, as well as the capabilities to re-shape the traditional energy business.

There are two rather opposing, but illustrative, examples of the current oil and gas industry development. One is the exploration of remote conventional oil and natural gas resources offshore in the Arctic, encouraged by innovative solutions and digital technologies. The second one is the deployment of decentralised renewable energy solutions in combination with traditional energy sources. Both of these cases are the result of the changing energy industry.

Urging transformation pressures, like climate change or renewable energy growth, have a diverging impact on the oil and gas industry. However, from the industrial dynamics theoretical perspective,² the industry as an incumbent possesses a high level of momentum and has a substantial effect on the global energy system. The limitations of currently dominating views



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on sustainable transformation by themselves restrict the transformation capacity of the global energy system, as they do not take into account the capabilities and competencies of the oil and gas industry. A broader view on the oil and gas industry shows its key facilitating role in leading the path of change. 💧

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THE KEY TO UNLOCKING THE ARCTIC'S RESOURCE POTENTIAL

Amid the conventional fields' gradual depletion and the steady increase in energy demand, the development of hard-to-recover petroleum reserves is becoming increasingly important, in particular, offshore field development in the Arctic. The series of significant hydrocarbon resource discoveries that has occurred in recent decades has heightened industrial interest to the region.

According to the International Energy Agency, the World Ocean hydrocarbon potential is estimated at more than 450 BTOE. About a third of these resources are concentrated on the Russian continental shelf, which almost entirely relates to the Arctic region.

Oil and gas exploration in the Arctic started with the implementation of artificial islands that were only suitable for shallow waters and were used extensively in the 1980's in the Beaufort Sea.

The islands were made with gravel, on which the drilling rig was installed. In some cases, the ice was utilised as a construction material for the islands (e.g. Spraying MARS Island 1986).



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With time, exploration moved to deeper waters and new technologies evolved.

One of the key technical challenges for the operations in the Arctic region is the development of the facilities' ability to withstand enormous loads caused by the environmental conditions, mainly by ice and waves. One of the possible technical solutions to manage this issue is implementation of a gravity-based structure (GBS). The prime example of this is the Hibernia platform installed in offshore Newfoundland and



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Labrador and able to resist the large-tonnage of iceberg loads. Another approach is to deploy floating production units and subsea production systems, (for example the White Rose project) whose field development concept includes subsea wells in drill centers located in glory holes for iceberg scouring protection and connected to ice-resistant ship-shaped FPSO (floating, production, storage and offloading) via flexible risers and flowlines.

In Russia, dynamic Arctic shelf exploration started in the 1980s focusing on the



Pechora and Kara seas. Since then, many large discoveries had been made revealing tremendous hydrocarbon reserves (Shtokmanovskoye field, Prirazlomnoye field, Pobeda field, Dolginskoye field etc.). Currently, active production is occurring only at the Prirazlomnoye field. To operate this field, a gravity-based structure, able to withstand significant ice loads due to specially designed sloping-walls (caisson), was constructed.

Harsh environmental conditions, fragile ecosystems, and the remoteness of this area

are the key elements that should be considered when discussing further sustainable and responsible Arctic development. There are many technological challenges being faced now that will have to be solved in order to ensure the safety of personnel and the environment. Among these challenges are: prediction of ice drifting due to climate change, corrosion and strength of pipelines in extremely cold temperatures, subsea equipment protection from ice ridges, disposal water management, stability of subsea pipelines due to thaw settlement and many others.

Arctic resource development is impossible without taking special measures adapted to extreme climate conditions. These matters are the responsibility of asset owners doing business responsibly in the Arctic.

According to experts, the Arctic region will be of great economic interest in the future. In this regard, issues of technological advancement, competence development, and future leaders training are considered vital for maintaining the industry's competitive advantage. 💧



REVOLUTIONARY PROCESSES IN DOWN-STREAM: STAYING ON YOUR TOES

While global crude demand continues to grow, the trend in Europe is forecast to change direction, with rising fuel efficiency of internal combustion engines, reinvention of alternative drivetrains and environmental concerns likely to refute the predictions of the last decades as growth diminishes in Europe. How can European refineries maintain their profitability while utilising their installed distillation capacities in the long run?

Improving flexibility in refining by implementing options to shift towards petrochemical feedstock production seems to be a solid strategy, as demand for plastics is booming. Refinery propylene production is an excellent opportunity to complement the ethylene produced by steam crackers running on shale gas in the United States and on ethane in the Middle East. Unsurprisingly, new technologies are being developed to increase the propylene yields and overall flexibility of Fluid Catalytic Crackers, the refinery's primary propylene workhorse.

The FlexEne technology of Axens does just that by utilising a simple fixed bed reactor oligomerisation unit that is

integrated with the FCC. Light olefins in the unit are oligomerised into either gasoline or distillate products, improving the flexibility of the refinery. The catch is that the oligomers may also be recycled to the FCC as a high propylene selectivity premium feed. This concept may be implemented to Grass Roots or existing FCC units. Since its introduction in 2008, seven FlexEne units are in development or under implementation.

Another approach is the development of a novel catalytic cracking process and catalyst, such as in the case of KBR's Catalytic Olefins Technology (K-COT). K-COT is designed to process light olefinic feeds, mainly steam cracking pyrolysis oils and FCC gasoline, but can handle several lower value olefinic, paraffinic or mixed feeds. Its unique reactor design and custom catalyst provide high propylene yields, winning KBR a contract with Lihuyi for a new olefin production unit in 2018.

The utilisation of olefinic feeds seems to be solved, but is there a way to convert mostly paraffinic light feeds? Enter Innovacat: their Gasolfin technology utilises a multi-staged fixed bed reactor system with a multifunctional heterogeneous catalyst to crack both paraffinic and olefinic light



Márton Takács

Márton Takacs, Internal Audit & Compliance Manager at MOL Magyarország

naphthas, even straight run naphthas to olefins and aromatics, enabling surprisingly high propylene yields. The technology is currently in pilot phase, with a demonstration plant in the works.

The sheer number of technologies being developed in this field shows the potential and demand for flexibility and petrochemical integration, as steam cracker propylene output is likely to decrease while the demand growth for propylene derivatives is here to stay. The availability of technologies alone is not enough though. To ride the changing tides, we refiners must be flexible ourselves and we should stay on our toes. 💧



DEVELOPMENTS AND FUTURE DIRECTIONS OF THE GEOTHERMAL INDUSTRY

At present, environmental pollution has become one of the most important problems of global sustainable development. Geothermal energy is renewable energy with the characteristics of being low-carbon and recyclable. Geothermal resources, with the advantage of large reserves, wide distribution, clean environmental protection, good stability, high utilisation coefficient, etc. have great potential for future energy supply, energy conservation and emission reduction. According to data taken from the World Geothermal Congress, the scale of geothermal energy direct utilisation increases at a compound rate, and the scale of geothermal power generation increases linearly.

China has rich geothermal resources, mainly medium-low temperature geothermal resources. According to the statistics of the Ministry of Land and Resources of China in 2011, the amount of shallow geothermal energy resources

is equivalent to 9.5 billion tons of standard coal every year, the amount of middle-deep geothermal resources is equivalent to 853 billion tons of standard coal, and dry-hot rock geothermal energy resources equivalent to 86 trillion tons of standard coal. The geothermal industry in China has made some progress, such as the “Xiongxin Model”. In 2009, Sinopec Star entered Xiongxin market. After 8 years of development, geothermal district heating has covered nearly all the urban areas of Xiongxin, and Xiongxin has become the first smog-free city in China. However, the geothermal industry is still in its initial stage. The resource development and utilisation level is quite low, mainly direct utilisation, and the geothermal power generation industry is far behind. Now, China has obtained high temperature and high quality dry-hot rock mass at Gonghe basin in Qinghai Province. In order to establish a dry-hot rock demonstration base, Sinopec and the Chinese government are working together

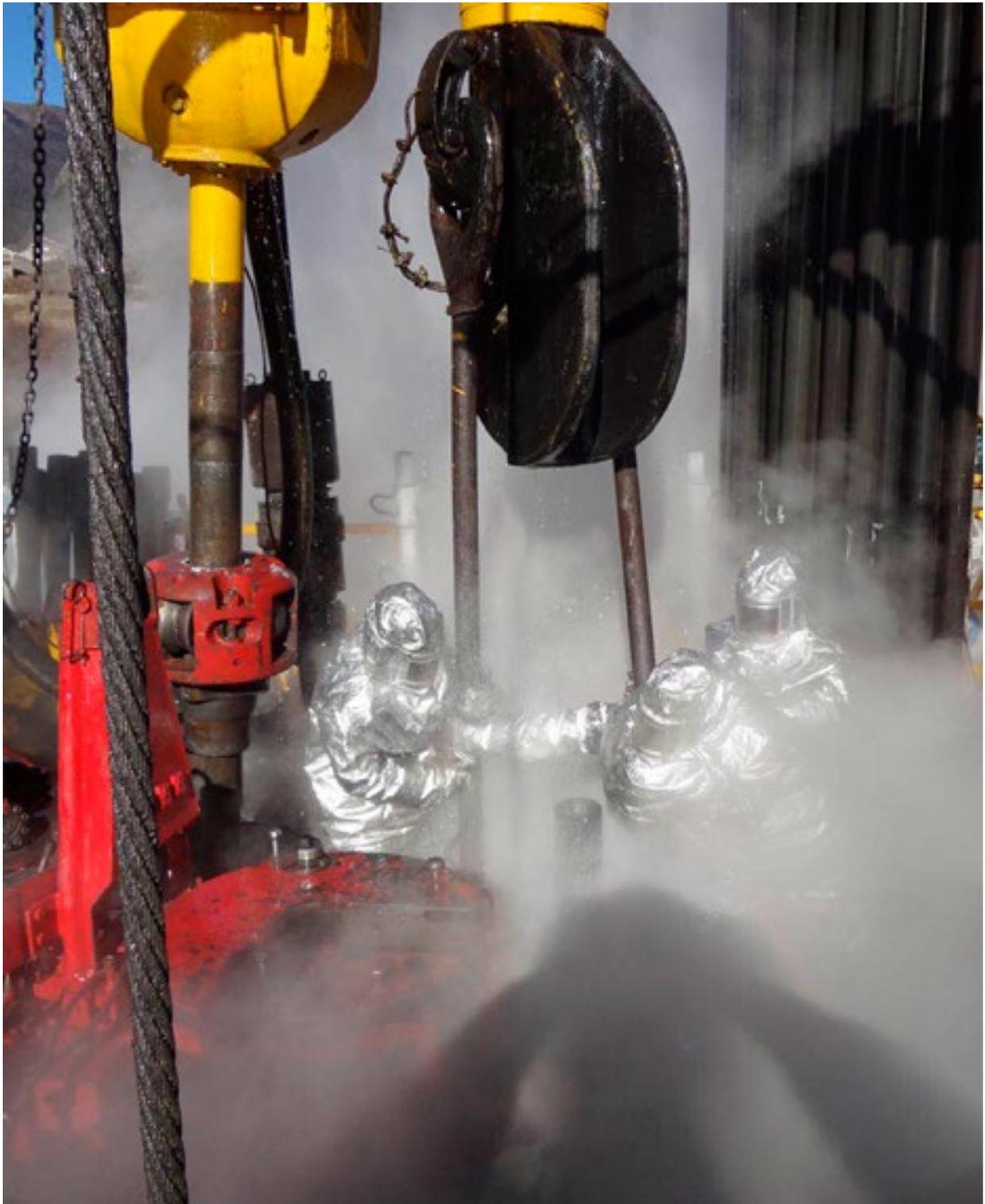


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to resolve key technical problems of dry-hot rock exploration and development, such as high temperature drilling technology, fracturing technology, and business development modelling.

There are three main hot spots of the future geothermal industry development direction: the first is the exploitation and utilisation of supercritical geothermal fluid; the



second is enhanced geothermal systems, such as Renton Hill, Desert Peak, Geysers, Soultz, Habanero, Hijiori, Landau etc.; the

last is the large-scale development and utilisation of hydrothermal type geothermal resources, including power generation

technology and direct use, as well as the effective combination between the two cascade utilisation technologies. 💧



INDUSTRY 4.0 IS COMING

From the invention of the steam engine, to the first industrially manufactured products and the automation of production processes, each single industrial revolution has led to the rise of a huge number of growth opportunities. Not only have these opportunities allowed new business models and economy development, but also they have provided for an increase of living standards.

Today, we find ourselves on the verge of the fourth industrial revolution (4IR). Whereas previous revolutions based their strength on different kinds of raw materials, such as coal, iron and silicon, a non-physical raw material has become the new source of value to be exploited – data. Digitisation has rapidly entered our lives and homes in the form of smart appliances, wearables and/or social networks. Although stringent regulatory standards and capital intensity may slow down the adoption pace in the industrial sector, especially in O&G, the trillion-dollar opportunity behind makes us expect many groundbreaking changes in the coming years.

Global scale and business complexity make O&G a fertile ground for 4IR breeding. The Internet of Things (IoT) lets us know and act on every pressure, flow rate and weather condition both from our local refineries as well as deep water offshore

rigs. Every asset from every site can be connected, either through satellite communications, mobile networks or fiber cables, allowing us to process data at the cloud but also at the edge.

Different advanced analytic techniques, such as Big Data or machine learning, let us understand and contextualise raw data, transforming it into actionable knowledge. We can improve decision making by shaping a digital twin of the real world. Maximising the life of a well or adapting refinery production to changing conditions requires complex optimisation algorithms that consider both hard and soft data, from process conditions to market prices. Predicting the failure of a complex machine and planning needed maintenance tasks that minimise downtimes requires enterprises to integrate systems and capabilities both vertically and horizontally. Visual recognition techniques are already helping drilling companies to analyse debris characteristics in real time to optimise drilling process. Wearable technologies are being used to improve field worker safety under hazardous conditions.

Moreover, many other emergent technologies are making their way into the business. Drones inspect long pipelines at low cost, improve safety by avoiding some of the works currently performed



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at height and help to track oil dumping. Additive manufacturing – also known as 3D printing – avoids long downtimes when spare parts are needed for equipment to function. Virtual reality can improve workforce training, while augmented reality can complement worker knowledge and skills when performing a maintenance task on complex equipment. Bilateral dealing and product heterogeneity make oil-trading agreements complex to reach and execute. Conditions such as average reference prices, currency exchange values or certified product qualities could be registered and monitored using blockchain smart contracts that would automatically validate its fulfillment and unleash agreed payments.

Of course, every great opportunity comes with great challenges. Firstly, regulation



needs to be updated to consider all these new existing capabilities. Secondly, new key skills should be welcomed into the fold. Data scientists or certified drone pilots are just some of them. Finally,

keeping up with the pace of technology evolution is a tough task. Therefore, solid partnerships need to be formed between traditional players and tech companies, not only to provide

expertise, but also to introduce new methodologies and visions. 💧

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THE ROLE OF TECHNOLOGY IN SHAPING THE BUSINESS LANDSCAPE

With the ever-growing population and increasing energy demand, global energy companies are facing constant challenges in their pursuit to provide enough energy supplies. The continued transformation of oil and gas industry technologies is deemed to be the most effective solution to respond to such demands while providing affordable prices and maintaining safer and environmentally friendly operations.

All major industry players today understand that technological innovation and research breakthroughs are the key drivers for the successful transformation of the industry. Therefore, most global energy companies have been increasing their research and development (R&D) budgets over the past few years despite the challenges in the oil market. The R&D pursuits are focused on a broad spectrum of challenges associated with hydrocarbon discovery, recovery, and exploitation as well as searching and advancing other energy sources.



Pavel Golikov

Geophysicist, Aramco Upstream Solutions – Moscow

However, corporate research divisions are, by design, mostly focused on applied research that can make a visible impact in a short period of time. On the other hand, the majority of the fundamental research in various areas around the world is done in universities. Therefore, it is extremely important for the oil and gas industry to establish strong and fruitful connections with global academic research groups to stimulate future generations of technologies. There are several models for this interaction, such



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as industry sponsored research projects, research consortia, joint centres, and corporate research centres located at universities' research parks.

As an example, Saudi Aramco utilises these models to reinforce its position among the leaders in global energy innovation. One of the most successful ways to explore the global research landscape, and to show the strong presence in the major hubs of research and innovation, is the Aramco Upstream Global



TECHNOLOGY AND INNOVATION

**ARAMCO UPSTREAM
GLOBAL RESEARCH
CENTRE LOCATIONS**

Research Centres (GRCs). Started in 2012 with its first international GRC at TU Delft, Aramco now has 6 GRCs in America, Europe and Asia, in addition to two centres inside the Kingdom of Saudi Arabia. These centres are focused on a wide range of challenges and visionary solutions. Key differentiators of Saudi Aramco technology endeavours are the unwavering commitment to long term research pursuits, aggressiveness to embark on game-changing technological concepts, openness for collaboration wherever complementarity prevails, and availing of the environment and opportunities for researchers to pursue bold ideas.

Aramco Research Center - Moscow is the latest addition to the Saudi Aramco Upstream GRCs family. It was launched in July 2018 and by design it's located close to the number one university in Russia – Moscow State University (MSU). Following the leading-edge trends in academia and industry, the Moscow GRC is centred around developing technologies that stem their niches from the applications of the so-called 4th Industry Revolution drivers. Coupled with an organisational structure that is focused on research themes rather than traditional discipline divisions, the Center is going to conduct research in: Modelling and

Simulation, Artificial Intelligence and Data Analytics, Advanced Materials and Geo- & Petro-physical Instrumentation. Being placed at the MSU campus, the Moscow GRC has direct access to bright minds and leading-edge facilities that required for successful implementation of the most innovative ideas. And these ideas are the actual fuel for the next generation energy demand.

Historically, knowledge is the key for future technological breakthroughs. Moving closer to the knowledge creation hubs is a winning strategy for any company and Saudi Aramco demonstrates a model to follow with its network of centers around the globe. 💧



INSPIRING THE NEXT GENERATION OF MALE AND FEMALE ENTREPRENEURS

What are the key barriers to getting more young professionals, female and male, into the entrepreneurial world? And what are the personal attributes one should develop in order to achieve one's goals?

The first challenge aspiring entrepreneurs face is to identify target customer segments with big needs, and then to develop a solution that offers a significant value that has product-market fit. It's a lot harder than it sounds because product-market fit is not just about addressing the need, but also about developing a product that the customer can afford and adopt without requiring too much change in behavior.

In addition, an entrepreneur must have an innovative mindset, including characteristics such as:

- Propensity to take risks and experiment in order to find what works
- Ability to collaborate because any big ventures require a team
- Valuing diversity because a successful start-up requires different people with different skillsets and experiences
- Self-confidence and tenacity because entrepreneurship is

going where nobody else has been and there will be many nay-sayers along the way

- Ability to empathise with others like customers and team members.

The energy industry has always been a male-dominated industry. What is your perception and what would be your recommendations for women to start and succeed in such an environment?

As a former female engineer at Exxon, I believe the biggest driver of success is to respect others, to work really hard, and to be excellent at your job. This requires good listening and learning skills so you understand the priorities and acquire valuable knowledge to build out your skill set. When I first started working at an Exxon refinery, there was a field supervisor who thought I was a hot-shot college graduate engineer who really didn't know anything. He was often critical of me and my work. But after listening to him with respect and working diligently for six months, I gained his respect and he became one of my biggest champions in the refinery. In addition, women need to ask for opportunities, instead of waiting for them to be given to them. After managing both genders, I have been surprised to



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learn how men are very pro-active about asking for promotions and raises, while very few women are.

Do you believe there is some sort of pattern or formula to becoming a successful entrepreneur?

It goes back to having the right mindset as mentioned earlier – the propensity to take risks and experiment, in valuing diversity, the ability to collaborate and having tenacity and self-confidence, as well as empathy with others such as customers and team members. If an entrepreneur is willing to



keep experimenting, even if he or she encounters failures on the way, they can eventually develop the killer ultimate solution with product-market fit.

What is the role played by regulation in fostering gender equality? What would be the best legislation needed to drive change in cultures and habits (e.g. companies, professional federations, states, regional institutions)?

Studies have shown that people tend to hire and promote people who are like them. In situations where there is a lot of gender

inequality, like the dominance of male leaders in the petroleum industry, I think there needs to be some regulation that opens the door to women at senior levels. Meanwhile, there are leaders who are for equality, but often they are not aware that gender equality is a problem or of the challenges that women face in the industry. My thought is that legislation should first be focused on education and fostering awareness of gender issues so that current leaders can implement programs to foster gender equality. If that doesn't work, implementation of more drastic legislation

until the playing field is more level for gender equality.

Summing it up, to all our young male and female readers, what would be your advice as they start to embrace building their own businesses?

Be passionate about solving problems, take risks, value others especially those who are different from you, believe in yourself, keep doing your best, and never give up. If your first business doesn't work, reflect on why you failed, learn all that you can, and you'll be in a better position to succeed in the next business! 💧



YOUNG ENTREPRENEURS IN ENERGY: DREAM VS REALITY

The energy sector has traditionally been one of the most risk averse. Entrepreneurship, to the contrary, is defined by a very disruptive and innovative DNA. It emerges from a challenge to the existing status quo and offers better alternatives with new and innovative solutions.

What was your key driving force in becoming an entrepreneur? And how do you generate new ideas?

My key driving force is curiosity and the will to have a more direct impact, coupled with a frustration with certain decision making mechanisms blocking innovation from happening. To generate new ideas, more system optimisation, transparent data collection and processing, artificial intelligence and machine learning as well as new breakthroughs in physics and new materials help us answer some of the most pressing challenges in the energy world. These include electricity storage, renewables integration, more efficient use of base load power and better demand-supply dynamics in an "internet of energy".

What has been your most satisfying moment in business?

While the most satisfying business moment was the first signing of a partnership deal with a billion dollar corporation, the major

motivational breakthrough was the point at which my team started to prosper, collaborate and grow together around the same vision and burning desire to have an even bigger impact. Every great success is the success of a strong team.

What were the key lessons you learnt during your own career? If you had a magic wand, which are the three things you would change in the world?

Starting something from scratch is difficult and it will make you go through all possible emotional stages. So when things get tough, it is the passion for what you do, which navigates you out of those rough seas. The second lesson: to succeed, build structures that grow and learn by themselves, a bit like neurons in our brains, semi-autonomous, connected and highly efficient. Thirdly, always stay humble and remember to give back. Share your experiences, lessons and openly contribute to paving the way for more future entrepreneurs. If I had a magic wand, I would solve the problems of energy storage, sustainable food and energy supply safety, as well as universal access to affordable healthcare.

What advice would you give to college graduates and young professionals who want to become entrepreneurs?



Timur Topalgoekceli

Founder & Head, Hello Tomorrow Turkey

Try yourself and see whether it is right for you. To be an entrepreneur does not begin with starting a corporate legal entity. It is above all about having an entrepreneurial mindset, looking at the world through the lenses of a change maker. Just like the "lean" startup methodology, you become a successful entrepreneur through various cycles, each of which teaches you an improvement lesson via both success and failure. If you do not want to start a company immediately, join an existing startup and see how the internal dynamics are. Always stay open to mentorship, keep questioning, learn from what has and what has not worked in a particular field and then implement novel solutions. 💧



IF I KNEW THEN WHAT I KNOW NOW

What was your journey like to get where you are? What were some important changes of industry cycles you dealt with and what were the personal changes you went through in order to make it to a top level executive?

Having graduated with a diploma both in sciences, and management, I first worked in administrative bodies in France. I then decided to move on, quit public service and continue my career in international business. I joined Total in 2010, and left France for many years. After assignments in Singapore, Morocco, and Angola, I now work in Russia.

While at Total, my responsibilities have been diverse, ranging from downstream to upstream, and covering strategy, M&A and the management of business units. Over that period, oil prices were high, fell sharply, and recovered again. The USA was a net import of hydrocarbons, and now they are net exporter. The industry must be prepared for such rapid changes, by focusing on safe operation, controlling costs and generating cash. At the same time, it must be ready to seize the opportunities created by these dynamics. It has actually been the same for me: focusing on delivering and keeping my eyes open.

If you had the chance to start your career over again, what would you do differently?

I am glad that I work in this industry. The problems, combined with environmental,

technological, geopolitical, and business challenges, allow me to valorise my education and experience. A profile with both state administration and business is also useful in this industry which is traditionally close to state interests because of taxes and natural resources. Understanding both approaches in the oil and gas domain is like speaking two languages.

In addition, studying local languages is also a benefit for a top manager of a company like Total, where geographic mobility is a part of the corporate culture – we consider that Total should be perceived as Angolan in Angola, and Russian in Russia.

Like Total, I am driven by a pioneering spirit that pushes me to expand the limits of my own capabilities, and believe in the principle that the most interesting things lie ahead.

What were your guiding principles throughout your career – do you feel these apply to young professionals today?

I would frame it as sticking to intellectual honesty. For me, this means approaching things without a priori or prejudice, not copying any previous decisions taken by anyone else, and opening your mind to draw your own conclusions.

Moreover, don't fight against trends and innovation, accept competition. Trying to protect the security of a well-known environment is a lost battle.



Arnaud Le Foll
CEO, TOTAL Russia Office

What advice can you give to a young professional who wishes to achieve a successful career in the industry?

Our industry is moving forward very fast and has significantly progressed in recent years. It is a place to be for the young of various backgrounds. Especially if they are ready to move, learn and adapt as well as drive the change. With the current transformation of the world of energy, we can be not only the witnesses, but also the participants.

This industry is the response to the most basic societal need: access to energy. But what we do is more than that. It has to be cleaner, affordable, and more reliable. Tomorrow's new societal parameters will have to be included in the picture. Young professionals need to keep listening to the world, and to their communities, in order to anticipate the future challenges and make their contribution. 💧



WHAT ARE WE LOOKING FOR & WHAT SHOULD YOU BRING WITH YOU

A declining trend of oil and gas prices, and the advancement of technology development, has powerfully changed the shape of the industry's workforce and created challenges for both companies and employees in the oil and gas industry. These trends will motivate companies to increase their productivity by transforming the way they work to become more digital. A number of jobs will also decrease because certain jobs are replaced by automation and new technology – like artificial intelligence. On the other hand, companies are also facing the challenge of labour shortages because there is less supply in the labour market due to more and more people opting to work for other industries such as tech companies. Take a look at the latest list of LinkedIn Top Attractors, and you'll see that seven out of top ten companies in the list are tech-companies, while the highest ranked oil and gas company is in 16th place.

As young professionals, being digitally savvy will be an advantage to not only be capable of working with new technology that can increase productivity, but also developing

unconventional methods of working effectively with digital innovations. Furthermore, data-driven decision making is important for professionals to produce the right decisions and formulate relevant strategies. Therefore good data analytic skills are desirable to gain the right data, analyse it correctly, and make the right recommendation. In addition, in an unpredicted business environment like today, high emotional intelligence will be a valuable asset which can help you to not only survive but also thrive.

Massive digitalisation in the workplace will require intervention from companies to increase their employees digital literacy through various paths, such as training, coaching, and job exposure. Besides that, digitalisation will result in the reduction of several jobs that could potentially lead to lay-offs, and as such companies need to make an effort to help their employees reskill or retrain in order to minimise the effect of digitalisation. Finally, active collaboration between companies and universities is expected to prevent a mismatch between industry needs and university output for future jobs. ♦



Syahid Deradjat

*People Management Analyst / Masters of Industrial and Labour Relations (MILR) Students
Pertamina / Cornell University*



WAYS WOMEN CAN DEVELOP THEMSELVES FOR COMPETITIVENESS AND LEADERSHIP

There are many tenets of leadership but in my own words, a strong leader encourages, motivates, inspires and enables their team to drive their business forward in a sustainable and successful way. This is true of all leaders – male or female.

In the energy industry, amongst others, it is impossible to argue that women don't have to reach higher and work harder to gain leadership roles. But I would argue that it is not in the way that you think.

Demanding more from employers when it comes to acknowledging the importance of diversity is important. Encouraging an inclusive culture and raising awareness of unconscious bias is necessary. Joining mentoring groups or future leaders' programmes is encouraged. However, there is only so much others can do to back you or promote you.

Success as a leader must come from within.

There are a few learnings I

have picked up along the way that I would like to share with you:

Recognise your talent: In the workplace as in life, confidence is key. So many women question their abilities and talk themselves out of applying for more senior positions. As a client once told me, don't forget the life skills you learn that you can bring with you to the office — negotiating with a toddler and negotiating with your board of directors is not necessarily too different!

Ask for help: Don't question yourself, question others. If you are focused on your development and your own personal goals within the business, you can start to view guidance and help as a necessity, not a weakness. Seek out feedback from your mentors and colleagues; make a business case for a change you need. And don't apologise!

Be yourself: Trying to emulate your male colleagues or other leaders will often come across as inauthentic and will make you miserable. By all means, identify values and management



Amy Miller
Group Managing Director, Oil & Gas Council

styles that you admire — but stay true to who you are.

Take risks: Putting yourself outside of your comfort zone is... uncomfortable! But raising your hand to lead or take part in a new project will be worth it. Believe in yourself and others will believe in you too.

Make a plan for the top: Pathways to get to the top are many and varied; create your unique stepping stones and don't be afraid to be great! ♦



IF I WERE A C.E.O.

WHAT KEY ASPECTS OF THE FUTURE OF THE ENERGY INDUSTRY WOULD YOU FOCUS ON THAT ARE NOT SUFFICIENTLY ADDRESSED AT PRESENT?



Jun Niu

Petroleum Engineer, Sinopec

I would like to focus on the recovery technology of hydrate. Hydrate is regarded as a clean energy resource as it is the combination of methane and water. And the resource amount is huge, around $2 \times 10^{16} \text{m}^3$ natural gas at standard condition. That is twice the total amount of petroleum, gas and coal in terms of organic carbon. The hydrate recovery approaches that are tested in labs include the pressure drop method and the heating CO₂ replacing method, but some key problems have not yet been addressed, such as

the greenhouse effect from the leakage of methane, formation collapse and landslide and the regeneration of hydrate and tubing blockage. As a result, some solid research has to be done to facilitate site practice and achieve safe exploitation. 💧

WHAT WOULD YOU DO TO RESHAPE THE GLOBAL ENERGY SYSTEM TOWARDS A MORE SUSTAINABLE FUTURE?



Maram Al Belushi

Geologist, Ministry of Oil and Gas of the Sultanate of Oman

To reshape the global energy system to a more sustainable future I would start with changing the focus by collaborating with universities and research centres to conduct more industry related research and projects among the various types of renewable energy; its related issues, how to overcome the identified issues and the its long term positive impact. Secondly, I would invest in the most promising type of renewable energy projects which can provide a long term positive impact and a high rate of return to the environment

and the country. Finally, I would also invest in an efficient technology for monitoring energy consumption among oil and gas production facilities and hence, define the areas of higher energy consumption. For the areas of higher energy consumption, I would conduct renewable energy projects, which would consume a cleaner energy such as solar energy and geothermal energy depending on the available factors. 💧



IF I WERE A C.E.O.

WHAT POLICIES AND REGULATIONS DO YOU THINK PRODUCING AND CONSUMING NATIONS SHOULD ADOPT TO AVERT CLIMATE CHANGE IMPACTS?



Anna Illarionova

*PhD, Sustainability and Communications Expert,
WPC YP representative from Russia (alternate)*

The oil and gas industry is deeply involved in the global transformation due to its DNA: it impacts people's everyday life by providing access to energy, which is also fundamental for the development of other sectors. This is why, the petroleum industry has to address (and is currently addressing) the climate change impacts responsibly, ensuring the compliance with international regulations and policies, fostering the implementation of low-emission technologies and creating new jobs in low-carbon spheres. A

strong political will is key to drive these changes but at the same time only international cooperation and collective action from governments, oil and gas industry leaders, academia and non-governmental organisations can make a significant step towards low-carbon future where the energy is produced, delivered and consumed in a sustainable manner. 💧

WHAT WOULD YOU DO TO RESHAPE THE GLOBAL ENERGY SYSTEM TOWARDS A MORE SUSTAINABLE FUTURE?



Alev Güray

Biostratigrapher, Turkish Petroleum

The increasing need for energy is a well-known fact in our world with its increasing population and industrialisation. On the other hand, climate change and other environmental issues gain importance for the Earth to be a habitable planet. Therefore, if I were a CEO, one of my priorities would be research & development. The sustainability of the oil and gas industry depends on innovation and new technologies are important to reduce the risks in the upstream sector. Besides the conventional methods, unconventional resources are now a key factor of the industry and the

technological improvements are also important in the exploration and production of unconventionals. Alternatively, we know that the fossil fuels are not the only building blocks for today's global energy system and we need the renewables for sustainability. As a CEO, I would also invest in R&D for renewables. To work towards a more sustainable future, we need innovative solutions, which can be obtained through the R&D projects. I believe that the collaboration of academia with our research team will be necessary for these developments both in the oil and gas industry and for renewables. 💧



PEARLS OF WISDOM

What was the most difficult situation you faced in your career path and how did you manage it?

I would like to talk about a challenge that faces all of us who work in oil and gas. The negative public perception of our industry affects both our industry's ability to deliver the world's energy needs and our ability to attract young talent. I believe that our industry serves humanity, providing energy and prosperity. Climate change concerns lead to suggestions we just stop using fossil fuels, without an understanding that a transition will be required or a significant reduction in lifestyle will result. Our strategy towards climate change is through energy transition that promotes cleaner and more efficient use of oil and gas complimented by renewables.

To address this, I made sustainability the theme of my term as SPE President. A big part of my role is education – helping SPE members (and others) to understand what sustainability means and the very important role that oil and gas play (both now and for the foreseeable future). There are numerous common sense things that we can do – reducing flaring and fugitive emissions, improving energy efficiency, reducing our energy intensity, and so much more. Most of these make good business sense as well as helping the environment. Our industry is the leader in carbon capture and storage (CCS) technology, which the UN has identified as the key to reaching a zero net carbon emissions world. We make contributions across almost all of the UN's

sustainable development goals.

My vision for our members is to feel the pride of the industry's higher purpose of supplying energy to meet humankind's needs, supporting their economy and improving their lifestyle.

Q: What advice can you give to the young professional in order to achieve a successful career in today's energy industry?

I discovered the concept of Citizen Engineers only recently, but I have always supported the idea even before connecting it to that name. While developed for civil and mechanical engineers, it applies across all engineering disciplines, and likely into other disciplines as well. Marrying citizen with engineer means embracing the social and societal aspects of our engineering decisions.

With the growing importance of sustainability, both to young people and our planet, I would encourage all young professionals to strive to find ways to balance the commercial realities that must exist for our industry to continue with consideration for societal needs. In many parts of the world, our industry is not viewed very favourably, but we supply the energy that drives economies. Be proud of what you do and share your stories about how we help in the areas where we operate. It will make a difference – even one person at a time.

I would be remiss if I didn't also say – get involved with SPE, or a similar professional society like the WPC. SPE has been the driving force behind



Dr Sami Al Nuaim

2019 President, Society of Petroleum Engineers

not only my professional growth, but also my leadership skills development. Participation in such organisations will not only add to your technical and industry knowledge, but through volunteering with the organisation you will learn "soft skills" and build your personal and professional network.

Q: What were the key lessons you learned during your own career – do you feel these still apply to young professionals today?

The key lesson I would share is to never stop learning and growing, and don't be afraid to take on a new role. I have worked in a lot of different areas within Saudi Aramco during my career -- reservoir engineering, production engineering, research and development, and at the upstream computer centre. Each new role presented me with challenges and new things to learn. I embraced each one in turn and as a result I enhanced both my own knowledge and expertise and my value to my company. As I moved into an R&D role, my knowledge of other



areas of the business enabled me to make connections among them, which is a key aspect of innovation. Rarely are new ideas completely revolutionary – they arise by seeing how A effects B and connecting approach C that appeared promising in another situation. Knowledge of different areas of our business can help you to make connections (with both ideas and

with people) that can propel you and your company forward.

In addition to my work with Saudi Aramco, I am a professor of petroleum engineering at King Fahd University of Petroleum and Minerals (KFUPM). There I interact with so many bright young people, and help them gain the skills they will need to be successful in our industry. I

have always been so energised by what they bring to the table and confident of their success. Teaching has been a very gratifying part of my career. Find something you are passionate about – whether it is teaching, mentoring, volunteering, or helping others. Having something that energises you beyond your corporate career will sustain you in good times and bad. ♦



PEARLS OF WISDOM

What was the most difficult situation you faced in your career path and how did you manage it?

There have been many situations in my career path that were difficult ones. Some were related with the need to choose between different career tracks, others were related to very attractive job offers from other companies, and others were related with the need to confront a manager that I felt was not taking the right decisions or focusing on the right issues.

The most relevant decision I was confronted with is when I was offered a position in my company that I was very hesitant to accept as I had other career options that attracted me more and I did not see the value of changing. For several months I rejected that position until one day my CEO called me and told me to accept it, offering me his full support once I took that role. Looking back, I must admit that was the best career decision I took (or better said that someone took on my behalf!) which had a positive impact on my entire professional career. It taught me that sometimes you do not have the full perspective and the counseling from others may be very useful.

My recommendation is to never take a decision on the spot but instead carefully consider all the aspects of the issue, seek advice from the people you trust that are not directly involved with the issue, and once you take the decision firmly believe it is the best decision and don't look back. Sometimes the best decision is not to take the decision and see how

things evolve, and then take the decision once things are clearer.

What advice can you give to young professionals in order to achieve a successful career in today's energy industry?

In general I would say that in order to have a successful career the most important attribute is to be passionate about what you do. Young professionals in the energy industry should be passionate about being able to develop a career in a relevant, vibrant and exciting industry that contributes positively to satisfy the increasing and more sophisticated energy needs of our societies, in a responsible way from an environmental and social point of view.

The energy industry is under a major transformation characterised by a fast and disruptive technology development that creates many new and exciting career opportunities. The uncertainty about the future requires a high level of adaptability from the industry and the flexibility to cope with all the changes, and implies for young professionals a need to be constantly updated and trained on the technology evolution, and a flexibility to change paths as new technologies make others obsolete.

The transformation of the energy industry is also breaking the historical situation with very hierarchical organisations and mainly tenure based promotions, providing a career advancement where younger people are getting a lot of empowerment and accountability. Young professionals can bring the



Ivan Marten

Senior Partner Emeritus, Boston Consulting Group; and Non-executive Director, Tubacex, Spain

fresh air needed to cope with the future of the industry.

The young professionals that will succeed will be the ones that actively shape their own career, the ones that are prepared to take advantage of the increasing digitalisation of the industry, the ones that have a global mentality to understand the interrelations between business segments within the industry and outside the traditional boundaries of the industry, and the ones that network intensively.

I firmly believe that we have exciting times ahead and fantastic opportunities for young professionals.

What were the key lessons you learnt during your own career – do you feel these still apply to young professionals today?

I have spent more than 30 years in consulting focused roles in the energy industry, and have had global responsibilities and nurtured, developed and followed the careers of many



young professionals within my organisation as well as with my clients and this I think gives me a good perspective.

During all those years what I have learned is that precisely learning is the key: learning every day from mentors, from colleagues, from successes and from failures.

First you need to learn from your mentors and role models in the organisation, listen to their advice and observe their behavior. Those individuals had a

real impact on my development and my success afterwards as a leader, and I keep using the learnings I gained from them.

Second you need to learn from your colleagues by investing in people and surrounding you with the best of the best, engaging them, supporting them, empowering them and learning from them. Success is always a shared one.

Third you need to learn from successes and failures by being bold, as well as action

and results oriented. The worst thing is to procrastinate and delay decisions. You need to listen to and evaluate all the implications but you also need to decide and act fast. I believe it is better to fail than not act.

And finally you need to enjoy what you are doing. You need to be passionate about your job and the company you work for. Even if you are satisfied, reevaluating your career periodically is always healthy as it helps you to reconfirm that you are doing what is best. 💧



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● The aim of the group is to link talented students from universities and young professionals (Below 35 years old) working in Oil, Gas, Refinery and petrochemical industry from all over the world.

● WPC YP Connect is your one-stop for industry insights, diverse news, and thoughtful posts focused on key pillars of the WPC Young Professionals: talent development, leadership, innovation, diversity, gender parity and entrepreneurship.

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