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ENERGY EQUITY

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04 Message from the editor-in-chief

05 SandRose Team

06 Message from the chairman

07 Meet the SPE-KSA Executive Board



08 Energy Equity

12 Venturing Beyond

18 Baker Hughes leverages localization as a pathway to global growth

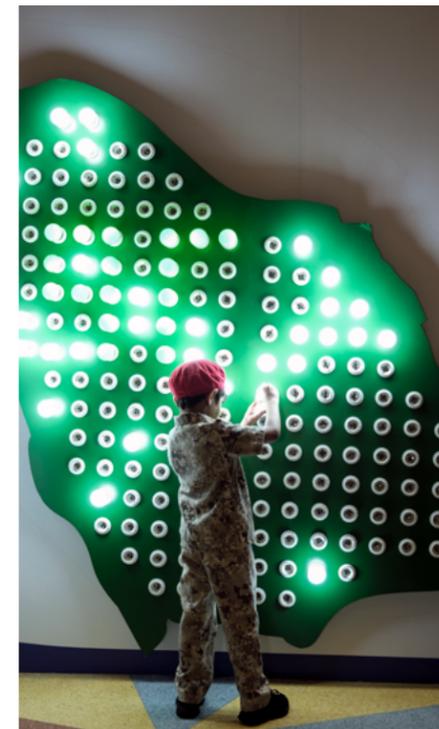
24 Fit-for-Purpose RSSAB While Drilling Improves Challenging Operations and Well Placement

29 Lower Carbon Oil through Reservoir Management Technology

33 Career in Focus: Energy Economics & Finance

36 Technical Paper Digest

38 Five Reasons to Consider Investing Today



40 The Hidden Power of Inclusive Language: Why Words Matter

42 YLAB Café: Journey of a Saudi Coffee Bean

46 Member Spotlight

48 SandRose Reviews

50 SPEED 2022: SPE Energy Dynamics Petrothon

56 September 2022 Dinner Meeting

60 SPE-KSA's D&I Hosts a Mindfulness and Workplace Productivity Workshop

64 Trips & Social Activities Events



74 Student Outreach Activities

78 Student Chapter in Focus: PMU

80 Student Corner: A Track to Victory

82 SandRose Reader Lens



Letters from

THE EDITOR-IN-CHIEF

Dear reader,

As professionals in the oil and gas industry, we often focus on cultivating knowledge and deploying technologies that enable us to extract hydrocarbons safely, efficiently, and sustainably. However, to meet the growing demand for cleaner energy, driving innovation and impact must be balanced by healthy economics and adequate financing. Therefore, in this issue, our theme revolves around "Energy Equity" in two contexts: Providing access to affordable and equitable energy systems (one of the three challenges of the energy trilemma). The second being acquiring equity and financing cutting-edge solutions to build more sustainable energy systems.

In pursuit of energy equity, many companies and countries globally are honoring emission reduction commitments. Saudi Aramco is one such company that has gone beyond R&D and has developed Aramco Ventures Company, a venture capital company, to diversify investments away from oil and to acquire equity in technologies that support its net-zero ambitions. In this special issue of SandRose, the editorial team sat with Aramco Ventures CEO Mahdi Aladel for an exclusive interview.

In this installment of the magazine, we also highlight the many section activities that have taken place between September and December of 2022. SPE-KSA's Technical & Professional Programs (T&PP) held their second Dinner Meeting in September on the "Role of Oil & Gas Companies

in the Energy Transition," featuring Mr. Peter Parry, Chairman of Global Energy and Natural Resources at Bain & Company. In October of 2022, SPE-KSA's Diversity and Inclusion (D&I), Young Professionals (YP), and Information Technology (IT) committees held their first joint SPE Energy Dynamics Petrothon, (SPEED), providing YPs with a venue to work together to develop solutions tackling challenges related to the energy industry. In this issue, in collaboration with the Student Outreach team (SO), we are proud to unveil the "student chapter in focus" feature highlighting the activities and accomplishments of SPE-KSA backed student chapters. After a long hiatus, the Trips and Social Activities (T&SA) team is back in full swing, organizing the first-ever SPE-KSA Padel Tournament and many more activities featured in this issue.

Finally, I would like to thank Baker Hughes for sponsoring this issue. Your support and partnership are instrumental to our success. I would also like to recognize the efforts and dedication of SandRose contributors and the editorial team.

We are always looking for talented writers and artists to feature in future issues. Feel free to contact us for feedback or future contributions at sandrose@spe-ksa.org 

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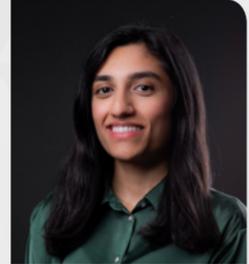
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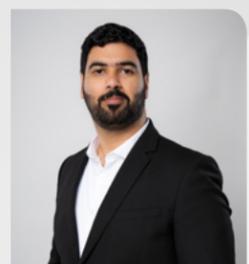
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Letters from

SPE-KSA CHAIRMAN

As we reach the end of 2022 I cannot help but reflect on the many accomplishments and milestones SPE-KSA has achieved over the past year. From the return of Technical & Professional Programs (T&PP) technical dinner meetings, successfully completing the SPE-KSA SPEED Petrothon, the establishment of new university chapters by Student Outreach (SO), and the continuation of the Trips & Social Activities (T&SA) team's involvement with members and the local community, to the many Diversity & Inclusion (D&I) events and workshops, SPE-KSA is proud to deliver to its members. These efforts have resulted in SPE-KSA not only winning the section excellence award, but also in achieving a milestone of 12,162 active professional members as of December of 2022. SPE-KSA continues to be the largest SPE section in the world. I would like to acknowledge the different SPE-KSA team members, volunteers, and members, in addition to SPE-KSA leaders and sponsors for their efforts and for their support which has made for a remarkable year. As we enter 2023, we hope to continue to raise the bar with the continuation of many of our flagship activities, in addition to introducing a host of new and exciting SPE-KSA events, programs, and initiatives.

In this issue of SandRose, we proudly document key moments and events between September and December of 2022 with the overarching theme of "Energy Equity". At the second T&PP Dinner Meeting, Mr. Peter Parry, Chairman of Global Energy & Natural Resources at Bain & Company, spoke about the role of oil and gas companies in the energy transition. Additionally, at the SPE-KSA SPEED Petrothon, students and young professionals enthusiastically worked together over a period of two days to find unique solutions to address challenges around the areas of sustainability, youth engagement, and digital transformation. The role of professional societies such as SPE is to provide opportunities for knowledge exchange, as well as technical and professional development. It is through events and programs such as the technical dinner meetings, SPEED, Student Outreach, and Diversity & Inclusion activities and social events that SPE-KSA empowers its members with technical knowledge, professional competencies, and an interconnected social network to tackle industry challenges and pave the way for more sustainable and equitable access to energy resources. SR

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Energy Equity: Building Reliable and Affordable Energy Systems

The transition from a hunter-gatherer society to smartphone-wielding and city-dwelling societies has been proliferated by the emergence of technologies and scientific breakthroughs that have allowed us to extract hydrocarbons from the subsurface, harvest wind and solar power, mine coal, and create nuclear energy. Energy has been critical to the development of human society and is the backbone of the global economy.

However, each energy resource, renewable or non-renewable, has its challenges. Hydrocarbons, for instance, have a lower Levelized Cost of Energy (LCOE) compared to renewables. LCOE measures the lifetime costs of a technology divided by energy production. Calculating LCOE Allows for the comparison of different technologies (e.g., wind, solar, natural gas) of unequal life spans, project size, different capital cost, risk, return, and capacities. Hydrocarbons emit significantly larger volumes of greenhouse gases than renewable alternatives, with oil emitting 720 tons of CO₂-equivalent (per GW-hour), behind coal at 820 tons of CO₂-equivalent, and natural gas emitting 490 tons. Comparatively, wind and solar power emit 4 and 5 tons of CO₂-equivalent per GW hour, respectively, with nuclear emitting little to none. Despite the larger carbon footprint of oil and natural gas, they continue to dominate the global energy mix accounting for 57% of global energy consumption. This can be attributed to their lower carbon footprint relative to coal, lower associated costs, accessibility, and higher energy density.

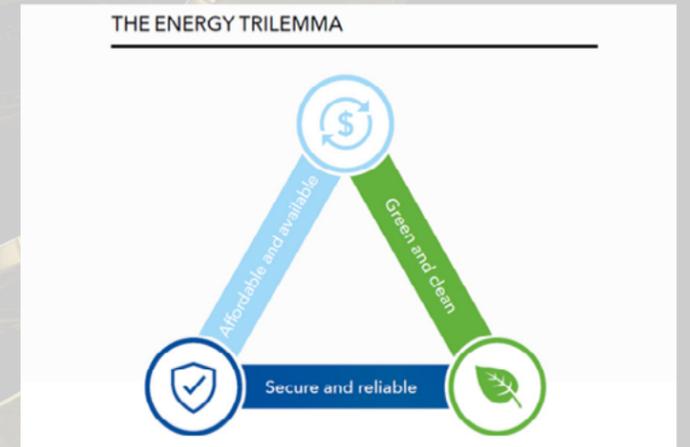


Figure 2: Illustration of the three challenges of the energy trilemma: energy accessibility, security, and sustainability.

Realistically, no single energy resource has it all; some sources, such as wind and solar power, may have a significantly lower carbon footprint. In return, renewables have higher associated costs, lower efficiencies, and aren't accessible to some communities, with the opposite being true for non-renewables. Scientists and economists have dubbed this the "Energy Trilemma," describing the need to balance three conflicting priorities within energy systems: energy security, equity, and sustainability. Understanding the challenges faced by businesses and individuals in balancing these three core challenges is vital to achieving Net Zero without compromising accessibility and affordability. In this article, we address one of the key challenges of the energy trilemma, **energy equity, which describes the ability of a country to provide access to reliable and affordable energy to support economic development and prosperity.**

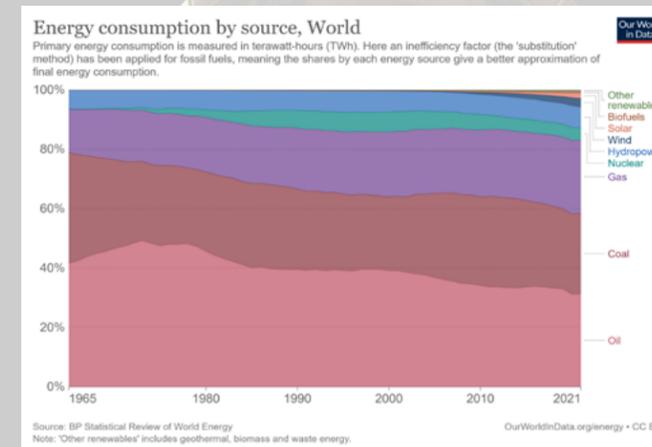


Figure 1: Distribution of global energy mix. In 2021, Oil and gas dominated the global energy mix occupying 57% of total energy consumption, with coal making up 27%. Solar and wind account for 1.65% and 3% of global energy consumption, respectively. (Source: OurWorldinData.org)

ENERGY EQUITY: GLOBAL DISTRIBUTION OF ACCESSIBLE AND RELIABLE ENERGY SYSTEMS

Access to energy is a fundamental need. However, globally there remains an uneven distribution of access to electricity. Countries scoring higher on the UN’s Human Development Index (HDI) are more likely to have access to reliable and affordable energy and, in return, electrification. This trend is evident in figure 3, where countries such as South Sudan, with one of the lowest GDPs and HDIs globally, is also currently ranked as the least-electrified country in the world with only 7.2 percent of its population having access to electricity, followed by Chad at 11%. Both countries experience extreme energy poverty due to the lack of energy infrastructure. Prosperity and well-being are, therefore,

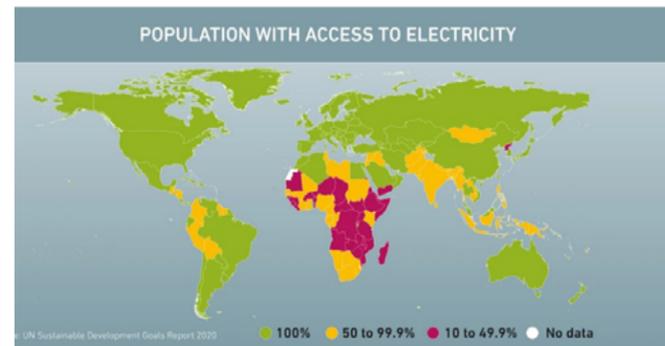


Figure 3: Global distribution of populations with access to electricity. Access to electricity is proportional to the availability of affordable energy sources, reliable energy systems, and key metrics such as GDP and HDI, a measure of human development. (Source Spectra by Mitsubishi Heavy Industries Group)

proportional to the availability of energy, which means that providing energy and combatting poverty are inherently interlinked. **According to the International Energy Agency (IEA), as of 2022, approximately 775 million people have no access to electricity, 77% of which are in Africa.** This is particularly alarming as this is the first global increase in 20 years. The trend can be attributed to rising fuel and food prices which hinders progress on some of the United Nations’ Sustainable Development Goals (SDG). To get back on track, the IEA estimates that an annual investment in the energy infrastructure of 30 billion USD from now to 2030 is

required to improve access to electricity in Africa alone. During COP27, leaders affirmed their commitment to improving energy infrastructure in Africa with the Africa Just and Affordable Energy Transition Initiative (AJAETI). The initiative aims to ensure a just and equitable energy transition in Africa through technical and policy support.

On the other hand, many countries in the Gulf region, such as Qatar, UAE, Saudi Arabia, Kuwait, and Bahrain, rank in the top 10 countries in energy equity. This can be attributed to the abundance of oil and gas reserves and energy costs being heavily subsidized by the government, making it affordable to its citizens.

FIGURE 4: TOP 10 PERFORMERS IN EQUITY

Rank	Country	Energy Equity Score
1	Luxembourg	100
2	Qatar	99.9
3	Kuwait	99.8
3	UAE	99.8
4	Oman	99.6
4	Iceland	99.6
5	Bahrain	99.5
6	Ireland	98.6
7	Trinidad & Tobago	98.4
7	Switzerland	98.4
8	Israel	98.3
9	United States	97.3
10	Saudi Arabia	97.2
10	Norway	97.2

Source: World Energy Council

IMPROVING GLOBAL ACCESSIBILITY AND AFFORDABILITY

With a growing commitment to decarbonization, countries are continuously expanding their energy portfolio to include carbon abatement technologies such as CCUS, hydrogen technology, and growing investments in renewables. However, in many countries suffering from energy poverty, non-renewable energy sources, such as coal and oil, cannot be immediately replaced by renewables due to their intermittent nature and higher LCOE, absence of power storage solutions, lower efficiency, and land requirements. Therefore, consumption of cleaner and affordable non-renewable resources such as natural gas should grow parallel to investments in decarbonization solutions and renewable resources. To improve access and affordability of energy sources, however, countries can seek out multiple solutions tailored to their unique circumstances to strengthen equity, such as:

1) Regional Integration

Promoting interconnectivity of energy infrastructures regionally, such as shared electrical grids and regional pipelines.

2) Investing in the development of sustainable energy infrastructures

Investing in facilities that are “future proof” by ensuring endured maintenance of the project, with minimum waste, factoring in aging, evaluating technological possibilities and potential disruptions, and anticipating future innovations of the business model.

3) Leveraging innovative technologies

Employing technologies suited to domestic consumption and demand with the potential to improve affordability, accessibility, and efficiency and accounting for unique country-specific challenges. Using energy storage solutions and technologies is one of the critical challenges that must be addressed to ensure a viable energy transition.

4) Policy and governance support

Drafting policy to ensure better energy security and a sustainable long-term development strategy to meet national and internationally determined goals. Improved governance to effectively manage and coordinate efforts mentioned above.

Access to reliable and affordable energy is critical for improved socioeconomic development. Further progress is essential to allow for universal access to close the energy equity equality gap and ensure no nation is left behind.

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Venturing Beyond:

Insight into Aramco Ventures with CEO Mahdi Al-Adel



Time and time again, the lore of companies such as Google, Uber, and Apple has fascinated people from humble beginnings up to their near mythical status in present day. In the case of Google, no one can deny Larry Page and Sergey Brin's ingenious idea which culminated in the creation of the world's most used search engine. With that being said, venture capital (VC) companies can also be credited for the early momentum achieved by each of these companies by providing the funding and business expertise which were necessary to scale and deploy these technologies. In 1999, Google sought out buy-in from VC investors who participated in a Series B round, investing 12.5M USD in exchange for equity. Over a period of five years after Google's IPO in 2004, those investors' stakes were worth about 4.3 Billion USD, equating to a 300-fold return.

Venture capital is a form of private equity financing in which an investor (an individual, bank, or other organization with finances) invests in high growth potential business, often an entrepreneurial start-up, in exchange for ownership. The investor then helps the business grow and develop for a period of time, until they exit the enterprise (hopefully) at a profit. It is generally risky to invest in budding businesses. A study by Harvard Business School Professor Shikhar Ghosh showed that 3 out of every 4 venture-backed companies fail to return money to its investors. However, the endeavor also holds tremendous opportunity to capitalize on exciting and innovative products and services that could reshape life as we know it.

Saudi Aramco is no stranger to this field. Like many of the tech giants today, Saudi Aramco started from a group of ambitious geologists with a mission to find oil and gas across the Kingdom. What started as a dream, catapulted the company to become the largest (most valuable) company in the world in terms of market capitalization. Like Google, the company has also started its own VC arm known as Aramco Ventures, which helps in diversifying its revenue streams as well as gaining access to cutting edge tech with potential to be deployed in the company's own operations and beyond.

In order to better grasp the role and value of VC within Saudi Aramco, the SandRose team spoke with Mahdi Al-Adel, CEO of Aramco Ventures.

OVERVIEW OF ARAMCO VENTURES

Aramco Ventures (formerly SAEV) is the venture capital arm of Saudi Aramco which invests in companies, primarily start-ups, at the early stages of innovation. Aramco Ventures was established in 2012 'to invest globally in companies with technologies of strategic importance to Aramco, to accelerate their development and deployment in Aramco's operations'. This is done through three funds:



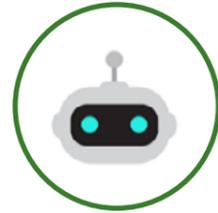
Fund 1: Digital/Industrial fund (\$500 MM)

A strategic fund looking at technology start-ups in areas such as AI and Analytics, Cybersecurity, Additive Manufacturing, Robotics and Automation, Blockchain, in addition to Industrial and Upstream solutions. These technologies have potential applications in Saudi Aramco's current and future businesses.



Fund 2: Sustainability Fund (\$1.5 billion)

A strategic fund aligned with Saudi Aramco's decarbonization and lower-carbon fuels efforts to meet Saudi Aramco's 2050 net-zero ambitions. The 2050 net-zero ambitions will require the company to commit massive capital to decarbonize its operations. Part of reducing that capital outlay is to invest in technologies that can reduce that total cost. Aramco Ventures via its Sustainability fund scouts for these technologies for the purpose of investment and deployment in Saudi Aramco's operations.

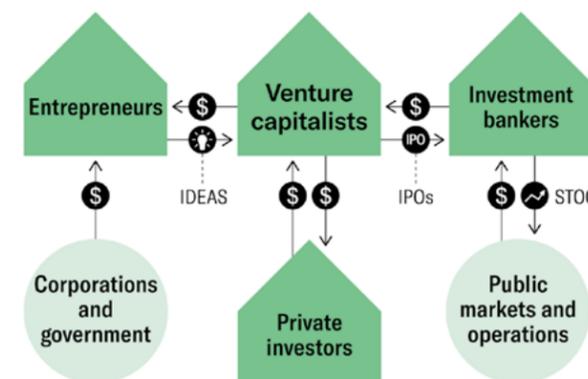


Fund 3: Prosperity7 (P7) Fund (\$1 billion)

Named after prosperity well or Dammam no.7, P7 is a traditional financial VC play, targeting disruptive, scalable, and resilient technologies outside of the energy sector without an obligation to deploy them in the Saudi Aramco businesses. Nevertheless, the P7 fund is keen on bringing some of these technologies to the Kingdom in support of the country's 2030 vision. Investments have included companies such as Wasabi, which offers cloud storage solutions at a fraction of the cost of Amazon and Google cloud solutions. Other investments have included a brain-computer interface (BCI) technology (Neuramatrix) that could help with treating epilepsy and a robotic solution for warehouses (Quicktron). Ultimately, Prosperity7 is looking for the next unicorns (a term dubbed for start-up companies that exceed billion-dollar valuation) that will reshape and disrupt their respective industries.

How the Venture Capital Industry Works

The venture capital industry has four main players: entrepreneurs who need funding; investors who want high returns; investment bankers who need companies to sell; and the venture capitalists who make money for themselves by making a market for the other three.



With the exception of P7, the objective is to employ and pilot these technologies within Saudi Aramco or within the Aramco ecosystem, including its subsidiaries, to generate strategic value. This value, measured in dollars, can come in the form of doing the business faster, safer, cheaper, or with better quality. All this is done while aiming that the value of the investment grows as the technology matures. After a period of maintaining the investment Aramco exits, ideally at higher valuation compared to that at the initial investment value. This can happen through an acquisition of the company (M&A) or through an Initial Public Offering (IPO).

While this offers a handy overview of the structure of VC within Saudi Aramco, we wondered how their teams went about selecting promising investment options among the dizzying variety of up-and-coming products and services in the ever-evolving tech space.

Q1) How are start-ups and technologies chosen?

The two strategic funds (Digital/Industrial & Sustainability) are aligned with Saudi Aramco's strategic priorities. For instance, the Digital/Industrial fund is aligned with Digital Transformation Organization's (DTO) priorities and focus areas. The technologies are purposely sourced to align with the respective organization's strategic priorities.

Aramco Ventures' teams consists of investment professionals located all over the world with, headquarters in Dhahran, offices in Boston, Houston, New York, Palo Alto, Aberdeen, London, Oslo, Beijing, and Shanghai to source promising technologies. Every team is dedicated to a certain fund and actively seeks out technologies to fit the focus areas of the respective fund and Aramco's general strategy.

Each start-up investment opportunity then goes through an internal Aramco Ventures gated screening process to review the viability and disruptiveness of the technology, the strength of the founding team, and the envisioned financial returns of the potential investment. If a start-up passes all the gates it is then reviewed and recommended for investment, or not, by an Investment Advisory Committee headed by Saudi Aramco's Chief Technology Officer (CTO).

The Business Development (BD) team in Dhahran then acts as a liaison between the technologies, international teams, and proponents in Aramco (e.g. refineries, research centers, production departments), with the goal of ensuring the technology is worthwhile and relevant to the respective organization. The BD professionals also drive for the successful pilot and deployment of these technologies when applicable.

“VCs focus on the middle part of the industry S-curve. They avoid both the early stages, when technologies are uncertain and market needs are unknown, and the later stages, when ... growth rates slow dramatically”
– HBR.org

Now that the strategic direction of the investments has been outlined, we wondered how the experts manage the high levels of risk and uncertainty that characterize the ecosystems in which emerging and disruptive businesses operate.

Q2) How do you manage the inherently high-risk nature of VC especially when companies are pioneering and there might not be competition to benchmark it against?

VC investments are inherently risky; when looking at a VC's source of funding, most of it comes from a handful of companies. As a rule of thumb in a portfolio of 50 companies, as an example, a few companies will actually make the entire returns of the fund. In general, a third of the portfolio companies in a fund

will have positive returns another third will be written-off, and the last third are classified as zombies, barely making enough money to pay for employee salaries and stay afloat.

VC investments go through a series of investment rounds from pre-seed, seed, angel investors, then series A, B, C, etc. Aramco Ventures invests typically in companies between series A to C, where most investments have some revenue, a defined business model, and some traction. The exception however, is for the Sustainability fund, where Aramco Ventures is setting up a scheme to invest in start-ups during the very early seed phase when the company is raising initial capital from investors. The seed stage is riskier in that an idea or an IP exists, however, the technology or business model yet has to be proven and scaled and the company is pre-revenue. Seed stage investments are typically small in value, few hundred thousand to two million max.

To mitigate the risk associated with VC, Aramco Ventures employs teams of seasoned investment professionals and technologists who have a wealth of knowledge and expertise in the venture capital. All of this is done while leveraging the massive resources and capital available within Aramco from research centers, engineer capabilities, financial and subject matter experts to vet start-ups and technologies. Ultimately the strength of Aramco Ventures lies in being backed by Aramco's massive scientific and engineering horsepower.

Q3) With the wealth of resources and research centers available at Saudi Aramco around the world, why set-up a VC fund?

Aramco has established research centers all around the world in the US, Europe, Saudi Arabia, and Asia. All of these centers work on homegrown research agendas set by the company from working on enhancing internal combustion engines (ICE), or converting more of an oil barrel into a chemical barrel.

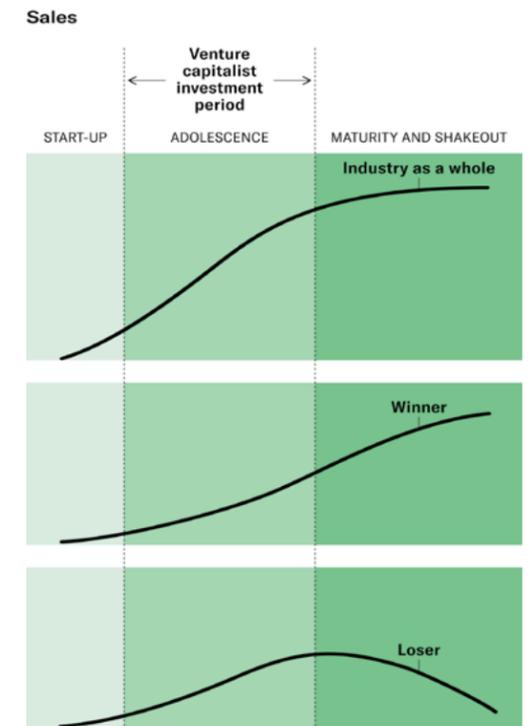
However, there are many more fields and research topics we are yet to explore and it would be costly to set-up a center and research groups dedicated to tackling all of these topics. Therefore, Aramco Ventures provides Saudi Aramco with the flexibility to put some equity into people and companies tackling interesting problems and challenges and even exposing the teams to new and novel ideas. As an investor in such start-ups, Aramco Ventures also is given the opportunity to sit on the board as members or observers, providing Aramco Ventures with an opportunity to see what happens with technology and what is hindering its success such as cost, raw material, and timing. Timing is an essential factor in the success of any technology. For instance, many companies have developed smart-phones before they became mainstream. However, the timing along with increased internet accessibility allowed it to take-off. Therefore, entities such as Aramco have a lot to gain from putting money into novel ideas to understand the development and associated challenges, even when that investment goes away, there is significant value and insight to be gained from learning about cost curves, maturity or lack thereof, for future development.

Q4) How does establishing a VC play out in the long-run, is there potential for it to expand further in the future?

If we just look at Aramco's evolution over the past 20 years, the company today is a very different company. For instance, we have a new administrative area called the Digital Transformation Organization, dedicated to leading the digitalization of the company. DTO is also working on setting up an Aramco Digital Company, investing in AI and creating an AI corridor. This would have been out-of-place two decades ago, which in itself is a diversification play and recognition that AI and digital solutions will be essential to the future of Aramco and the Kingdom. This move, however, is consistent with Aramco's history: diversifying and evolving originally from an exploration and production (E&P) company, expanding into refining, later moving into chemicals, acquiring SABIC, and into a digital transformation organization. Venturing into other

Timing Is Everything

More than 80% of the money invested by venture capitalists goes into the adolescent phase of a company's life cycle. In this period of accelerated growth, the financials of both the eventual winners and losers look strikingly similar.



areas has always been a part of Aramco's DNA. If you think about it, Aramco started as a start-up when entrepreneurs from Standard Oil California (SoCal) came to the Kingdom in the 1930s exploring for oil and ultimately helped create one of the most valuable companies in the world by market cap.

We in Aramco Ventures like to think that we help Aramco explore the future through technology investments and ideas that have not been proven or scaled yet. Some of these start-ups might be the next disrupters in their domains and through our investments Aramco will have a seat at the table.

As the company and the Kingdom move forward into a more digital and sustainable future, the role of VC investments is key in the development and utilization of cutting-edge technology to confidently venture towards a brighter future fueled by daring innovation.

To learn more about Aramco Ventures visit <https://aramcoventures.com/> 



We take energy forward

We're committed to making energy safer, cleaner, and more efficient for people and the planet. By combining industry-leading technologies and services with operations in over 120 countries, we're collaborating with customers to transform the future of energy – everywhere.

[bakerhughes.com](https://www.bakerhughes.com)

Baker Hughes 



Baker Hughes leverages localization as a pathway to global growth

For over 80 years, Baker Hughes has been a committed partner to Saudi Arabia. Our journey started when our technology helped drill the Dammam 7 Well in 1938.

Today, we are focused on creating the right energy ecosystem in Saudi Arabia through job creation for local talent, building local capabilities and know-how, strengthening local supply chain, driving gender diversity, promoting technology transfer, and boosting exports. For that, we were honored to be recognized as the “Best in Supplier Development” at iktva 2022’s Excellence Awards earlier this year, reflecting Baker Hughes’ active role in building the energy ecosystem in the Kingdom, in line with the Saudi Vision 2030 and the iktva program.

Localization is a key driver and enabler to how we do business in the Kingdom. With more than 14 facilities focused on manufacturing, maintenance, services, and research & development, and more than 2,500 employees, our footprint allows us to serve the needs of the Saudi market.

Today, more than 73% of our employees are Saudi, with close to 50% of our leadership team being Saudi nationals.

Additionally, we are keen on building local talent through our leadership and development programs, whether for entry level employees (ASPIRE) or mid-level managers (IMPACT).

As part of our continuous efforts to drive localization in Saudi Arabia, we closed a deal with Dussur on October 2022 for the formation of our chemical joint venture company (JV). The JV supports Baker Hughes’ and Dussur’s efforts to better serve the chemical market in the region, through our already existing chemical blend plant in Dammam and manufacturing facility that will be located in Jubail. The JV brings Baker Hughes closer to customers and suppliers, creating efficiencies including lower operating expenses and locally sourced raw materials.

The JV will directly support chemicals focused on the needs of KSA while expanding localization opportunities. The JV’s main purpose is to increase Saudi Arabia’s supply base targets of raw materials and accelerate the development of manufacturing skills and capabilities of the local workforce.



The ASPIRE Program helped shape my commercial acumen, which prepared me for the role that I do today. During my time on the program, I handled roles that include strategy & market intelligence, application engineering, commercial operations, and sales & business development. Currently, I am the Business Development Manager for our Oilfield Services & Equipment business in Saudi Arabia, with specific focus on growing the business to support the Kingdom's growing need to drive the energy transition.

Rakan Al-Murshed
Lead Business Development Manager



Our participation at Drilling Innovation Technical Symposium and Exhibition

We were proud to be an active partner at the inaugural edition of the Drilling Innovation Technical Symposium and Exhibition (DITS&E) event.

We had the opportunity to speak about the role of technology and innovation to drive a sustainable energy future. Maria Claudia Borrás, Executive VP, Oilfield Services and Equipment at Baker Hughes participated in a panel to discuss the key milestones that shape the energy industry today and what is needed to achieve a sustainable future.

Additionally, we showcased via our booth some of our most innovative technologies and solutions which drive more efficient operations with Saudi Aramco.



It was an honor to participate in the inaugural Drilling Innovation Technical Symposium & Exhibition organized by Saudi Aramco. I had the opportunity to participate on a panel about key technology and innovation milestones that helped shape our industry as we know it. As energy continues to transform, the need for more efficient technology will help us achieve the right balance between sustainability, affordability and energy security. The symposium was a great platform, bringing together industry leaders to discuss how we can take energy forward in the Kingdom and beyond.

Maria Claudia Borrás
Executive Vice President, Oilfield Services and Equipment



As an Energy Technology company, Baker Hughes is keen on growing its local presence to serve the key market of Saudi

Arabia. Localization of manufacturing, supply chains and technology is a top priority for us, but it all starts with our people. We are proud to showcase our consistent strive to recruit Saudi National talents, develop their skills and shape their careers to be the future Saudi leaders who can take energy forward for the benefit of the customer, their country and Baker Hughes.

Khalid Alsadoon
Sales & Commercial Executive Director - OFSE



Being part of the ASPIRE early career development program has been one of the best moves of my career. The program

was designed to shape future leaders in the company; as ASPIREs we are exposed to the company's leadership, participate in tremendous amounts of learning sessions and courses, rotate within different departments and business segments, and have strong support from managers around the organization. I know the program will shape my career and set me up for success in the future.

Lama Al-Awami
ASPIRE Associate





Saudi Aramco and Baker Hughes share the same vision and ambition to reach net-zero by 2050.



Today, our industry is faced with an energy trilemma... how can we find the right balance between energy sustainability, affordability, and security. The answer lies on reducing emissions rather than fuel resources. As an energy technology company, this is the core of our mission – to deliver the highest efficiency energy technology solutions and advance the path to energy decarbonization.

The challenge is possible to solve, but it requires a variety of technologies and solutions. At Baker Hughes, we believe our energy technology can help. There is technology available today to make a big impact on reducing emissions – such as digitization of the oilfield, high efficiency power, flare combustion optimization, methane leak detection, and advanced compression and combustion turbine tech for hydrogen. At the same time, we must incubate and invest in new technologies to reduce the carbon intensity of hydrocarbons, like hydrogen-natural gas blended infrastructure, CCUS, and geothermal applications.

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As an energy technology company, the core of our mission is to deliver cutting-edge technology and solutions to Saudi Aramco and help accelerating our joint journey towards net-zero objective. We are committed and ready to do what is needed to partner with Aramco to drive a sustainable energy future and enable the novel targets of the Saudi Green Initiative.

Mohammed Al-Habib
Regional Executive Director – Energy Transition

”

Today, we all share the vision and ambitions, to reach net-zero by 2050. We believe it will take energy producers, technology and service providers, energy buyers, policymakers, and the community at large working closely together to achieve our collective ambitions. We’re seeing governments, NOCs, IOCs, OEMs, and service providers are all making commitments to reaching net-zero. That’s why we believe that there’s no path to net-zero without partnership and collaboration.

We are constantly in discussion with Saudi Aramco around areas of collaboration around the energy transition. Together, we can make a difference.

We are committed to taking energy forward – making it safer, cleaner and more efficient for the people and the planet.

Our mission

<p>Reach net-zero carbon emissions by 2050</p>	<p>Lead in energy transition and digitalization and be a critical decarbonization partner</p>	<p>Deliver the highest efficiency, productivity outcomes for broader energy and industry</p>

Fit-for-Purpose Rotary Steerable System at Bit with Continuous Survey While Drilling Improves Challenging Drilling Operations and Well Placement

By Salahaldeen S. Almasmoom, Drilling Engineer, Saudi Aramco

INTRODUCTION

Standard surveying technologies were initially used to drill 8-3/8 in curve and lateral sections with very limited and varied results. Furthermore, the considered surveys include measurement while drilling (MWD) and rotary steerable systems (RSS) with multiple drilling bit choices. Therefore, a new system is proposed in efforts to improve upon these inconsistent results which negatively impacted well delivery performance. A new rotary steerable system at bit (RSSAB) and continuous survey while drilling (CSWD) tool were introduced to drill a combined vertical, curve, and lateral section in one run. This new method will deliver a smooth wellbore with higher build rates in the curve, and faster overall drilling performance.

Using specific digital modeling, the RSSAB integrated both the steering and cutting structure to achieve a more optimum well trajectory while at the same time delivering better drilling performance. RSSAB was engineered with (1) pistons close to the cutting structure, (2) automated trajectory control with continuous six-axis inclination and azimuthal measurements, and (3) azimuthal gamma ray measurements close to the cutting structure. This new RSSAB eliminated the previous practice of reducing drilling parameters to achieve required build rates. As well as, to counter the turning tendency in the curve and lateral sections. This improvement enabled drilling with higher rates of penetration in the curve section. Plus, achieving higher dog-leg severity (DLS) in the curve along with drilling

a longer lateral section in one run with less tortuosity.

Introduction of fit-for-purpose RSSAB technology for the first time internationally outside U.S. land, and CSWD technology for the first time worldwide has taken drilling performance to a new level. It has provided improvement in drilling performance, accuracy in well placement, and associated cost reduction. In a short period of time, the drilling performance improved dramatically, and the top five wells with the vertical, curve, and lateral sections drilled in one run had the highest average ROP. Additionally, this newly deployed RSSAB and CSWD BHA achieved:

- **The field record for the longest lateral footage drilled in one day.**
- **Fastest time from spud-to-TD.**
- **Fastest time from spud to rig release.**

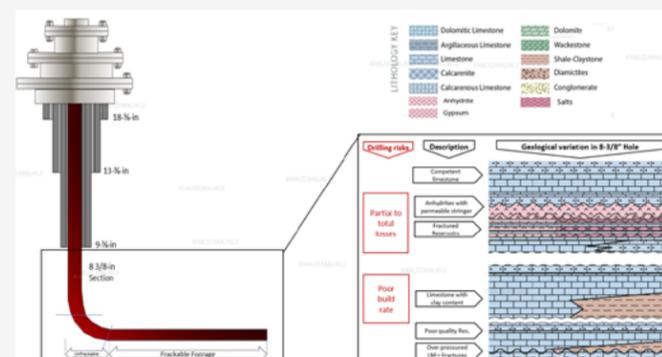


Figure 1: Standard well design and formations overview

TECHNOLOGIES OVERVIEW

The RSSAB technology is designed with an actuating system that is placed with strategic precision to push against the borehole wall for propulsion (Vié 2020). This actuating system has pistons which are located as close to the bit cutting structure as possible. Moreover, these pistons aid in better control for directional changes (planned and unplanned), helping to achieve higher build rates with no additional hydraulic force (Vié 2020). This improvement enabled drilling with higher rates of penetration in the curve section with higher DLS and longer lateral section in one run with less tortuosity. In addition, the RSSAB steering unit incorporates metal-to-metal hydraulic seals to reduce erosion and increase hydraulic design capability for improved performance. It is adapted with specialized single shoulder connections to increase reliability during high-DLS drilling. These connectors also enable compatibility with PDC application-specific cutting structures (Vié 2020). The combination of the RSSAB steering system with the specially designed bits deliver combining the vertical, curve, and lateral sections with improved drilling efficiency.

The RSSAB technology itself is designed with a built-in multiaxial sub to deliver a capability to measure comprehensive six-axis continuous inclination and azimuth. Smoother wellbores with reduced tortuosity can be achieved because of the ability to automatically hold inclination and azimuth measurements (Vié

2020). An azimuthal gamma-ray sub can be added to the RSSAB tool, and can be positioned close to the bit (approximately 6-ft behind the bit). The additional sub provides real-time early signs of changing lithology, allowing better real-time well placement, improved in-zone percentage and better geo-steering within the target zone sweet spot (Vié 2020).

The RSSAB technology is illustrated in Figure 2.

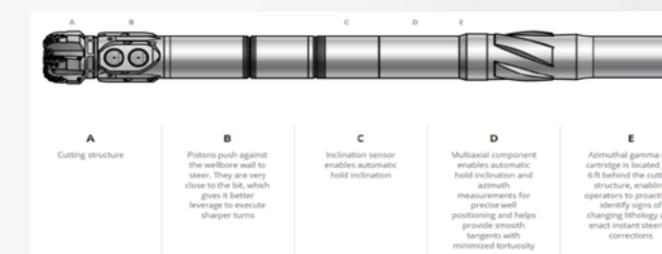


Figure 2: RSSAB Technology Diagram (Vié 2020)

RSSAB AND CSWD FIT-FOR-PURPOSE BHA IMPLEMENTATION JOURNEY

The project evaluated different performance challenges in its 8-3/8 in hole size of the well, its longest section. The challenges were categorized in five areas. First, the section required multiple BHA assemblies to drill the different vertical, high DLS curve and long lateral intervals. Second, the vertical interval drilled through different formations with high laminated layers. It also, utilized dedicated standalone motor BHA where formation tops were picked based on ROP changes.

Third, the curve interval is a 3D profile that requires high DLS with azimuthal control to land the well in ultra-thin sweet spot. However, some formation lithologies in the curve cause a drop tendency which limit the conventional RSS building capability with azimuthal control. Thus, this interval utilized controlled parameter drilling. Close to landing point several surveys were taken off bottom to confirm wellbore position. Fourth, the downhole lateral interbedding required control on drilling parameters to manage formation tendencies. Fifth, the reservoir required geo-steering capabilities to allow for downhole near bit measurements to maintain in the ultra-thin sweet spot with a maximum of 50 ft azimuth window. These challenges resulted in multiple trips, controlling of rate of penetration (ROP) and affected completion runs. Different strategies combined with new technologies were required to manage these inefficiencies and challenges.

Collaboration was essential to introduce and adapt the RSSAB technology (first deployment of the RSSAB in the Middle East) and CSWD technology (first worldwide deployment of the CSWD technology). The collaboration focused on bottomhole assembly optimization, cutting structure design, modeling and adaptation to the environment, equipment design upgrades for downhole conditions, and well design and configuration changes.

MODELING OF BOTTOMHOLE ASSEMBLY AND CUTTING STRUCTURE

The bottomhole assembly dynamics and stability is a major area that impacts the performance of the newly introduced RSSAB assembly. The BHA and cutting structure went through multiple iterations and modeling rounds to evaluate the different stabilization requirements, bit structure configuration, and bottomhole components. Modeling revealed the right BHA configuration and cutting structure that minimized the downhole dynamics of the assembly while maximizing drilling performance with the optimum drilling parameters. The BHA configuration journey with the final fit-for-purpose BHA is illustrated in Figure 3.

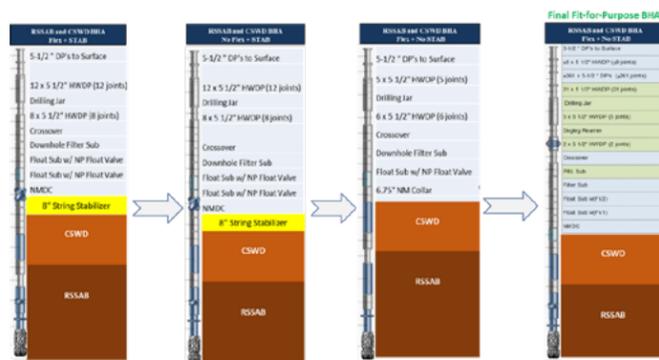


Figure 3: Fit-for-purpose BHA design improvement journey

EQUIPMENT DESIGN UPGRADES

The drilling environment includes multiple interbedding layers with compressive strengths up to 20,000 psi. This tends to induce high shock and vibration to the drilling assembly which proved that the drilling environment is more challenging than the US land. To manage this geological challenge, a dedicated team from the product centers worked on enhancing the mechanical components of the technology to strengthen the piston retention mechanism and abrasion resistance. These improvements were critical to adapt the technology to the current drilling environment, as illustrated in Figure 4. The improvements are summarized by adding an anti-rotation plate to reduce the wear on the retaining rings, installing a pin cover to prevent the failed retaining rings from falling into the wellbore, and utilizing a stronger more robust material for the retaining rings.

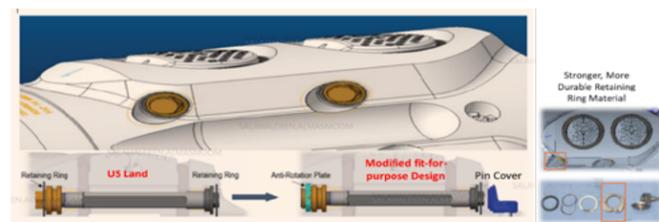


Figure 4: Summary of the RSSAB design upgrades done specifically to fit the geological challenges

FIT-FOR-PURPOSE (RSSAB AND CSWD) BHA PROVEN BENEFITS AND APPLICATIONS

Fit-for-Purpose BHA managed to successfully drill significant number of wells in the recent past with substantial improvements to drilling operations. This success provided performance improvement and cost reduction through the following initiatives:

- Well design optimization to deepen kick off point.
- Maximizing dogleg severity in curve section. Improving geo-steering to drill in the deep ultra-thin targets.
- Optimizing connection time with CSWD tool.
- Reducing tortuosity for smoother completion running.
- Characterization of specific formations with additional evaluation technologies.

The successful implementation journey went through three phases with a learning curve (Figure 5).

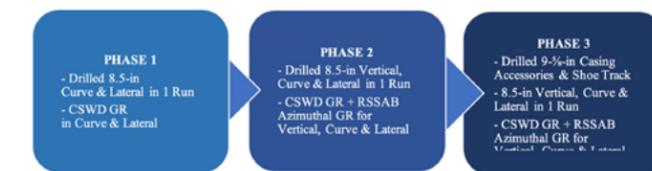


Figure 5: RSSAB and CSWD successful implementation journey

WELL DESIGN OPTIMIZATION WITH DEEPER KOP

Before the introduction of RSSAB and DSS technologies, the curve interval was designed to be below 6°/100 ft DLS for the conventional RSS to be able to drill the curve and lateral. While still considering the potential drop in the buildup rate at the limestone/clay zone in the top of the curve interval. Therefore, KOP was designed at the lower part of the depleted carbonate zone. This induced a risk of opening existing fractures when starting sliding causing severe lost circulation. Deepening the KOP by 200-300 ft will eliminate this risk tremendously. However, the overall DLS range of the curve section would increase to ≥6.5°/100 ft to geo-steer and land at the narrow target.

The successful implementation of the fit-for-purpose BHA (RSSAB and CSWD) allowed for deepening KOP while achieving the required higher DLS in curve interval, land the well earlier with shorter vertical section, and gained more reservoir contact on the lateral interval (Figure 6). These changes did not jeopardize well performance objectives and did not require additional BHA runs.

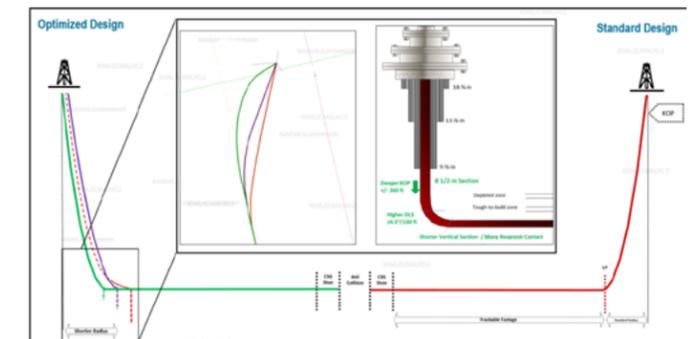


Figure 6: RSSAB technology optimized well design with deeper KOP

IMPROVED GEO-STEERING WITH FULL RSSAB AND CSWD BHA

Deployment of RSSAB and CSWD technologies provided improvements in drilling performance while also improving the precision of well placement. The initial results obtained from azimuthal GR real-time interpretation and continuous survey while drilling trials showed that the wellbore was navigated through the ultra-thin sweet spots with optimal geometry and decision making. The accuracy and frequency of CSWD tool surveys have improved on-the-fly geo-modeling efforts to best predict ahead of the bit as well as enhance the quality of mass planning for operations. This is critical in deep settings with dipping formations. As a result of this tailored solution, performance and target precision was significantly improved bringing well delivery to a new level of excellence as shown in Figures 7 and 8.

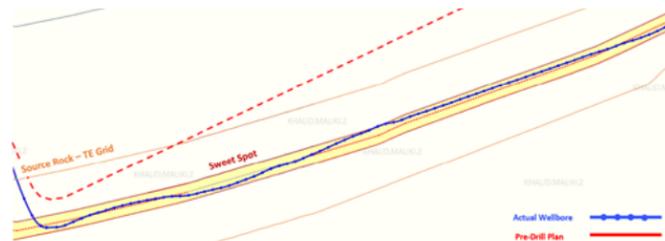


Figure 7: Wellbore navigation in thin sweet spot with real-time monitoring

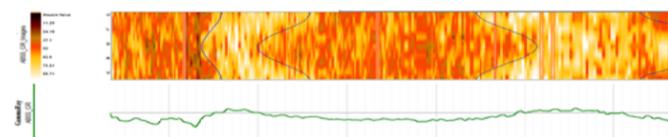


Figure 8: RSSAB azimuthal gamma ray image used for excellent well placement journey

IMPROVED CONNECTION PRACTICES WITH CONTINUOUS DRILLING SURVEYS

RSSAB was combined with CSWD technology to optimize connection time. The strategic combinability of the two technologies proved to deliver further benefits on managing the nondrilling time. The elimination of surveying time with CSWD allowed reducing the weight to weight time significantly leading to further improvement on well delivery objectives. CSWD was deployed in 16-in, 12-in and 8-1/2-in hole sections to maximize the added value and reduce the overall well delivery time as illustrated Figure 9.

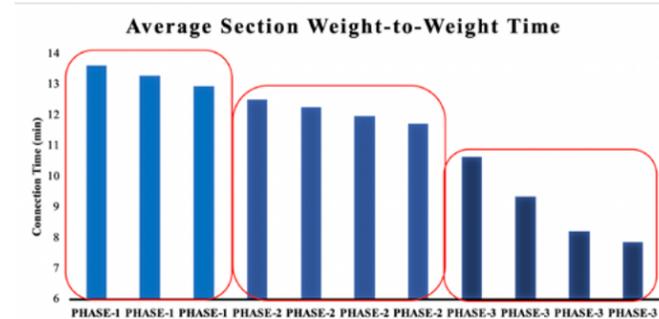


Figure 9: The journey of weight-to-weight time reduction

WELL DELIVERY IMPROVEMENT AND COST REDUCTION

RSSAB and CSWD technologies have delivered significant results in past several years, reducing well delivery time and well associated cost by a significant amount (Figure 10). These improvements were achieved while continuously exceeding field drilling performance records as displayed in Figure 11.

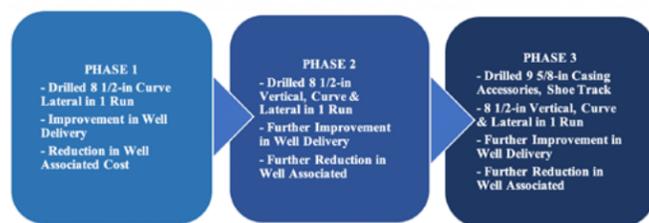


Figure 10: RSSAB and CSWD Well Delivery Improvement and Cost Reduction

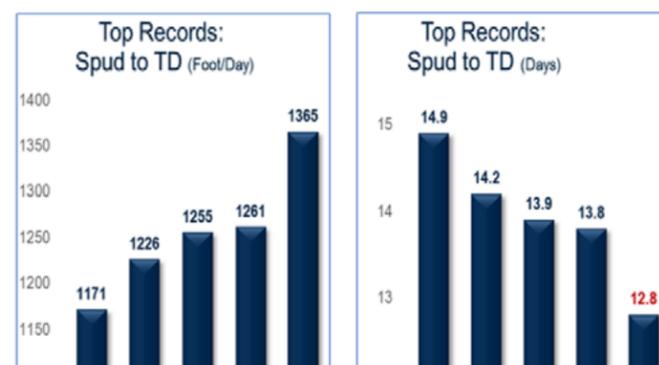


Figure 11: RSSAB and CSWD well delivery improvement and drilling performance records

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Lower Carbon Oil through Reservoir Management Technology By Inflow Control

INTRODUCTION

Energy demand is not going down. The necessity for humanity to expand reliable energy supplies is at a paramount climax. This adds significant strains on all energy suppliers ranging from hydro power, geothermal, wind, solar, and hydrocarbons. Society requires affordable energy sources today, and all the while the pressure to reduce greenhouse gas emissions (GHG) to prevent global temperature from rising 2°C above the pre-industrial level has put the oil industry under tremendous pressure.

Significantly diminished exploration investments since 2015 and minimal development investments for nearly sanctioned projects pushed production coming online to a new low, with minimal projects to supply a forward-looking production back log. Oil companies have had to become focused on revitalizing and extending the life of existing fields with the additional challenge of producing oil with the lowest cost and aiming to have a much lower carbon footprint along the entire value chain. New production and reservoir recovery technologies can optimize oil recovery while reducing the associated carbon footprint by reducing the unwanted water and gas production in new and existing wells. These technologies are called inflow control technologies, and they support reservoir management, which is the heart of an oil company's wealth generation.

Conventionally completed wells are producing with higher gross production, but most reservoirs globally are producing mostly unwanted fluids such as water and

gas ranging from only 10-20% net-oil production. These wells are high energy consumers, as the energy demand to lift excessive water with the oil strains the operating expenditures (OPEX) costs for all oil companies. The oil industry typically requires what is known as artificial lift, or pumps to lift the well fluids to surface. When the proportion of the well's fluid are increasing in water cut % this adds further costs. If a well becomes un-economical oil companies then place the well in a shut-in phase and potentially position the well to be P&A (plugged and abandoned). If there are technologies that can lower the amount of water being produced and promoting an increased net-oil production, it is a potentially profitable technology to review from both an economics gain and environmental improvement and extend the economic viability of the well and/or field.

Categorically, emissions from the produced unwanted fluids such as water and gas can broadly be split into three categories.

- **High energy consumption in pumping large volume of unwanted fluids from producer wells to surface plus the pumping of the fluids via pipelines to treatment facilities.**
- **Energy and chemical needs to treat the un-wanted produced water and gas.**
- **Reinjection of these un-wanted fluids back into injection formations via disposal wells.**

Carbon Capture and Sequestration (CCS) is one of the rapidly growing options to decarbonize the upstream sector. Furthermore, as the world's oil demand is gradually restoring to pre-pandemic levels and other world-changing crises, supported by high oil prices, more CO2 flooding projects and technologies are coming online.

Norway has an energy industry long-known to focus on emissions reduction and improved oil recovery. These technologies have been adopted globally for the various environments as needed and InflowControl is a Norwegian technology company that is expanding such technology globally and notably within the GCC. InflowControl has been collaborating with numerous energy companies globally and in the GCC to produce lower carbon oil by implementing AICV® technology (Autonomous Inflow Control Valve) in producer wells. Most oil companies must utilize 'injection wells' for pressure support and maintenance of the reservoir. This also supports the displacement of oil from the injection wells towards production wells.

Water is more mobile than oil and this causes fingering to occur. Water fingering will by-pass the oil in the reservoir and then plague the production wells with excessive water production. The AICVs can choke autonomously for water and gas. This will eliminate short-circuiting of any injected water or gas from injection well CO2 and increase the efficiency of the projects by better distributing water and CO2 in the reservoir, resulting in better utilization of injection fluid.

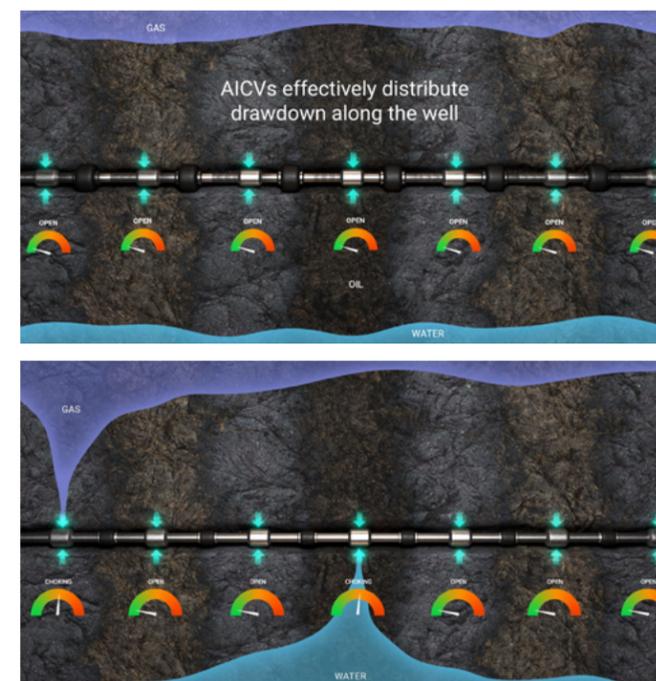
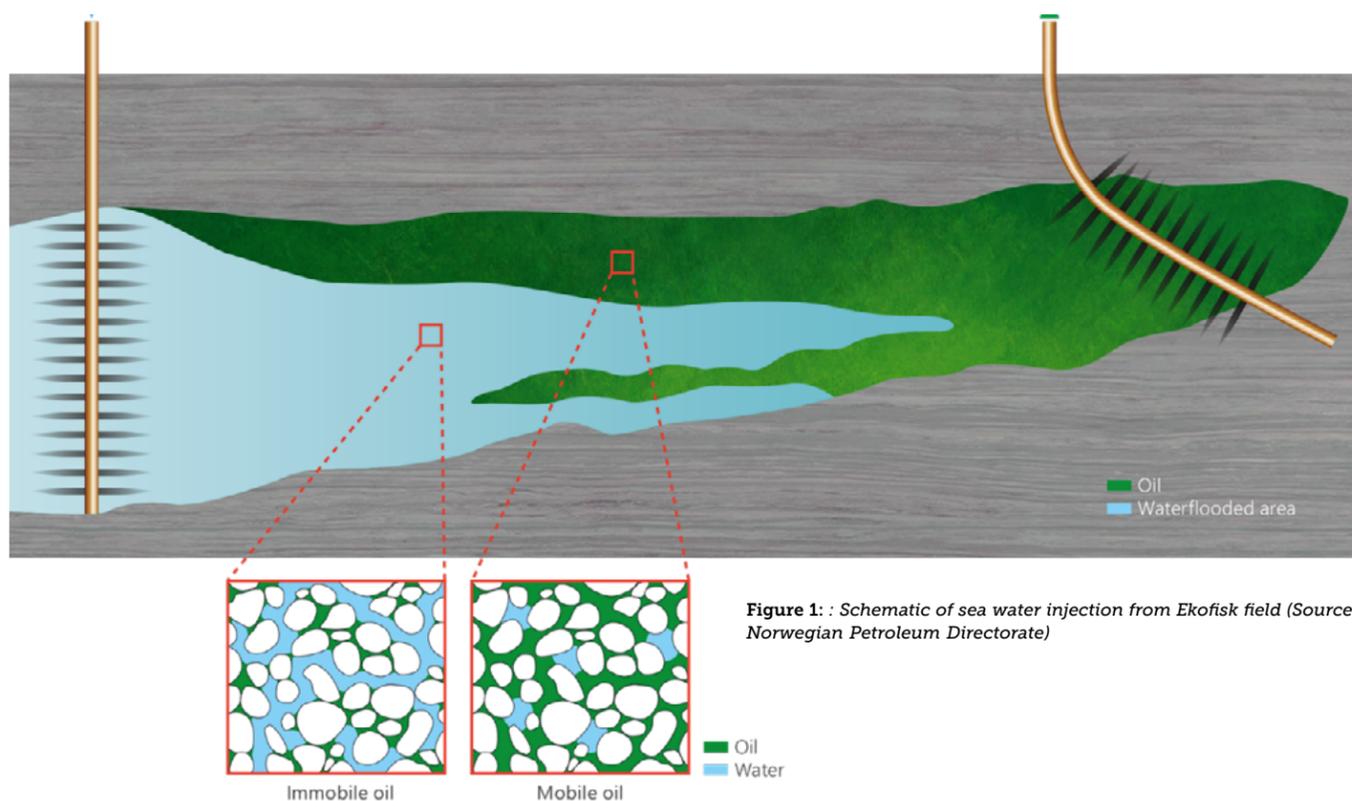


Figure 2: (a-b) Illustrates AICV® technology's ability to freely manage fluids that inflow from the reservoir by adjusting choke and through and an autonomous valve which dictates flow based on reservoir fluid properties (density and viscosity).

The AICV® is advanced reservoir management technology which autonomously managed the fluids that inflow from the reservoir. It is commercially available and was first run offshore in the GCC in 2015. Its functional design is revolutionary as it opens for oil yet becomes restrictive for increased water and/or gas rates without any human engagement required to manually adjust. You could compare this to an automatic-sink that turns on when your hand is present by the sensor, but shuts off when you move your hand away. The AICVs become more restrictive as the gas and water portion of the well increases, and adjusts accordingly.

Its ability to effectively generate enough 'closure force' for un-wanted gas and water zones, by autonomously adjusting the choking of the autonomous flow control valve based on the reservoir fluid properties (density and viscosity) is significant for advancing the 'AI'-like behavior from a mechanical perspective. As the AICVs remain open for oil due to its viscosity and density vs.

gas/water, as GOR (gas oil ratio) increases within a section of the well, the valves will become more restrictive within that zone of the well and choke/shut off accordingly. This ensures un-wanted gas and water remain underground and are not produced to surface in vast quantities, which saves significant cost and reduces associated emissions.

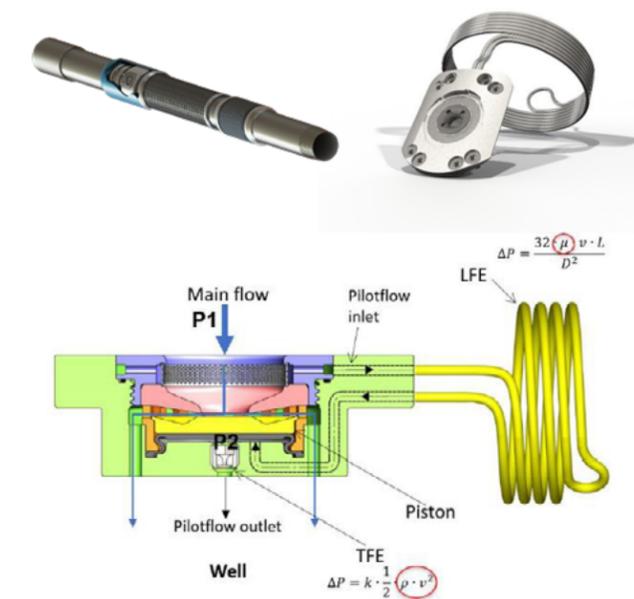
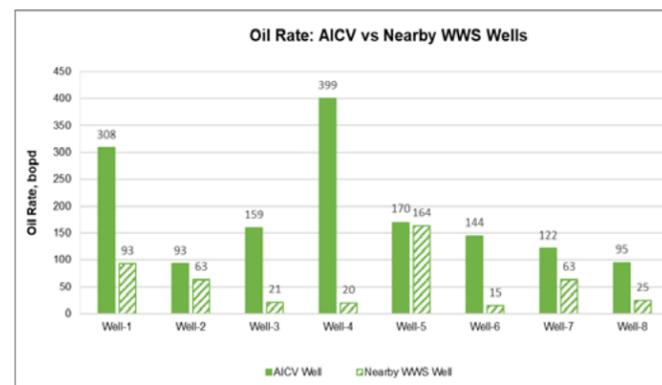
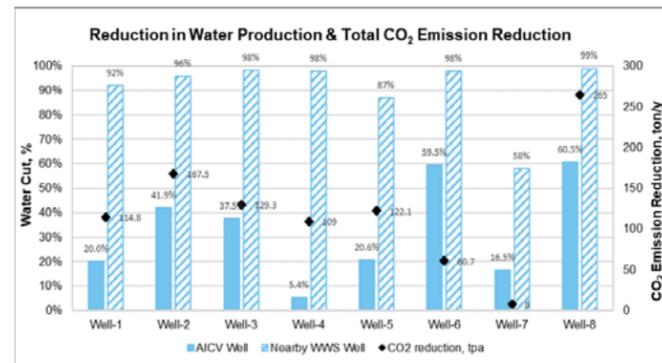


Figure 3 : Schematic of AICV® technology (Autonomous Inflow Control Valve)

Globally, the oil industry produces between 8-10 barrel of water per 1 barrel of oil. The challenge is that oil is a valued commodity, whereas the produced water is riddled with harmful chemicals and carries significant negative environmental impacts on top of the associated economic burden. Inflow Control's AICV technology contributed in 2020 alone to saving over 4 billion liters of water whilst enabling the operators to produce the oil more efficiently. This meant that the oil production was 'sustained' in a more environmentally friendly way, when keeping up to 90% of the gas in the reservoir and 50%-80% of the water in the reservoir and not transported to the surface.

By preventing (or reducing) unwanted fluids from flowing to the surface, oil companies gain remarkable benefits such as electricity savings associated to pumps, chemical treatment, and transportation handling.

Figures 4-6: The graphs below show comparisons of standard wire wrapped screen (WWS) well completions vs. AICV well completions. These graphs are supported by publications SPE-207069 and SPE-208179 respectfully.



Considering the return on investment, technology adoption must also be linked with economic drivers and a proven track record. The AICV technology has proven to provide operators with a ROCE (return on capital employed) or 'payback' within 1-6 months after installation. These figures are calculated from real project examples where energy companies increased net-oil production, reduced their OPEX costs, reducing the unwanted gas and/or water and in many cases reducing the pump size required for the well operations

Reduced production of unwanted fluids such as gas and water make it possible for the operators to meet their climate goals and to meet the world's growing energy needs. Reducing high GOR (gas oil ratio) will not only provide increased oil production and recovery, but it will also lower GHG emissions due to flaring or gas venting. Less water production means less water needing treatment at the surface, which circumvents additional expenditure such as water handling costs. Applying this technology yields oil companies with Lower Carbon Oil and better profitability. **SR**

Career in focus: Energy Economics & Finance

In this edition of SandRose, we feature multiple professionals from the energy industry working in the area of energy economics and finance. We asked them a series of questions about their career of choice.

Name: Osama Siddiqui

Job title: Business Development & Localization Manager, Siemens Energy



How does your job fit within the oil and gas industry?

The oil and gas industry is one of the main pillars of Saudi Arabia. With high investments in cutting-edge technologies, my role is to explore and study what can be locally procured and manufactured, which in parallel is increasing local circulation of the economy, which will positively impact The Kingdom's GDP.

What do you like most about your work?

Being able to contribute to Saudi Vision 2030 of having a more diverse economy, and increasing local manufacturing capabilities.

How did you become interested in this field?

As a Saudi pursuing a higher education in the United States, I witnessed true diversity in manufacturing capabilities, you can find a manufacturer for almost all living needs, and I wanted to be able to contribute the same for The Kingdom in my field.

What steps would you recommend readers take to prepare to enter this field?

From a technology company point of view, correlate all your technologies to the current and future initiatives of Saudi Arabia and market needs, understand your potential for local activities based on the available supply chain, focus on supplier development, and have a roadmap to increase Saudization in critical roles in your company.

What advice would you give someone considering this job (or field)?

Take pride in your work, follow up on the local content trends and needs, have a basic understanding of technical developments, and enhance your financial acumen to pursue local capabilities.

Name: Dr. Yousef Alshammari
Job title: CEO and Head of Energy Markets Research
Years of experience: 13



Describe your chosen career. What are your primary responsibilities as an energy finance/economics professional?

My work primarily focuses on developing models, monitoring data, making projections, updating scenarios, and providing meaningful insight. I provide just-in-time insight to the media on various global events influencing global energy markets. For instance, during the COVID-19 crisis in 2020, I responded to more than 100 media inquiries and client consultations, and I attended all of the OPEC+ monthly virtual press conferences with energy ministers of several countries, including Saudi Arabia, Russia, the UAE, Algeria, Iraq, Angola, and Nigeria. We had to keep the investors well informed on the latest developments to navigate the market risks.

How does your job fit within the oil and gas industry ?

As energy economists, we help energy leaders make decisions. We develop economic scenarios, highlight factors of uncertainty, and quantify risks. Essentially, the future of the oil and gas industry can be significantly influenced by these scenarios.

What do you like most about your work?

Every day there is something new, and it gets more exciting as our learning curve continues to rise as the world keeps changing. The public impact of your work is very significant and visible, which gives me absolute satisfaction.

What current issues and trends in the field should I know about/be aware of?

Energy transition, climate change, and carbon markets are all emerging trends that energy economists must be aware of to understand how their impact will shape the future of the global energy business.

How did you become interested in this field?

I did my Ph.D. at Imperial College London in chemical engineering, studying hydrogen production from oil fields. During my Ph.D., I was engaged in various professional organizations in London, including the Energy Institute, the World Energy Council, and the UK Parliamentary Group for Energy Studies. Being a member of such entities brought me closer to policy and business leaders in the energy sector. I have always wanted to create an impact through science and technology, and this has been a major theme of Imperial College research. This made me rethink my career options, which was one of the hardest decisions I ever had to make. I did not want to move away from the technological environment in which I made significant breakthroughs. As a result, I designed my research agenda to emphasize the role of technological development in changing energy landscapes. Being an individual consultant for many years motivated me to start my own energy market consultancy, CMarkits, in London, UK.

What steps do you recommend readers take to prepare to enter the field of energy economics and finance?

Read, listen, and follow the latest news and analysis. It should help you develop expertise that many don't have. Be ready for action, less sleep, and lots of travel. Energy is the world's most influential business shaping our everyday lives. Yet, few can understand this field and draw sound judgment from its complex variables.

Name: Mohammed A. Mian
Job title: Sr. Petroleum Engineering Consultant in the area of energy economics
Years of experience: 30+ Years



Describe your chosen career. What are your primary responsibilities as an energy finance/economics professional?

I am a Petroleum Engineer (M.Sc. in Petroleum Engineering) and Economist (M.Sc. in Mineral Economics) by education. I started my career as a Reservoir Engineer and, after about 10 years of experience, decided to switch to the commercial aspect of the business.

How does your job fit within the oil and gas industry

Perform economic evaluation of upstream and downstream projects, i.e., field development, LNG plants, NGL plants, Refineries, and Power Plants.

What do you like most about your work?

Exposure to senior management of the company as they make multi-billion-dollar investment decisions based on my analysis.

What current issues and trends in the field should I know about/be aware of?

The most critical issues are the increasing uncertainties in our operations. We will need to use advanced quantitative techniques to arrive at Expected Profitability Indicators for decision-making.

What steps do you recommend readers take to prepare to enter the field of energy economics and finance?

Obtain higher education in commercial aspects of the business, i.e., MBA or M.Sc. in Energy Economics in addition to your primary degree in engineering. Gain some experience in the operations of the oil and gas industry to have a helicopter view of the operations. Then start learning about how to convert the various types into economics.

What advice would you give someone considering this job (or field)?

Be inquisitive and innovative, don't follow the status quo. Try to bridge the gap between textbook approaches and industry experience.

SandRose Technical Paper Digest

Curated by Nora Hamidaddin, Associate Editor SandRose Magazine

In this section, we curate a number of recommendations for technical papers from subject matter experts on topics relating to their respective disciplines.



Kingdom of Saudi Arabia Section

Residual Oil: Special Core Analysis Lab in Carbonate Rocks

IMBIBITION CAPILLARY PRESSURE FOR MULTI-POROSITY CARBONATE ROCKS

Recommended by Aymen Alramadhan, Reservoir Engineer – Saudi Aramco

Alramadhan, A., Yildiray, C. 2021. Paper SPE-200367-PA published in SPE Journal 26, Pages 1261–1277

This paper is the first in the industry to investigate how bi-modality (or co-existence of micro-porosity with macro-porosity) and how variations in mineralogy can affect residual oil in carbonate rocks. The paper formulates a systematic workflow that ensures the data quality obtained from imbibition centrifuge test, minimizes uncertainty in deriving imbibition capillary pressure (Pci), and analyzes the data while considering pore-size distribution from Mercury Injection Capillary Pressure tests (MICP) and mineralogy from Quantitative Evaluation of Minerals by Scanning Electron Microscopy (QEMSCAN).



Production & Completions; Artificial Lift; Machine Learning; Artificial Intelligence

ESP DESIGN OPTIMIZATION UTILIZING MACHINE LEARNING AND AI

Recommended by Bander Khonain, Production Engineer – Saudi Aramco

Diker, G., Frühbauer, H., and Edna, M. 2021. Paper SPE-207929-MS presented at the Abu Dhabi International Petroleum Exhibition & Conference, UAE

Electrical Submersible pumps (ESP) are devices installed as part of the tubing design of a well to enhance the well production. As the deployment of ESPs is increasing globally, further design and efficiency optimizations to the ESP system is indispensable. This paper offers an optimization solution by utilizing machine learning and artificial intelligence (AI) conducted by a Norwegian oil and gas company Wintershall Dea, and provides an easy-to-follow guide for engineers new to the field of machine learning and AI in the area of artificial lift and ESP.



Sand Management; Production Engineering

A HOLISTIC SAND MANAGEMENT APPROACH

Recommended by Faical Baghdadi, Production Engineer – Saudi Aramco

Gupta, A., Borhan, N., Kamat, D. B., Mat, A., Singh, R., Sunnapu, R., Baghdadi, F., Jadid, M. B., Gong, M., and B. B. Madon. 2016. Paper OTC-26554-MS presented at the Offshore Technology Conference Asia, Kuala Lumpur, Malaysia

The authors emphasize the concept of holistic sand management to address sand issues. To control and manage the sand, a holistic approach was adopted that brought all sub-surface and surface disciplines under one umbrella. This approach was effective in reducing redundancy and generating feasible solutions. A full road map is outlined in the paper, including the necessary technical and managerial tools. It can be utilized as a simple blueprint for any operator, and it equips engineers dealing with sand issues and struggling with ad hoc and poor solutions for managing them with the required tools and procedures.



Kingdom of Saudi Arabia Section

Reservoir Description; Rock Characterization; Mud

ADVANCED MUD LOGGING: FROM ARCHIE'S DREAM TO REALITY

Recommended by Khalid AlQubaisi, Mud Log Engineer – Saudi Aramco; Sarah AlGhamdi, Sales Lead – Saudi Arabia, Schlumberger

Loermans, T., Kanj, M., and Bradford, C. 2005. Paper SPE-106324-MS presented at the SPE Technical Symposium of Saudi Arabia Section, Dhahran, Saudi Arabia

Archie is considered the founding father of petrophysics whose famous laws and works from the 1940's are still and will remain the core foundation of modern petrophysics. Written by one of Aramco's intellectual senior consultants, Charles M. Bradford, this publication discusses the Advanced Mud Log (AML) technology, with an abbreviation derived from the Arabic word "hope". AML is a quantitative surface technology proven to exhibit similar results to downhole measurements. It is aimed towards "Advanced Rock Characterization and Hydrocarbon Indication and Evaluation through Systematic Determination with Rock and Elemental Analysis Methods", or "ARCHIE'S DREAM"!

Five Reasons to Consider Investing Today

By Mohammed Al-Husein, Management Consultant,
Saudi Aramco

There are many reasons people don't invest their money, either misconceptions or a lack of knowledge about the topic. However, investing may get you there far more quickly than saving alone if you have long-term financial goals.



1 Protect Your Purchasing Power

Investing protects your purchasing power against inflation. You will be able to buy less with SR100 in 2022 than you could ten years ago. If the inflation rate is 2%, your investment rate of return must match that. You can protect your purchasing power by investing in a diversified portfolio of assets that outperforms inflation.

2 Compound Interest

Compound interest simply means that the rate of return of your investment increases exponentially—rather than linearly—over time. For example, suppose you make an SR5,000 investment in a business that pays you a 10% profit yearly. If you reinvest the profits and compound them with your initial investment, your returns will accelerate over time.

Compound interest works like magic in multiplying your funds. For example, if you invest SR1,000 monthly in a business that returns 10% annually, the value of your investment will grow to SR759,000, only SR240,000 of which is the principal; however, SR519,000 will be accrued. It is no wonder that Albert Einstein once said, "Compound interest is the eighth wonder of the world."

3 Achieving Your Financial Goals:

Investing can help you reach ambitious financial milestones. If your earnings are made at a higher rate of return than your savings account, you will make more money over the long term and within a faster period. This return on your investments can be used toward significant financial goals, such as buying a home or a car, starting your own business, or putting your children through college. For example, if you aim to have SR250,000 and use it as a down payment for a home, investing your monthly installments will help you reach this goal faster than simply saving them due to the effect of compounding.

4 Investing is More Learnable

Investing involves various types of risks. Therefore, experts warn against engaging in any investment before becoming knowledgeable enough to make calculated decisions. Nonetheless, there are many investment products nowadays that do not require deep knowledge while promising good returns in the long run. For example, investing in a well-diversified portfolio of Exchange-Traded Funds (ETFs) can yield good returns and can be fully automated without the need for sophisticated and specialized knowledge. Additionally, one can learn about ETFs and similar investment products through the internet and make sound investment judgments. Such investment products and opportunities are now available in Saudi Arabia in abundance.

5 Saving for Retirement

Increasingly, people are discovering that their retirement pension will not be sufficient to maintain their current lifestyle. So, as you are working, you should save and invest money for retirement. Then, you can live off funds earned from these investments at retirement age. Considering your attitude towards risk, you may make riskier investment choices at a younger age. However, a higher chance of both loss and reward comes with increased risk. Conversely, becoming more conservative with your investments as you grow older can be wise, especially as you near retirement age and would prefer stability. 

The Hidden Power of Inclusive Language:

Why Words Matter

By Ghaida Al Juhani, SPE-KSA D&I Publications Team Editor

Communication is an inherent part of all human beings. In our day-to-day life, we interconnect socially to convey, share and exchange knowledge and ideas, and build deep, meaningful relationships. This can be achieved through one of the most intricate and nuanced abilities acquired by humans: language. Language is uniquely expressive, shaping how our mind functions and how we express ourselves through symbolism and motifs. The words we use every day have tremendous power, whether we are describing people, events, or thoughts. To foster a deep, positive, and caring environment, it is increasingly crucial for individuals to prioritize diversity and inclusion by embracing the use of inclusive language.

Reflecting diversity in our community and promoting cultural humility to a higher degree starts with how we speak to one another. Inclusive language avoids expressions, terminologies, and phrases that insinuate prejudice towards certain groups according to their gender, ethnicity, religion, social class, or mental and physical traits. Contrary to popular belief, inclusive language is not limited to speech; it encompasses literary outlets and other communication tools such as facial expressions, tone of voice, posture, and eye contact. Inclusion is a mature state of mind; by avoiding the use of stereotypical marginalizing terms and recognizing the world is not fragmented into several exclusive categories, it is fluid and everchanging. While we do take this into account, the human brain is akin to a sponge and is, therefore, subconsciously absorbing what it hears. As such, accidental spurts of insensitive comments may leak through. Despite not having any malicious intent, we might be alienating people we care about. The key to avoiding this is to think before we speak since words hold immense power that can shed either a positive or negative light.

The use of inclusive language succeeds with a people-first approach by focusing on the person rather than their characteristics. One example of non-inclusive language would be to refer to a person by their disability. The inclusive alternative would be to refer to them directly by name simply. It is essential to use the positive language daily and avoid clichés. In addition, gender-inclusive language is a branch of inclusive language that proactively signals our commitment to achieving gender equality. Historically in the English language verses generally cater to men. This inclusivity can be achieved by replacing gendered words with options such as using the word “everybody” to aspire towards inclusivity. As inclusive language evolves over time, communication is crucial to discover how a particular



person would like to be acknowledged and respected. Inclusive language proves that the slightest language adjustments can make a profound difference that endorses a diverse culture. Communicating with diverse individuals will recruit top talent, allow expansion to new markets, and grow your team. By learning to interact with a diverse audience, you can broaden your reach and transfer your message further. This would create a sustainable and profitable environment at the workplace and beyond.

Adapting to a diversifying society and world is essential, and this can be achieved by raising awareness of inclusive language and making it an entrenched habit. Inclusion is no longer an affirmative action but a necessary action for a diverse tomorrow. The call for inclusive language requires us to stand and mindfully refocus the words we use daily, respecting the differences that are present in our societies to create a true environment that fosters belonging. 



Journey of a Saudi Coffee Bean

A celebration of the “Year of Saudi Coffee” hosted by Saudi Aramco’s Young Leaders Advisory Board (YLAB)

By Rahma Abdulal, Associate Editor

From the living rooms of homes to celebrations of major life milestones, coffee is deeply rooted in Saudi Arabia’s culture and traditions. Saudi coffee embodies the spirit of Saudi generosity and hospitality which has been immortalized in poetry and song. In recognition of the significance of coffee to the Kingdom and to promote and celebrate the unique coffee rituals integral to Saudi culture, the year 2022 has been designated as the “Year of Saudi Coffee.”

The Young Leaders Advisory Board (YLAB) is an empowering force that serves to amplify the voices of young professionals throughout Saudi Aramco and bridges the gap between youth and senior management. One of the many initiatives introduced by YLAB is the YLAB Cafe, which provides a forum to engage participants in thought-provoking discussions on exciting topics relevant to the company and the country. The most recent YLAB Cafe session was on the “Journey of a Coffee Bean,” which took place on December 7th, 2022, at the Ithra Knowledge Tower. The keynote speaker was Mr. Hazaa Al-Khaldi, the head of the Programs Unit under the Corporate Citizenship Division. The unit runs the company’s micro-industry projects across the Kingdom, including coffee as a micro-industry. The enlightening discussion highlighted one of Saudi Aramco’s micro-industry initiatives: the coffee plantation and production project in Jazan and celebrating the year of Saudi Coffee. The Jazan coffee project is one example of the many corporate citizenship projects that Saudi Aramco has launched to cultivate and preserve traditional crafts as viable businesses and to enable local communities to thrive. Ultimately it was the success of the Jazan coffee project launched by Saudi Aramco’s Corporate Citizenship Division that inspired and led 2022 to be designated as the “Year of Saudi Coffee.”

Located in the southwestern part of the Kingdom, Jazan has the highest concentration of coffee farms in Saudi Arabia. The region bears the highly regarded Khawlani coffee, which bears the name of the historic Khawlan tribes who once resided between Jazan and Yemen. When you hear about Saudi Aramco, coffee may not be the first thing that comes to mind. However, the micro-industry initiative run by the Corporate Citizenship Division aims to conserve and protect national heritage and crafts, to expand coffee production, and ultimately create opportunities to enhance and diversify the Kingdom's economy. Currently, 84% of the total coffee production in the Kingdom is Aramco-supported. The company has already transformed the lives of many farmers and their families by providing financial, moral, and technical support, such as training on advanced irrigation systems and agricultural methods. Since the program's launch in 2016, it has aided the production of more than 800 tons of coffee locally by enabling more than 1,000 farmers and reducing water use by 80%, thereby improving the health of coffee beans while preserving a valuable resource. The program was initially launched in the governorate of Al-Dayer in Jazan and, due to its success, has been expanded to include six additional areas.

According to the American Specialty Coffee Association, Jazan coffee beans scored more than 80 points out of 100 in multiple tests, earning it a specialty coffee classification, the highest grade of coffee available.

When reflecting on his experience working on the Jazan coffee project, Al-Khaldi expressed his fascination with the remarkable ability of local farmers to grow coffee at high elevations (up to 1,428 meters (4,685 ft)), navigating the steep cliffs and the jagged rock formations. Al-Khaldi also spoke about one of the challenges they faced in gaining the trust of farmers and locals. Initially, they were reluctant to accept training in modern irrigation tools and techniques. However, almost immediately, the benefits of that training translated into an increase in crop yields, reduction in water use, and economic and social gains for the local community. In return, the company earned the trust of farmers, by providing modern tools while preserving what they have learned through instinct and tradition. In future visits, Al-Khaldi also further reflected how it's been remarkable to see the program's impact on locals, with an evident boost in morale and increased interest and contribution to the trade.

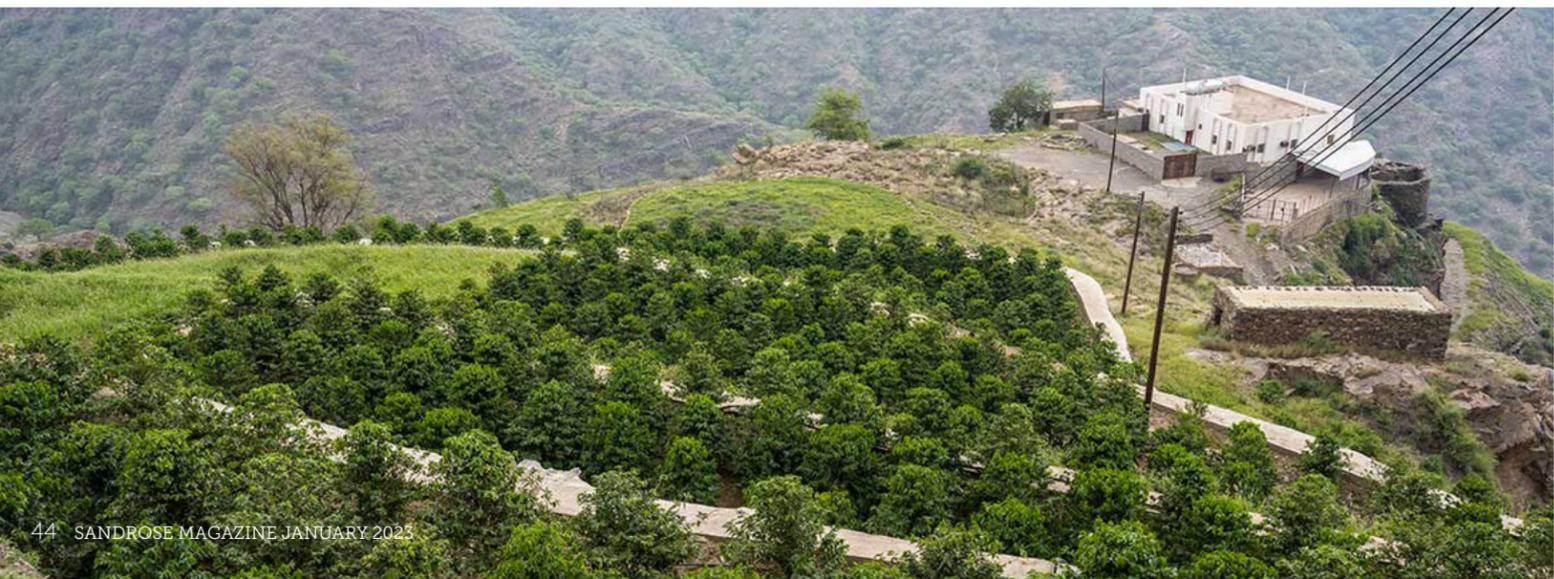
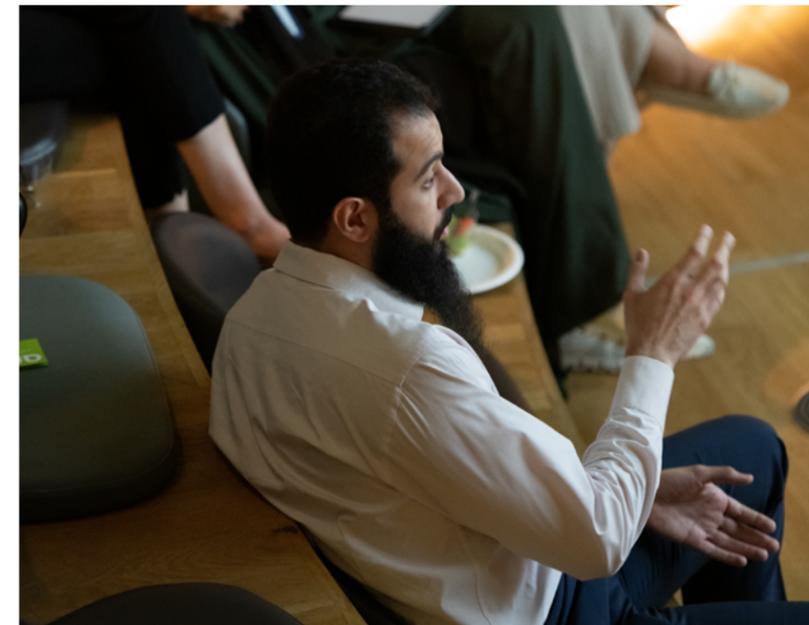
It is truly inspiring and fulfilling to shed light on Saudi Aramco's efforts in improving our relationship with local crafts and appreciation for our heritage. Not only is Saudi Arabia the world's largest producer and exporter of oil, but it is also home to a rich culture shaped by the diversity of its people and their hospitality. In Saudi Arabia, coffee is the first beverage offered to any guest. It is impossible to provide good hospitality without offering a cup of coffee and dates, a most delightful treat! It would be wonderful for the rest of the world to feel that same delight at the first sip. 



Rawan Aldossary, YLAB Coordinator



Hazaa Al-Khaldi, Supervisor of the programs unit, Corporate Citizenship Division, Saudi Aramco



Member Spotlight

In this section, we select a distinguished member of the SPE-KSA community to highlight in each issue.

FAST FACTS

Name:

Herman Nieuwoudt

Job title:

Vice President, Baker Hughes Oilfield Services for Saudi Arabia & Bahrain

SPE involvement:

Executive Sponsor of SPE-KSA MEOS 2023.

2) What event, person, or life experience has had the most influence on the direction of your life?

Singling out an event is almost impossible. However, there has been a couple of times that have influenced my thought process and thinking throughout my life. Traveling and living all over the world you meet a variety of people from all walks of life and a rich variety of cultures. Each country and culture that I have interacted with has helped develop me as a person, becoming a better human! It has given me the ability to first appreciate some of the unique brilliance in diversity that our industry has, but more than that, each interaction has enriched my understanding of the world we live in and how I should attempt to add value to make this world just a little bit better than yesterday.

1) Why did you decide to join the energy industry?

Growing up in South Africa, energy has always been a scarce and unreliable commodity. Energy is the fundamental building block to a prosperous and growing society; without it progress and improvement are hampered. In addition, I have always had a built-in sense of adventure, seeking out challenges and new experiences. The energy industry allowed me to put my passion for energy and adventure together. I am truly privileged to have had the opportunity to spend my career in the energy sector, it is unique and pivotal to every aspect of modern life.



3) What's one thing — either industry/work-related or not — you learned recently?

Decisions matter, and perceptions matter. The oil industry has always been perceived negatively as "bad press, pollution, etc.". That perception, not fact, has driven some major global decisions delivering repercussions that the people of the world will have to deal with. It is enviable how the Kingdom of Saudi Arabia has been one of the few sources that have constantly been driving the message of caution to the rest of the world, asking all producing countries to do their piece, driving behavioral correction globally, and fixing the mistakes of others. We need to learn from the current circumstances we are in, we cannot allow major global decisions to be based on perception, and we need to make sure that these decisions are made unemotionally based on facts. Our industry needs to continue to lead the narrative and thought leadership in energy to enable global energy security.

4) Is there an achievement or contribution of which you are most proud? Why?

Developing people is one of the greatest achievements any of us can strive towards. I have had a couple of opportunities to place a bet on people to enable them to accelerate their growth. Spotting talented individuals, working with them on developmental actions, and stretching their capabilities enable them to prosper. There is no prouder feeling than seeing people you have enabled flourish in the industry.

5) What does SPE mean to you?

SPE is a critical platform that allows us to connect and share experiences and learnings and address the current and future challenges our industry faces. SPE will continue to be pivotal in our future, it allows us to connect and drive the industry forward as a team of 124,800 people.

6) What are you looking forward to in the future?

I am personally incredibly privileged to find myself in my current position. I have the responsibility to lead a major service company in The Kingdom of Saudi Arabia, the center of the energy universe, during a time of extreme energy volatility. This, while one of the most ambitious country strategies, "Vision 2030," is under execution, the results of which appear daily. I cannot think of a better place to be with my family at the moment to experience and contribute to the significant advancements in energy and society that the Kingdom of Saudi Arabia will achieve over the following years.

7) Advice you would give to other SPE members

Develop ambitious plans, utilize the incredible platform that SPE offers and drive to differentiate our industry. Look up and back to see how far we have come but keep your eyes forward to continue to deliver energy to the world; the world needs you!

SandRose Reviews

By *Basmah Alotaibi and Faisal Al Hunaidi, Associate Editors SandRose Magazine*

For this edition of SandRose Reviews, we bring you a diverse collection of media to explore the ebb and flow of business, from building a second digital brain to conversations with iconic CEOs. Whether you're reading a book, watching a documentary, or listening to a podcast, we hope you discover new aspects of the business prism with your preferred immersive storytelling experience. Check out our top picks below!

For future editions, we will be taking 'Recs from our Readers,' so if you'd like to submit your reviews, send them to SandRose for a chance to be included.

Recs from our Readers

We're delighted to share an assortment of mixed-media submissions from our SandRose community; delve into the fantastic selections from our readers in this edition below!

Books



Qutaybah Alowaifeer,
Engineer

Why Has Nobody Told Me This Before?

Every one of us has been through a lot in life. We are taught to suppress negative feelings, which only exacerbate them. We need to understand that they are part of being a human. This book will be the flashlight that guides you through difficult times. It is packed with tools that will train your mind to see emotions not for what they are but for what they mean. I can't stress enough how profound this book is. Once you read it, I promise you will say, "Why has nobody told me this before?"

Film



Abdulrahman Ekram,
Petroleum Engineer

Free Solo (2018)

Free Solo is an American documentary following Alex Honnold's quest to become the first person to free solo climb El Capitan Mountain in Yosemite National Park.

The film does a terrific job capturing Honnold's discipline and commitment to achieving an extraordinary and equally fatal goal many don't dream of fulfilling. The documentary also serves as a character study of Alex's enigmatic calmness throughout his treacherous journey. Inspirational would be an understatement for Alex's sheer willpower to persevere with the mental and physical struggles that would cause any other person to call quits.

Podcast



Abdulaziz Alsheraim,
Petroleum Engineer

Business Wars

Business Wars is a podcast that looks at real stories between two rival organizations in an attractive and entertaining way. It highlights the success story of their executive management and leaders, whether in the companies' early or late stages. It sheds light on previous obstacles these companies faced and their solutions. I recommend this podcast to those who want to learn from successful real-life stories or who want entertainment.

Books



Building a Second Brain by Tiago Forte

"To be able to make use of information we value, we need a way to package it up and send it through time to our future self."

Technology has been a significant factor in changing the way humans live and interact with each other. In his book, *Building a Second Brain*, Tiago Forte highlights utilizing such technology to build a personal, effective, and productive system. The concept of *Building a Second Brain* is to take advantage of a digital noting system to store all and any thoughts, ideas, projects, and resources as your own archive base.

Forte discusses four pillars for this system: to capture what resonates, organize for actionability, distill to find essence, and express by showing your work. Following this method promotes the potential to see all your gathered wisdom and information ready to be put into reality.

We can't possibly depend on our biological brains to store everything we know; therefore, building a second digital brain will ultimately benefit our future selves. It will reduce the hassle of depending on physical records, storing everything securely and within reach. It will enhance productivity as it is easier to conduct a business project, learn a new skill, track an ongoing idea, and witness all your progress all in one place.

If you enjoyed Building a Second Brain, you'd enjoy Deep Work by Cal Newport.

Film



Won't You Be My Neighbor? (2018)

"If you could only sense how important you are to the lives of those you meet; how important you can be to the people you may never even dream of. There is something of yourself that you leave at every meeting with another person."

Won't You Be My Neighbor? is an award-winning documentary by Morgan Neville examining the legacy of Fred Rogers, the treasured host of the popular children's television program *Mister Rogers' Neighborhood*. Neville paints a vivid portrait of the philosophy and work of children's entertainer Fred Rogers. Delightfully soft-spoken yet powerful in expressing his ideals, Fred Rogers was a unique presence on national television for over 30 years. Unlike any other children's shows at its time, *Mister Rogers' Neighborhood* imaginatively communicated heavy and crucial topics with empathy using a diverse cast of friends and puppets for generations. As a result, Rogers significantly influenced the world, from children to politicians.

The documentary also covers Rogers' constant deep self-doubt and how the occasional misjudgments in his prime affected him even when he was the only source of understanding and love for many. *Won't You Be My Neighbor?* is an important reminder to continuously and consciously exercise acts of kindness.

If you enjoyed Won't You Be My Neighbor?, check out Searching for Sugar Man.

Podcasts



Masters of Scale

"No matter how brilliant your mind or strategy, if you're playing a solo game, you'll always lose out to a team."

Reid Hoffman hosts a 30-minute finance podcast covering topics like raising funds, when to do things that Scale and things that don't, deciphering good from bad business ideas, workplace culture, founder's grit, and more. Hoffman, a charismatic entrepreneur and venture capitalist from Silicon Valley, co-founded PayPal and LinkedIn and invested in companies like Facebook and Airbnb at their beginning stages.

With his diverse and insightful guests from a broad spectrum of backgrounds ranging from Nobel Prize-winning economist Daniel Kahneman to former CEO of Starbucks Howard Schultz, Hoffman tests an array of theories through his interviewees' stories of entrepreneurship, leadership, strategy, and management. The businesses' failures and setbacks are also beautifully crafted and packed into each episode, allowing listeners to apply learnings within their own world.

If you enjoyed Masters of Scale, be sure to give Wisdom From The Top with Guy Raz a listen.



SPEED 2022: SPE Energy Dynamics Petrothon **Young Professionals and Students Tackle Industry Challenges** **at SPEED, SPE-KSA's Strategic Petrothon**

By Danna Khattab, SPE-KSA D&I Publication Team

Between October 17 and 18 of 2022 at the Saudi Aramco Plaza Center, SPE-KSA's diversity and inclusion (D&I) committee, in collaboration with Young Professional (YP) & Information Technology (IT) teams, conducted SPE-KSA's first SPE Energy Dynamics Petrothon, SPEED. The word Petrothon is a combination of two words: "Petroleum + Marathon," following the structure of a strategic hackathon focused on challenges relating to the oil and gas industry. The two-day event provided a diverse group of young professionals and students with a venue to work together to find unique solutions to enrich youth participation in the energy industry, address challenges around the area of sustainability, and develop solutions to accelerate digital transformation in the Energy Industry.

The event had over 150 participants from diverse backgrounds and expertise, grouped into 25 teams of five to seven across the three different challenges currently facing our industry. The challenges covered the following topics and themes:

Youth Engagement in the Energy Sector (Youth Engagement):

Participants were asked to provide solutions that enhance the engagement of younger generations to close the current generational gap in the industry.

Circular Economy in Oil and Gas Operations (Sustainability):

Participants must develop practices and innovations that can enhance the circularity in the energy industry and help close the loop.

New Technology Adoption (Digital Transformation):

Proposes the adoption of digital solutions within the context of the energy industry to ease the transformation and transition into an increasingly more digital world.

To assess all 25 submissions, subject matter experts relating to each challenge were invited to join the event, where they provided support and guidance to the teams. Additionally, by the end of the 2nd day, the specialized judges evaluated the different ideas to select the winners of each challenge.

Finally, SPE-KSA's participating committee intensified their efforts and ensured the potential endorsement of the winning solutions by the event champions, Saudi Aramco's Youn Leaders Advisory Board (YLAB) for the youth challenge, King Salman Energy Park (SPARK) for the sustainability challenge, and Upstream Digital Transformation Department for the digital transformation challenge.

This event was ripe with a healthy competitive spirit, immense enthusiasm, and devotion from participants, judges, industry leaders, and experts coming together in one venue to solve and discuss challenges to advance the energy industry. Not only did this event yield three great solutions, but it also provided the participants with the opportunity to network and connect with like-minded individuals. Lastly, it taught our participants how to collaborate effectively in a short amount of time. SPE-KSA's committees are proud to conduct such events as they play a significant role in developing the creative side of our community and honor SPE International's mission to promote knowledge dissemination and to provide opportunities for professionals to enhance their technical and professional competence. 

Winning Teams

Youth Engagement Challenge

Team 20:

Abdulaziz Almasrahi

Abdullah Alsaikhan

Ghaida Aljuhani

Dana Tayyib

Sulaiman Albassam

Samiulla Agha

Marwan Almulhim

Project: Social Innovation Youth Energy Hub (SIYEH)

Sustainability Challenge

Team 11:

Ali Binabdi

Ali Alshuwaikhat

Ridah Alhassan

Dana Alhashim

Anwar Alghamdi

Project: Sustainable Nano-Ink Detection Technology

Digital Transformation Challenge

Team 5:

Mohammed Alameer

Mohammed N Alotaibi

Meelaf Alsubaii

Mohammed D Alotaibi

Mohammed Alsaqabi

Project: Sandbox

Challenge Winners



Youth Engagement

To learn more about the winning projects visit our website by scanning the QR code

SPEED JUDGES AND SMES

Special thanks to our panel of judges and SMEs for providing support and guidance to participants and for choosing the winning teams



Youth Engagement

- Hadi Alqahtani
- Hussain Algaw
- Hind Alrayes
- Sara Shabib
- Cecilia Malagon
- Alejandro Gonzales
- Alejandro Noriega



Sustainability

Sustainability

- Majed Alotaibi
- Manal Alghannam
- Abdulrasheed Alhashem
- Wael Abdallah
- Khlood Tarabzouni

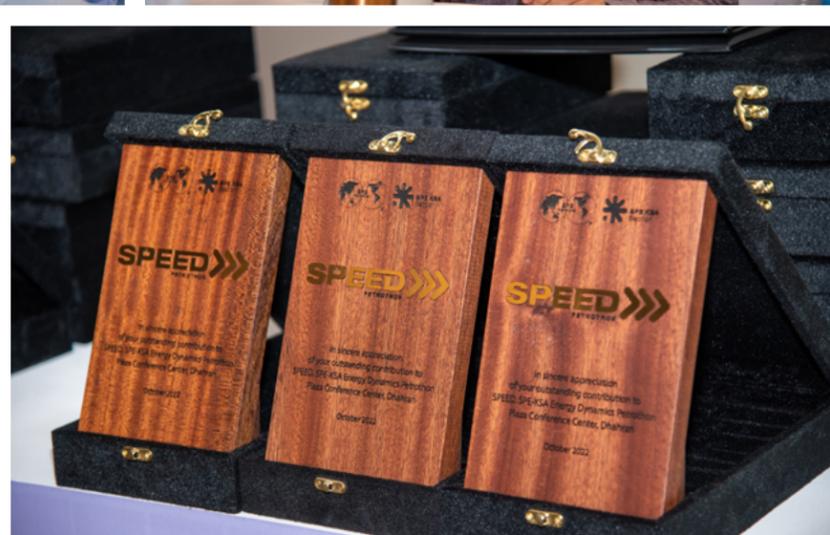


Digital Transformation

Digital Transformation

- Joao Soares
- Ridwan Jalali
- Laila Hmoud
- Ziad Hammuda
- Salaheldin Elkatatny







SPE-KSA's T&PP September 2022 Dinner Meeting

The Role of Oil & Gas Companies in the Energy Transition

By Danah AlZamil, SPE-KSA T&PP Team Member

On September 12th, 2022, SPE-KSA's Technical and Professional Programs (T&PP) team hosted its second dinner meeting of 2022. The keynote speaker and guest of honor was Mr. Peter Parry, Chairman of Global Energy and Natural Resources at Bain & Company. The session was moderated by Feda AlTuwaijri, Strategy & Market Specialist at Saudi Aramco.

ABOUT THE SPEAKER

With over 35 years of experience in the global energy and natural resources industries, Mr. Peter Parry paved a career with a focus on energy strategy, sustainability, and the energy transition working with global energy and resource asset owners, global investors, and regulators. Throughout his career, Mr. Parry worked with a range of national oil and energy companies across the Middle East Region, thereby supporting them through transformative challenges that include but are not limited to strategy development, portfolio evaluation, capital allocation, joint venture agreements, infrastructures & capital projects, management systems improvements, and capability building.

In the last decade, Mr. Parry has advised leading international oil and energy companies on their ESG programs with a strong focus on sustainability and

clean energy program developments such as the deployment of Hydrogen, Carbon Capture and Storage, and Renewables.

REFLECTIONS AND KEY TAKEAWAYS

During his talk, Mr. Parry emphasized the importance of balancing the three challenges of the energy trilemma as demand for power, heat, and transport increases. The trilemma consists of three essential pillars: energy security, which focuses on the security of supply; energy equity, which highlights its affordability and economic prosperity; and sustainability, which addresses the growing criticality of climate change and emissions management.

Following that, Mr. Parry also further emphasized how the energy transition context varies by region. More specifically, countries must weigh policy choices affecting current and future energy goals by balancing the energy trilemma based on their domestic energy supply and demand. In the Kingdom's case, Mr. Parry highlighted Saudi Arabia's efforts with the following examples.

Vision 2030: Where the Kingdom is aspiring to transform its economy through diversification to decrease its dependence on oil (expanding the energy sector to include gas, renewables,..etc.).



Sustainability: Pivoting towards energy efficiency and aiming to achieve net zero by 2060.



Investments: Maintaining investment efforts in the upstream sector by developing gas production, expanding downstream capabilities, and localizing the energy-sector manufacturing.



Technologies: Pushing to develop oil into chemicals, innovating in hydrogen production and transport, further developing carbon capture and storage (CCS), and localizing the production of solar PV and components.

The efforts mentioned above highlight the many ways the Kingdom has responded to the energy transition to achieve a truly Circular Carbon Economy. The key takeaway from Mr. Parry's talk was that the industry's future relies on balancing energy security, equity, and sustainability. To address the challenges of the energy trilemma, policymakers and energy companies need to consider three key factors when drafting policies and developing technologies: innovation, economics, and impact. **SR**



Mr. Peter Parry, Chairman of Global Energy and Natural Resources at Bain & Company



Left to Right : Mr. Nasir Al-Naimi, Honorary Chairman of SPE-KSA BoD , Peter Parry, and SPE-KSA Chairman Abdulaziz Al-Nuaim





Peter Parry and event moderator Feda AlTuwaijri



Left to Right: Abdulaziz Al-Nuaim, Nasir Al-Naimi, Peter Parry, Faisal Nughamish, Feda AlTuwaijri, and Seba Almaghlouth



SPE-KSA's D&I Hosts a Mindfulness and Workplace Productivity Workshop

By Danna Khattab, SPE-KSA D&I Publication Team Editor

Work takes up around a third of our adult lives, ultimately shaping our mentality and psychology. The 8-10 hours a day at work are filled with different experiences and encounters, some are light and productive, and others can be stressful and demanding. As work plays a significant role in our lives, learning how to adapt to the stressful nature of work is essential. Yoga and meditative practices are two measures that can be taken to reduce day-to-day stress experienced at the workplace.

On the 24th of August 2022, SPE-KSA Diversity & Inclusion Committee successfully held a mindfulness and workplace productivity workshop at Saudi Aramco's EXPEC Advanced Research Centre.

The workshop was conducted by Sara Al-Budair, a Professional Yoga therapist and instructor. In this session, Sara provided attendees with simple exercises to be conducted in the workplace to promote productivity and reduce anxiety. Furthermore, the workshop included brief stretching, breathing, and relaxation practices to be performed at the workplace.

At the end of the workshop, an interactive questionnaire game was held. The game awarded the top three winners with customized SPE-KSA D&I yoga mats. The workshop aims to enhance the attendees' knowledge of the importance of de-stressing during working hours and provide techniques and tools.

The Diversity & Inclusion committee is committed to advocating mental health and delivering the needed knowledge and equipment to achieve inner peace and maintain a good state of mind.

As a result of these efforts, the attendees had a relaxing experience that was a break from all the stress. Additionally, they expressed how beneficial and enjoyable the workshop was, and they particularly admired the simplicity of the exercises and their applicability at the workplace. 



Sara Al-Budair, Yoga therapist and instructor



D&I





Nutrition Tips for Healthy Skin

Look Healthier ... look Younger ... and Feel Better

By Johns Hopkins Aramco Healthcare

Proper and well-balanced nutrition plays an important role in determining the way we look and the condition of our skin, where all of the nutrients that are necessary for healthier and beautiful skin are provided. To achieve this goal of having healthy and glowing skin, the following nutrition tips are recommended:

Consume well-balanced meals that nourish all of your body, including your skin and prevent skin damage or dryness or dullness. These meals can include the following food groups:

Fruits and vegetables with bright colors, such as tomatoes, carrots, cucumbers, oranges, grapes, spinach, peppers, broccoli, banana and kiwi. The recommended daily serving of fruits and vegetables is five.

Healthy oils such as olive, canola or sunflower oil, unsalted nuts including walnuts, almonds and seeds are also important for skin health. Oils and nuts should be used in moderation in order to avoid oily skin.

Dairy products to provide Calcium and vitamin D, in which low-fat or nonfat products are preferred.

The food groups above are rich with many nutrients (detailed below) that are essential to achieving healthy skin.

Antioxidants :

Antioxidants fight many diseases and reduce the effect of aging on skin health and keep the body healthy with younger looking skin. Antioxidants promote a healthier and more youthful appearance, particularly of your skin. They neutralize the free radicals that damage the skin and contribute to premature aging of the skin and the appearance of wrinkles. Antioxidants are found in fruits and vegetables, unsalted nuts, green tea, seeds and salmon. Omega 3-fatty acid is an antioxidant that also encourages skin health. It is found in walnuts, almonds, avocado, tuna and salmon.

Selenium :

Selenium is a nutrient that helps in protecting the skin from sun damage and fights the appearance of wrinkles by reducing the effect of free radicals on the skin. It is found in seafood, fruits and vegetables, dairy products (preferred to be low fat or non-fat varieties), whole grains, and skinless poultry. Importance of Beta carotene Beta carotene nourishes the skin and keeps it healthy while contributing towards skin repair. It is found in green leafy vegetables and carrots.

Protein :

Protein provides the skin with the nutrients needed for making collagen, which keeps the skin healthy and supports its ability to repair itself. Protein is found in seafood, poultry, meat, dairy products, eggs and dried legumes such as beans and lentils. Lean protein is recommended to be consumed in foods such as low-fat or non-fat dairy products, skinless poultry and fat-free red meat.

Vitamins:

Vitamins A, B, C, D and E contribute to skin health and skin repair in addition to protecting it from the harmful effects of sun. These vitamins neutralize the free radicals that cause skin damage and the appearance of wrinkles. Consuming well-balanced meals in recommended portions provides the body with all the necessary nutrients that will keep the skin healthy and support skin cell regeneration and repair.

Other Health Tips :

Fluids, including low-fat soup, unsweetened fruit juices, vegetable juices, and water, keep the skin well hydrated and avoid dryness, as dehydration can negatively affect all body organs, including the skin. Caffeinated beverages (coffee, tea, and cola) deplete water from the body, if an excessive amount is ingested. Fluids help distribute antioxidants across our body and help us get rid of free radicals.

Adequate sleep (7 to 8 hours a day) is important for the body to produce new cells and repair damage, including the skin, in addition to the other benefits of sufficient sleep for the brain and the rest of the body.

Avoid smoking (active or passive), as smoking causes damage to the skin, accelerates its aging, and reduces the skin's nourishment by limiting blood flow.

Reducing anemia, as it causes less blood supply and delivery of nutrients to the body's organs, including the skin. Foods rich in iron, folic acid and vitamin B12 are important to avoid anemia. These include seafood, fortified cereals, lean meat, green leafy vegetables, skinless poultry and eggs.

Protecting the skin from pollution and excessive exposure to sunlight. It is important to keep the skin protected by limiting the exposure to intense sunlight by using medically approved sunscreen creams.

Performing regular exercises promotes wellbeing of the body, including the skin, as it improves blood circulation and the delivery of oxygen and nutrients to the skin. This will also help the body in getting rid of toxins that damage the skin and accelerate its aging processes. Physical activity daily or at least 5 times per week for 30 to 45 minutes is recommended, especially combining aerobic and strength exercises.

Maintaining skin hygiene supports skin health, reduces the risk of skin infection and removes dead skin cells.

Staying healthy and ensuring that the levels of blood sugar, blood pressure and lipids are within the recommended ranges will keep the skin healthy, as elevations of these levels will affect the skin, reduce blood circulation and the delivery of nutrients to the skin and to all other parts of the body.

SPE-KSA T&SA Returns Full-Swing with the First Padel Tournament

By Mohammed Howsawi, T&SA Team Member

SPE-KSA Trips and Social Activities (T&SA) Team returned full-swing with the first ever SPE-KSA Padel Tournament held on the 27th of August, 2022 at Double Padel in Dammam. The event's primary goal was to encourage networking among SPE-KSA members in a healthy and competitive manner through organized sport activity.

Before the event's start, slots for SPE-KSA's Padel Tournament and registration were full within 20 minutes of the announcement's release.

Padel is a racket sport typically played in dual teams, and over the past year, it has gained massive popularity across the Kingdom. The sport combines action with fun and social interactions and is suitable for players of all ages and skills. It is played in an enclosed court around a third the size of a tennis court.

The Padel Tournament was structured over two stages and included 12 teams with 24 players. The first stage consisted of three groups, and each team played three matches to qualify for the finals. The winning teams went onto the second stage, with two teams making it to the third and final round.

SPE-KSA's T&SA Padel Tournament Winners and Finalists

WINNERS



Bader Almulhim & Ibrahim Althani

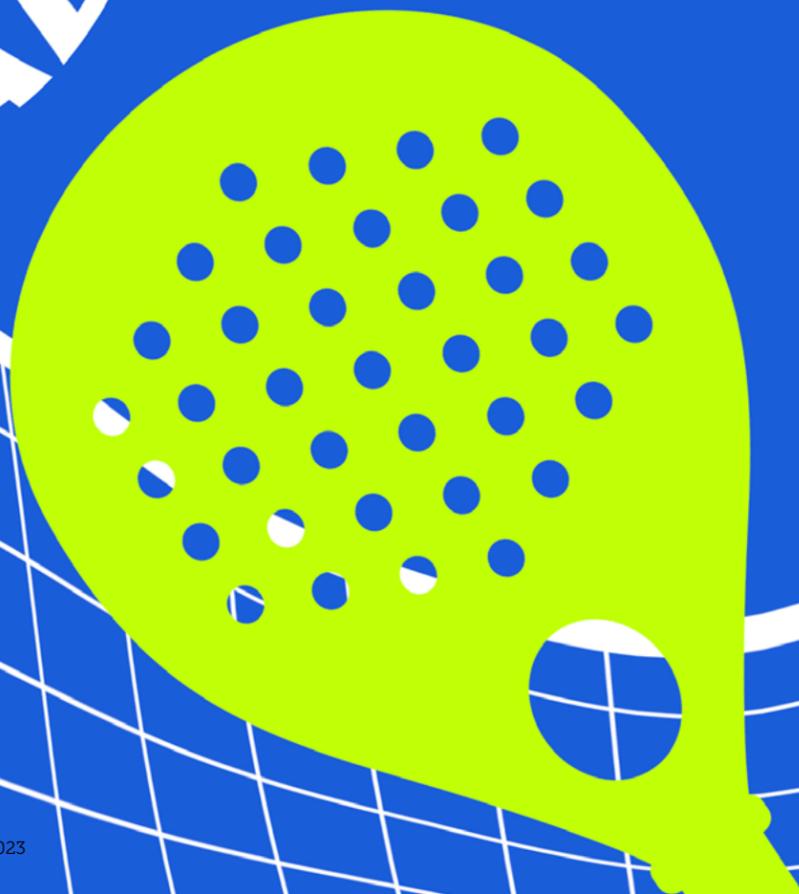


Abubaker Saeed & Faisal Alanwah



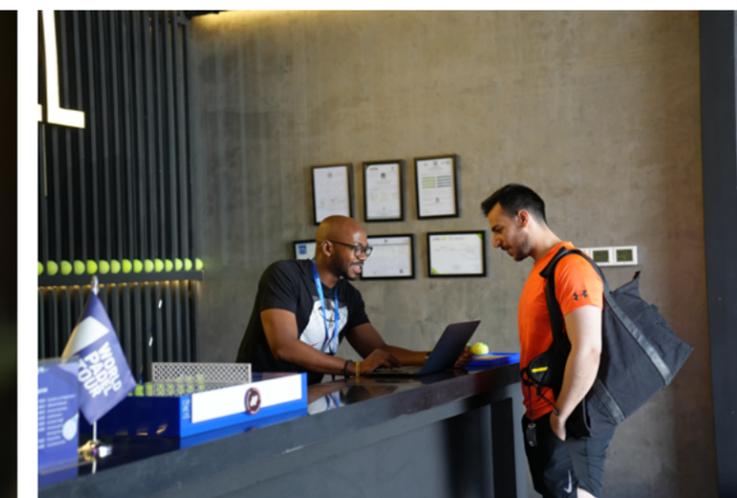
Abdullah Alarfaj & Mohammad Almulhim

LET'S PLAY
PADEL



dip
DOUBLE PADEL





SPE-KSA's T&SA Celebrates Saudi National Day at Ithra & Scitech

By Mohammed Howsawi, Alkhansaa Alqunaibet, T&SA Team Members

Between the 21st and the 24th of September of 2022, SPE-KSA's T&SA organized several activities and events celebrating the 91st Saudi National Day. The main goal of the events is to celebrate the National Day of our beloved country, the Kingdom of Saudi Arabia, while greatly promoting inclusion.

NATIONAL DAY CELEBRATION AT THE KING ABDULAZIZ CENTER FOR WORLD CULTURE (ITHRA)

SPE-KSA T&SA team arranged a Saudi National Day celebration at King Abdulaziz Center for World Culture (Ithra) in collaboration with social and charitable organizations: Efaa Organization, the Eastern Province Welfare Organization, and the Charitable Society for the Care of Orphans. The events were held on September 21st and 22nd, 2022.

The celebration of Saudi National Day at King Abdulaziz Center for World Culture (Ithra) included two main activities: a brief tour around Ithra Center and the live concert "Sing-along for Saudi," a live concert where all the children and their families were encouraged to participate in celebrating and singing. The event started by welcoming the children and their families. Then all the participants had the opportunity to tour Ithra Center to explore all the accompanying events and activities to the Saudi National Day celebration.





NATIONAL DAY CELEBRATION AT THE PRINCE SULTAN BIN ABDULAZIZ SCIENCE AND TECHNOLOGY CENTER (SCITECH)

On September 23rd and 24th, 2022, SPE-KSA's T&SA also cooperated with SciTech on several activities, such as SPE-KSA booth, live shows, and art competition. The SPE-KSA booth was set in the center, where volunteers approached SciTech visitors and spoke to them about the many events and activities organized by SPE-KSA. Copies of SandRose Magazine and SandRose Education were also distributed while a traditional folkloric dance (Saudi Ardah) was performed. Two different art workshops were presented by artists Taraf Aldaham and Mohsen Ghareeb, and a photography competition was held by SPE-KSA T&SA in collaboration with Ofoq Organization.

The first art workshop was about Creating Trophies, held by Mohsen Gharib and Mussa, where participants learned about the principles of trophy making. Additionally, the second art workshop was about Drawing for Children and Adults, featured by Taraf Aldaham. In collaboration with Ofoq Organization, T&SA also conducted a photography competition. The winning photos will be shared in the upcoming issue of Sand Rose magazine.

SPE-KSA T&SA Team would like to thank King Abdulaziz Center of World Culture (Ithra), Prince Sultan bin Abdulaziz Science and Technology Center (Scitech), Efaa Organization, the Eastern Province Welfare Organization, the Charitable Society for the Care of Orphans, Ofoq organization, and everyone involved in the success of these events.





SPE-KSA's T&SA Visits Ithra's Children's Museum and Al-Hijrah Exhibition in Collaboration with Efaa Organization

By Mohammed Howsawi, T&SA Team Member

SPE-KSA Trips and Social Activities Team arranged to visit King Abdulaziz Center of World Culture (Ithra) in collaboration with Efaa Organization on August 24th, 2022. The main goal of the event is to advocate for inclusion, educating children with special needs about Al-Hijrah, the journey that changed the world.

The collaborated visit to the King Abdulaziz Center of World Culture (Ithra) included three main activities, Al-Hijrah Exhibition, Children's Museum, and dinner at Zooba Restaurant.

The event started by visiting Al-Hijrah Exhibition: In the Footsteps of the Prophet . The exhibition, curated by Ithra aims to shed light on the Prophet's journey Hijrah from Makkah to Madinah. The children and their families were given a chance to tour the exhibition, which recreated one of the most important Islamic events and inspirational journeys that shaped the beginning of Islam. The exhibition incorporates numerous artifacts and features collective works that recreate the story of Hijrah.

All participants were then offered the opportunity to

visit Ithra Children's Museum. The Children's Museum is the first museum in the Kingdom that offers an array of interactive play-based experiences, including exhibitions, classes, and workshops created for children under the age of 12.

The visit concluded with a delightful dinner at Zoobaa pop-up restaurant open at Ithra, serving contemporary Egyptian street food.

The event was attended by around 48 children and their parents, with four SPE-KSA T&SA members and volunteers. SPE-KSA T&SA Team would like to thank the King Abdulaziz Center of World Culture (Ithra), Efaa Organization, and everyone involved in the success of this event. SR



T&SA

SPE-KSA Student Outreach Activities

UNIVERSITY OUTREACH: Engaging with Western Region Universities

By *Abdulrahman Al Rumaih, University Outreach Team Leader*

SPE-KSA Student Outreach Team successfully conducted an engagement program at Jeddah and Thuwal on October 22-24. The team met with the University of Business and Technology (UBT) at Jeddah to explore the possibility of establishing a university SPE chapter. Several meetings were held with the university deanship, faculty members, and over 100 students. The Student Outreach team successfully delivered presentations to highlight the value of starting UBT-SPE student chapter in the university and explain the process of establishing the chapter. As a result, UBT deanship endorsed the start of UBT-SPE student chapter and plans to submit the application by the next cycle, Q1/2023. Moreover, the team visited KAUST to strengthen the communication between SPE-KSA and KAUST-SPE and explore potential areas of collaboration. The visit included a campus and laboratory tour and meetings with the KAUST-SPE chapter and faculty members from the Ali Al-Naim Petroleum Research Center. The discussions were focused on supporting KAUST-SPE's activities and capitalizing on the talents of its members to potentially serve as SPE-KSA's active arm in the western region. The teams also discussed the multiple joint initiatives between SPE-KSA and SPE-KAUST. To further strengthen the ties, the SPE Student Outreach team is working to arrange a visit program for the KAUST-SPE members to Dhahran by Q1/2023. The engagement program was concluded by a visit to Saudi Aramco's Research Center at KAUST, which included a lab tour followed by a presentation highlighting the research functionalities of the center. This visit served as a rich medium to discuss SPE-KSA's future events related to sustainability and 4IR. The team also invited the center's faculty to volunteer and participate in SPE-KSA's future activities.



Establishing a chapter at Jubail Industrial College

By *Abdulrahman Al Mulhim, Establishment Program Team Leader*

SPE-KSA's Student Outreach Team visited Jubail Industrial College (JIC) in October 6th, 2022. The objective was to discuss the possibility of establishing an SPE chapter at JIC and explore collaboration opportunities. The team delivered a presentation to JIC dean and faculty members, sharing an overview of SPE-KSA and its activities while highlighting the value of SPE university chapters in contributing to the academic ecosystems at every level; university, faculty members, and most importantly, students. The visit was part of SPE-KSA's continuous efforts to expand its engagement with universities. Bridging the gap between academia and work by integrating various disciplines is one of the main goals of the Student Outreach Team. At JIC, faculty members and students were eager to join the society and establish JIC-SPE to develop themselves and gain industry insights. The deanship endorsed SPE student chapter establishment at JIC after capturing the



benefits and opportunities that it can offer. Hence, the university submitted an official chapter establishment application.

SPE-KSA Student Outreach Drives the Success of Tomooh 2022 Program

By *Zainab Al-Baharna & Ali Al-Shuwaikhat*

SPE-KSA Student Outreach Team, in collaboration with Petroleum Engineering & Development and Training & Development admin areas, conducted a five-day virtual petroleum engineering course as part of Tomooh 2022 program from July 31st to August 4th. In line with the corporate social responsibility and citizenship endeavors, Tomooh is a program that aims to educate talented high school students on essential subjects such as petroleum engineering, geoscience, computer science and life skills.

With 50 technical sessions delivered by 28 young professionals, the course witnessed strong participation of more than 950 diverse students. The young professionals covered the fundamentals of various petroleum engineering aspects thoroughly, starting from exploration and ending with production, with an

emphasis on the role of sustainability and 4IR in the industry. They also demonstrated their presentation and communication skills successfully during the sessions by reflecting on their own academic and professional experiences, addressing students' queries, and delivering multiple exercises, quizzes and videos related to the subject of interest.

The program was well received by the students, with a remarkable satisfaction rate of 95%. The course enabled high school students to have a holistic understanding of petroleum engineering and served as a rich medium to attract potential talented prospects to the energy industry.

ENERGY4ME certification workshop educates youth about the energy industry

Danna Khattab, Student Outreach Event Management Team Leader

On Saturday, 1st of October, 2022, the Energy4me Program, led by Danna Khattab, successfully held its fourth Training Workshop at the Kempinski Al Othman. The workshop introduced 11 industry professionals from different backgrounds to the Energy4me program pillars and provided them with the necessary training to become Energy4me ambassadors and educate the public about energy and the industry.

The agenda included an out-of-the-box ice-breaker activity followed by an overview of the Energy4me program and its importance to our local and global community. Five exciting hands-on science experiments were conducted; Exploring Oil Seeps, Core Sampling, Exploring Porosity, Perforated Well Casing, and Getting the Oil Out. After each experiment, an open discussion was held to further clarify the associated oil and gas concepts and ways to deliver these experiments in future workshops to students and teachers as Energy4me ambassadors.

After the workshop, the trainers and trainees expressed the added benefits from the workshop that played a significant role in their development as Energy4me ambassadors. Additionally, they shared their gratitude for this rewarding experience and showed their enthusiasm to perform these experiments in future school visits and conferences.

By the end of the program, all trainees qualified to receive the Energy4me Training certificate. With the addition of 11 new Energy4me ambassadors, the local team is now composed of 21 certified ambassadors ready to educate the public about energy and put a face on the industry.



Exceptional participation from KFUPM and KAUST student chapters in 2022 ATCE

Between the 3rd and 5th of October, the KFUPM and KAUST SPE Student Chapters actively participated in the 2022 Annual Technical Conference & Exhibition (ATCE) held in Houston. This was a remarkable opportunity for both student chapters to participate in the International Petrobowl competition, answering technical and non-technical industry-related questions. Additionally, KFUPM-SPE received a 2022 SPE Presidential award during the SPE Awards Banquet as a testament to their outstanding achievements in the previous academic year and won first place in the 2022 International Paper Contest.



KFUPM receives SPE Presidential award



Students at Petrobowl 2022



**International Student Paper Contest 1st Place winner
PhD Division, Ahmed Elsayed Gowida, KFUPM**

SPE-PMU Visits Drilling Innovation Technical Symposium & Exhibition

As part of our efforts to increase student engagement with the oil and gas industry, the members of SPE student chapter at Prince Mohammad bin Fahad University (PMU) attended the first Drilling and Workover Innovation Technical Symposium and Exhibition held in the Kingdom of Saudi Arabia between the 4th and 6th of October. This visit aimed to promote drilling technologies, digital capabilities, automation, and energy efficiency. The students successfully exhibited the drilling and workover technologies. They were also provided with the opportunity to attend multiple panel discussions and technical presentations and explore the e-posters section and exhibition floor. This experience enabled the students to interact with experts and learn from the experiences of industry leaders.

Student Chapter

SPE-KSA Student Chapter in Focus: Prince Mohammad Bin Fahd University

By Razan Abuzaid, Musab Fadel, SPE-PMU Newsletter Editors

The PMU-SPE student chapter is a professional organization that brings students, faculty, and professional members of the industry together to fulfill SPE's mission of providing the opportunity for students to advance their technical and professional skills. The opportunities presented by this organization allow the students to learn more about the industry and attain valuable skills that put the theoretical aspects of their education into practice. These events also provide scientific, cultural, social, athletic, and artistic experiences for students to discover and develop their talents.

ACHIEVEMENTS

The PMU-SPE chapter was established in the spring of 2022. Within just a few months, it was able to achieve incredible results. It is the 2nd biggest student chapter in Saudi Arabia, holding the largest number of new and active members in Saudi Arabia and 3rd in the middle east. The chapter also has one of the largest numbers of female participants and, at this rate, is on track to become one of the biggest student chapters in Saudi Arabia.

TRIPS AND ACTIVITIES

PMU-SPE has coordinated numerous official visits for its members to institutions to enrich their scientific and practical experiences. Some of the highlights include a trip to Huhtamaki Company (APPCO), where the group was shown the production process of products from raw materials to the finished result. In addition to a tour of the National Oilwell Vaco Company (NOV) facility in Dammam, which provided an overview of the product



review process to assess if it meets the consumer requirements. As PMU student Mohammed Alghanim said, **"The National Oilwell (NOV) trip was much more than I expected. Great work environment and lots of knowledge to gain. Would love to participate in more site visits in the future."** The students were also given the opportunity to view Neom's The Line display hosted in the Dhahran Expo center. The hosts demonstrated the project's alignment with the Saudi 2030 vision and unique design making it a future tourist attraction. PMU student Kauther Aldoukhi said, **"Dhahran Expo is a great place to visit now and then. Lots of events to explore. Visiting The Line was a very enjoyable experience. I would love to visit the city when it's done."** These experiences were remarkable for the students to explore future job opportunities and personal career interests.

PMU-SPE was involved in several programs and offerings organized by SPE-KSA and other regional and local conferences. The team attended two dinner meetings, the first with Mr. Khalid Al-Dabbagh, Chairman of the Board of Directors of SABIC and Saudi Aramco board member, and the second with Mr. Peter Parry, Chairman of Bain Global Energy and Natural Resources. In addition to the Drilling Innovation Technical Symposium and Exhibition, which aimed to promote drilling technologies, digital capabilities, automation, and energy efficiency. The student chapter also participated in the Piping Expo conference with a booth that introduced numerous companies to the mission and vision of PMU's SPE student chapter.



FUTURE VISION

The chapter has been working tirelessly to deliver the best experiences for its members. It also plans to expand its events by exploring other areas students may find beneficial to their future careers. Some of these plans include

bringing a variety of external courses to the university, which will give the students an edge in their education and control over their self-development. Moreover, the chapter is working on hosting guest speakers, including m holding leadership positions in the Kingdom, to inspire the students with their stories and experiences. Overall, the students have expressed gratitude for the opportunities provided by PMU-SPE; as PMU student **Ahmed Aljohar shares said, "Being part of the society proved to be very beneficial. The opportunities I found through the PMU-SPE chapter were priceless."**



A Track to Victory

by Veronica Egbe

The tension spread through the air; each breath felt plump and heavy. Curiously staring into your opponents' eyes, hoping you will be the one to walk home with a gold medal clutched in your hand. Sweat dripping down your forehead each time you glance at the track; with the desire to win filling your brain.

The triathlon, a competition between several teams of three, includes three sports. Common sports played in a triathlon are: swimming, running and cycling. After each sport finishes, the participant tags their teammate so they can commence their sport.

My name is Veronica Egbe and I got the opportunity to participate in my first-ever triathlon competition at the age of nine. The triathlon was part of a bigger event; the Community Championship 2022, that had created quite a huge buzz in the air, with posters everywhere you looked.

I was hesitant at first even though it was held in a familiar place. Generally, in these types of competitions, people train aggressively for months, sometimes even years.



Many spend their entire lives on one sport competing in certain contests. People you're competing with can also be a challenge: it can be awkward competing against friends and family; particularly contending with your best friend! All these thoughts and worries raced through my mind as I nervously put my name down for the triathlon.

Creating a team with me as the biker, I recruited a runner and swimmer to partake with me. The swimmer was a professional, for she had participated in several competitions in the past. The runner had limited experience; however, her slender athletic body helped her naturally be a fast runner. I was the biker: I had very little time to prepare for the competition due to me having joined the triathlon last minute. With only two days to train for the event, I spent all my time biking around the neighborhood, timing myself to know my pace.

On the day of the triathlon, it was boiling hot, quite unusual for the month of March. Everyone crowded up at the swimming pool eagerly awaiting the starting signal. As the whistle blew, the swimmers dived into the pool swiftly going from lap to lap to reach the tough target of 20 laps.

Our swimmer did extremely well finishing second, quickly tagging me. As soon as I felt the cold water on my hand, I sprinted to my bike, and took off like a bullet towards the track. I sped through the biking trail catching up with the other bikers who seemed to have already given up. Passing by them, I made my way uphill panting with sweat flying away from my forehead; my face couldn't help but smile at the sight of the top of the hill.

Stopping to take a breath, my eyes glistened seeing the curvy road lead downhill meeting with the corner on the right. Excited, I carelessly started pedaling downhill so fast I couldn't keep up the pace. Unable to control my speed, I crashed into the wall scraping my wrist; the blood dripped down my bruise staining my arm. I watched the other bikers pass by as I lay on the sidewalk embarrassed.

I kept my eyes on the other riders realizing what would happen if I did not finish the trail. I would let down my team, let down my family, and most of all I would let down myself. So I stood up, limped towards my bike, grabbed it tight and propelled myself forward once again. I saw the opportunity to get ahead when I noticed the other bikers confused about where to turn! With all my force and might, I raced down the road making my way to the final turn. I cycled faster than I ever did in my life, and made it to the end of the track

tagging our runner who was anxiously waiting for my arrival. I hopped off my bike with pride watching our runner race to the track awaiting victory.

In the end, it was a tough challenge that my team and I faced together. We were delighted to be on the podium collecting our sparkling bronze medals for third place.

As I stood on the podium that day, I finally really understood my parents' favorite line "you never know what you can do until you try." This was an experience I will never forget.



© Ishaq Madan

Sandrose Readers' Lens



IN THIS SECTION WE SHARE PHOTO SUBMISSIONS FROM OUR READERS, SHARING THEIR UNIQUE ABILITY TO CAPTURE IMAGES THAT SPEAK TO THEM

"As we explored Al-Ula we came across Jabal Al-Ithlib, a beautiful mountain that used to be a place of worship for the Nabateans who roamed the area. The mountain also houses the 'Diwan', an incredibly high ceiling room carved into the rocks that seem to have historically been used for gatherings. However, I was more fixated on the slither of light that hypnotized my perception. It almost seemed like another world awaited on the other end, a new hope of being reborn."

-Ishaq Madan, Photographer

Follow Ishaq on instagram @ishaqMadan

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