



April 2025

SandRose

Magazine



Kingdom of Saudi Arabia Section



SPE KSA
Section

ENERGIZING
ECONOMIES

CONTRIBUTORS

APRIL 2025 ISSUE

EDITOR-IN-CHIEF

Yazeed Aldughaither

Editorial Advisor

Reem Alsadoun

Managing Editor

Nouf Alsaad

Graphic Designer

Sara Sami

[behance.com/sarasami](https://www.behance.com/sarasami)

Instagram @agirlfrombahrain

Cover Design Artist

Created by Anastasia Zhenina



SandRose

Magazine

FOLLOW US ON SOCIAL MEDIA!



CHECK OUT THE DIGITAL VERSION OF THIS EDITION OF SANDROSE BY SCANNING THE QR CODE

<https://spe-ksa.org/>



WE WANT TO HEAR FROM YOU.

To contribute or collaborate on future issues email us at sandrose@spe-ksa.org



04 Message from the Editor-in-Chief

05 SandRose Team

06 Message from the Chairman

07 Meet the SPE-KSA Executive Board



08 Meet the SPE-KSA Board of Directors

09 Interview with Rakesh Jaggi

13 Interview with Sara Vakhshouri

17 Interview with Blake Gendron

18 Aramco Transition Minerals

21 Green Bonds

23 Global Oil & Gas Investment Outlook

26 Economic Evaluation of Water Management

32 Petrobot AI Assistant



36 Technical Paper Digest

38 Benefits of Indoor Plants

41 Citizen Development

44 Life of a Drilling Foreman

46 YLAB Cafe
Aramco IPO

48 ADIPEC 2024

50 SPE AI Symposium 2025

54 Volunteers Spotlight

59 SPE-KSA Section Activities



63 ECHO Initiative

90 Student Chapter Spotlight

96 SandRose Reviews

98 SandRose Reader's Lens

100 Meet SPE-KSA Sponsors



Letter from

THE EDITOR-IN-CHIEF


Dear reader,

In a world shaped by shifting markets, evolving policies, and technological leaps, the economics of energy remains at the heart of global progress. The interplay between supply and demand, investment and innovation, and stability and transition is more dynamic than ever. As we present this third edition of SandRose Magazine, we delve into the forces shaping energy economics and finance, exploring the realities of today and the opportunities of tomorrow.

This issue features exclusive interviews with two distinguished experts at the forefront of the energy sector: Mr. Rakesh Jaggi, President of Digital & Integration at SLB, and Dr. Sara Vakhshouri, Founder and President of SVB Energy. Through their insights, we uncover the critical role of digital transformation, the evolving energy mix, the narratives that shape the energy transition, and the financial mechanisms that underpin the industry's future. Their perspectives provide a lens into the complexities of global energy markets and the strategies required to navigate them.

Beyond these conversations, we are also delighted to bring you a curated selection of technical articles, industry analyses, and thought-provoking contributions from professionals across the energy spectrum. From investment trends and policy frameworks to technological disruptions and risk management, our contributors examine the intricate web that connects energy production, economics, and sustainability.

As always, SandRose is a product of collaboration and shared knowledge. I extend my sincere gratitude to our contributors, whose expertise and dedication enrich every page of this publication. To our sponsors, editors, and readers: your engagement fuels our commitment to delivering valuable insights and fostering meaningful discussions within the energy community.

I hope you find this edition both informative and inspiring. We welcome your perspectives, feedback, and ideas as we continue to explore the ever-evolving landscape of energy. 

Kindest regards,

YAZEED ALDUGHAITER,
EDITOR-IN-CHIEF
SPE-KSA Executive Board (2023-2025)

SANDROSE TEAM



REEM ALSADOUN
Chief Editorial Advisor



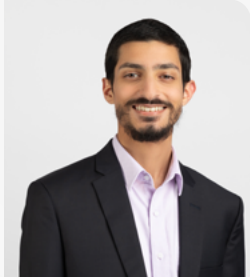
NOUF ALSAAD
Managing Editor



DANNA KHATTAB
Editorial Advisor



RAWAN ALDOSSARY
Editorial Advisor



MUSTAFA KIDWAI
Senior Editor



RANYA ALBEEESH
Associate Editor



DEEMA ALBEEESH
Associate Editor



MOHAMMED MAIDAN
Associate Editor



HATIM ALTARTEER
Associate Editor



YARA ALSINAN
Associate Editor



ELIAS ALZAYER
Associate Editor



YARA ALSHEHRI
Associate Editor



FAISAL ALDOSSARY
Associate Editor



FAHAD ALASSADI
Associate Editor



MOHAMMED ALOTAIBI
Website Lead



GHALIA ALSHANBARI
Associate Editor



Letter from

SPE-KSA EXECUTIVE BOARD

Dear valued reader,

As we move past the momentous 65th anniversary of SPE-KSA, we remain steadfast in our commitment to fostering a thriving community of energy professionals. Over the past six months, our section has not only sustained its momentum but has also expanded its footprint, strengthening its role as a hub for knowledge exchange, professional development, and industry leadership.

In an era where the global energy landscape is shaped by economic volatility, shifting policies, and financial complexity, SPE-KSA remains at the forefront of these discussions. Our mission to empower, connect, and advance energy professionals has never been more relevant. Through knowledge-sharing platforms, strategic collaborations, and flagship programs, we continue to equip our members with the insights and skills necessary to navigate an evolving industry.

The theme of this edition underscores the critical role that financial strategies, investment trends, and economic policies play in shaping the future of energy. As the industry adapts to new economic realities, we explore how various stakeholders are responding to the opportunities and challenges ahead. The insights presented in this issue serve as a testament to SPE-KSA's commitment to keeping our members informed and engaged with the latest developments.

Beyond the pages of SandRose, our section continues to host landmark events that reinforce our role as a leader in industry engagement. In recent months, we have had the privilege of hosting two distinguished Dinner Meetings. First, we welcomed Thamir Alsadoun, CEO of Saudi Arabia’s National Transformation Program, who provided invaluable perspectives on the Kingdom’s strategic direction and its impact on the energy sector.

We also made history by organizing our first-ever dinner meeting in Bahrain, in collaboration with SPE-Bahrain, where we had the honor of hosting the Bahraini Minister of Oil and Environment and Special Envoy for Climate Affairs, H. E. Mohamed bin Mubarak Bin Dainah. These events reflect our commitment to fostering cross-border collaboration and facilitating high-level industry dialogues.

As always, I would like to extend my sincere gratitude to our dedicated members, volunteers, sponsors, and supporters. Your unwavering commitment fuels our success and strengthens our community’s impact on the energy industry. I also extend my appreciation to the SandRose team for their dedication in bringing this issue to life, ensuring that it serves as both a source of knowledge and a reflection of the vibrant community we continue to build together.

On behalf of the Executive Board, I welcome you to this latest edition of SandRose Magazine. May it inspire new ideas, spark meaningful conversations, and reinforce our shared vision for the future of energy.



**MAHER RAHAYYEM,
CHAIRMAN**

2023-2025 SPE-KSA Executive Board

SPE-KSA 2023-2025 EXECUTIVE BOARD



DR. YARA ALZAHID
Technical & Professional
Program Chairperson



ABDULLAH ALHAJI
Conference Management
Chairperson



AFNAN ALNAHDI
Human Capital
Management Chairperson



TARIQ ALHARBI
Treasurer



RABAB ALMESHIKHES
Young Professionals
Chairperson



ABDULRAHMAN ALRUMAIH
Student Outreach Chairperson



ABDULAZIZ ALDOSSARY
Event Management
Chairperson



ABDULLAH ALMUBARAK
Public Relations Chairperson



YAZEED ALDUGHAITHER
SandRose Magazine
Editor-in-Chief



DANNA KHATTAB
Admin Coordination
Chairperson



AHMED ALSUNAIDI
Information Technology
Chairperson



LAMA ALBARGHOUTI
Trips and Social Activities
Chairperson



AKRAM AL-BARGHOUTI
Memberships Chairperson



ABDULRAHMAN ALMUSARE
Chairman Advisor



MUTLAQ ALOTAIBI
Logistics Officer



Announcing the new SPE-KSA Board of Directors

Waleed Al Mulhim
SPE-KSA Board of Directors Chairman
Senior Vice President, Petroleum
Engineering & Development
Saudi Aramco



Samer Al Ashgar
Senior Vice President,
Exploration
Saudi Aramco



Khalid Al Abdulqader
Senior Vice President,
Drilling & Workover
Engineering & Services
Saudi Aramco



Ibrahim Al Arnaout
Senior Vice President,
Unconventional
Resources
Saudi Aramco



Abdulmohsen Al- Mukhailid
Senior Vice President, Southern
Area Gas & Abqaiq Plants
Producing
Saudi Aramco



Ali Hablar
SPE-KSA Board of Director Vice
Chairman, Vice President and
Chief Petroleum Engineer (A),
Petroleum Engineering
Saudi Aramco



Ashraf Al Tahini
Vice President, Upstream
Digital Center
Saudi Aramco



Adnan Al Kanaan
Vice President, Gas
Development
Saudi Aramco



Hamad Al Marri
Vice President, Production
Engineering & Well
Completion (A)
Saudi Aramco



Rashed Al Mary
Vice President, Upstream
Finance
Saudi Aramco



Ibrahim Moussa
Managing Director
SLB



Fadi Al Jafari
Vice President
Baker Hughes



Khalid Nouh
Chief Executive Officer
TAQA KSA



Harry Lopez
Vice President
Halliburton



Naif Al Hadrami
Executive Director
NESR



Hani Al Maimani
Vice President
Weatherford



Ahmad Al Qadeeb
Managing Director
Rawabi Holding



BIOGRAPHY

Rakesh Jaggi is the president of digital & integration, a position he assumed in April 2023. Over the past 10 years, he has held several management roles including senior vice president of sales and commercial, president completions, vice president technology lifecycle management, vice president sustaining and president well intervention services. Rakesh began his SLB career as a wireline field engineer in India, Trinidad and Tobago followed by field management roles in Colombia, Trinidad and Tobago. He was then assigned to leadership positions including vice president wireline operations in North and South America, vice president and general manager India operations, vice president well services in Middle East and Asia regions and global vice president new businesses. He graduated in Mechanical Engineering from the Indian Institute of Technology-New Delhi and joined Schlumberger in 1992.

Rakesh Jaggi

*Interview on the Transformative
Impact of Digital Technologies*



What are the primary enablers of successfully translating a digital strategy to actual realized impact on the ground? What are the measures of success?

A focus on performance and safety has always been essential, and now sustainability must also be part of the strategy. Balancing these three dimensions adds complexity but also opens the door to new opportunities and innovations by broadening our perspective.

A critical enabler is ease of use and interoperability of digital technologies. We've all heard of promising local test deployments that go nowhere, and this is generally because a lack of compatibility between data and systems means they cannot be deployed at scale. Building solutions based on common standards, such as the Open Group's OSDU® Technical Standard, can make the transition from pilot to full-scale implementation a much smoother process.

Ultimately, for me, the true marker of a successful digital strategy is organization-wide change. This involves companies shifting from time-consuming, largely manual processes to efficient, digitized processes that automate routine tasks. This enhances efficiency and unlocks their greatest resources of all: the time and mental space of their workforce, freeing them to innovate and push boundaries.

Assess whether your top technical experts are remaining with the company. If they are, it indicates that you're doing something correctly.

Which digital technologies do you believe will be the most pivotal on the road to net zero emissions? Can you give some examples of how these technologies will be applied?

Today, our industry emits over 5 GtCO₂ annually, making the journey to net zero emissions both urgent and challenging. To address this, we must prioritize

impactful digital technologies in areas like carbon capture, utilization and storage (CCUS), methane emissions reduction, elimination of non-emergency flaring, electrifying upstream facilities, and expanding low-carbon hydrogen.

In methane management, digital solutions for detecting and fixing leaks, as well as reporting performance, are crucial. These technologies offer real-time monitoring and rapid response, significantly reducing emissions.

"Solutions that have traditionally been used in oil extraction, such as reservoir modeling, data management, and drilling solutions, can be extremely beneficial for CCUS projects"

The synergy of legacy technologies with emerging innovations like generative AI also holds immense promise. Solutions that have traditionally been used in oil extraction, such as reservoir modeling, data management, and drilling solutions, can be extremely beneficial for CCUS projects. These digital tools lower costs and manage risks in site selection, design, capture, transport, and storage, accelerating the transition to net zero. By leveraging existing domain expertise and integrating cutting-edge solutions, we can make swift progress on the pathway to our emissions goals.

How is digital innovation helping overcome the challenges of rigorous safety, regulatory, and cost constraints in field operations?

Digital innovation plays a crucial role in achieving both safety and performance improvements. We've already seen tremendous progress through the introduction of autonomous systems which are revolutionizing field operations by automating repetitive tasks. This enhances efficiency and minimizes human error, improving safety for both people and equipment. For instance, autonomous inspections and maintenance reduce the need for human workers to enter hazardous environments, thereby protecting people while



simultaneously enhancing operational efficiency.

By integrating cross-discipline workflows, companies can break down silos and uncover new opportunities that might have been previously overlooked. This approach optimizes the entire ecosystem from field to office, rather than focusing on individual components. Intelligent systems like our recently introduced OptiSite™ facility, equipment, and pipeline solutions, as well as OptiFlow™ production assurance solutions, provide real-time analytics and predictive insights. These solutions anticipate issues and aid human interpretation, enabling more informed, proactive decision making. At a customer facility in the Middle East, our solutions forecasted 88% of failures up to 21 days in advance, significantly reducing unplanned shutdowns. This ensures compliance with safety and regulatory standards, and also drives operational efficiency, ultimately reducing costs.

Which new SLB technologies are you most excited about deploying for your customers? Can you share some details of their real-world applications or ones we can expect to witness soon?

Data is often referred to as the new oil, and we apply the same rigor in collecting, processing, distributing, and utilizing data as we do with hydrocarbons. Our Lumi™ data and AI platform is a prime example of how we are adapting AI and generative AI technologies to meet the specific needs of the energy sector, with the option to

deploy on-premises, or on the cloud.

AI on the edge is another technology that holds immense promise. With our Agora™ edge AI and IoT solutions, our domain expertise, and the physics-informed AI models we have developed with our partners, we are on our way to make our field operations and workflows automatic and autonomous. This promises to improve the efficiency and productivity of our operations while significantly reducing our carbon footprint too.

In real-world applications, we've successfully integrated these technologies into our solutions. For instance, from an autonomous operations deployment on a remote pad in South America, an SLB customer achieved a remarkable 57% reduction in CO₂ emissions while delivering a sustained 4% increase in production. This deployment also significantly reduced the well and equipment failure index and achieved near-perfect reliability in the chemical injection system.

Moreover, SLB has made significant strides in autonomous drilling. Within a few years, we transitioned from automating the rig to achieving autonomous geosteering. By shifting our focus from the rig to downhole operations, we've been able to enhance precision and efficiency in drilling activities—a significant advancement in the field.

"Data is often referred to as the new oil, and we apply the same rigor in collecting, processing, distributing, and utilizing data as we do with hydrocarbons"

How does SLB select and leverage its strategic partnerships in the journey of digitalization and integration?

When selecting strategic partnerships, we look for those who share a common vision with SLB, who have safety, innovation, and sustainability at the heart of everything they do. Recognizing that partnerships are essential to the energy industry, SLB seeks out collaborators with

the capability to implement workflows on a large scale, ensuring we use processes and infrastructure that enable high uptime and accelerate deployment in new locations. Additionally, we highly value our partnerships with breakthrough innovators who can bring fresh perspectives and new ideas. This collaborative approach drives digital transformation and aligns with our commitment to navigating new frontiers together, as highlighted by the theme of the recent SLB Digital Forum 2024.

Collaborating with the right technology partners ensures we can navigate data residency challenges, the regulatory landscape, and create technologies that liberate and manage all types of data, structured and unstructured, giving customers the choice of deployment on-premises or on the cloud.



What advice do you have for young professionals entering the energy workforce in the context of the skill sets needed for digital transformation and energy transition?

Entering the energy industry can be one of the most exciting and rewarding paths for a young person, particularly in the context of ongoing digital transformation and the energy transition. Innovative thinking and fresh perspectives are highly valued, as we continually seek ways to improve efficiency, sustainability, and overall performance.

The energy industry is changing at a rapid pace, and this will continue. If you work in this industry, adaptability and a willingness to continue to learn and grow will be your greatest asset throughout your career.

Technology is embedded in the industry's DNA. From advanced data analytics to automation and AI, the energy industry is at the forefront of technological innovation and has the capital to continue the drive to develop and implement new, groundbreaking solutions. Familiarize yourself with these technologies and consider how they can be applied to solve complex challenges.

Energy is also one of the most global and multicultural sectors. In my experience, if you embrace this diversity and seek to understand different perspectives, it will immensely enrich your professional journey and contribute to more successful and comprehensive solutions.

"Entering the energy industry can be one of the most exciting and rewarding paths for a young person, particularly in the context of ongoing digital transformation and the energy transition"

BIOGRAPHY



Dr. Sara Vakhshouri

***Interview with Dr. Sara Vakhshouri on
The Energy Transition & the
Importance of Narrative***

Dr. Sara Vakhshouri is Founder and President of SVB Energy International and SVB Green Access, Adjunct Professor at Georgetown University, the Institute of World Politics (IWP) and KAPSARC School of Public Policy, Head of The Center for Energy Security and Diplomacy at the IWP and Senior Energy Fellow at Oxford Institute for Energy Studies and the Canadian Global Affairs Institute.

How would you describe the relative significance and interplay between the components of the energy transition?

The energy transition requires a delicate balance between the components of the energy trilemma: reliability, affordability, and sustainability, all anchored by the critical need for energy security. Reliability ensures energy systems remain resilient and capable of meeting demand without interruptions, which is essential for economic stability. Affordability focuses on providing energy access at reasonable costs for consumers and industries, while sustainability emphasizes reducing environmental impacts and addressing climate change through clean and renewable energy sources. Energy security however is both core and fundamental to the energy transition, as it directly supports national security, economic prosperity, and the reliable supply of essentials like electricity, water access and food security—all critical to basic human needs and everyday life.

“The energy transition requires a delicate balance between the components of the energy trilemma: reliability, affordability, and sustainability”

How do you stay informed about the latest advancements in the energy landscape while ensuring a pragmatic and balanced view? How do you recommend non-experts stay informed as well?

I follow reputable energy-focused publications, attend industry conferences, and engage with experts, policy makers and, decision makers from diverse and related sectors around the world. I also prioritize understanding the practical implications of emerging technologies and policies to ensure a pragmatic approach.

“Read and follow all data, reports, and narratives, but don’t trust them too easily.”

For non-experts, I recommend starting with accessible resources, reputable news outlets, and educational platforms that simplify complex topics. Podcasts and webinars from trusted sources can also be helpful for staying informed without delving too deeply into technical details. Diversifying sources and seeking out balanced perspectives is essential.

I like to share a guideline I often tell my students: “read and follow all data, reports, and narratives, but don’t trust them too easily.” Often, certain data and narratives may not be accurate and can instead be misleading. Critical thinking and cross-referencing are crucial in navigating the complexities of the energy landscape.

“Critical thinking and cross-referencing are crucial in navigating the complexities of the energy landscape”

How do you envision an equitably-financed energy transition, and what role will inter-governmental and private-public partnerships play in that process?

Based on our experience working with underserved communities lacking power and safe water, addressing energy poverty and fostering energy equity is complex, requiring multidimensional planning and investment across sectors like energy, water, health and education. Many of these communities cannot immediately repay investments, making conventional, bankability-focused financing unsuitable. Government grants and support are essential to make such projects viable and sustainable, as governments can assume higher risks and provide foundational funding.

Another key challenge is the lack of reliable data, as many impoverished communities are poorly documented, and data collection is costly and difficult. Unknown factors further complicate planning, requiring resilience and risk tolerance that governments are better positioned to provide. Inter-governmental and public-private partnerships are crucial to bridging these gaps by de-risking projects, attracting private investment, and ensuring a sustainable, inclusive energy transition that empowers vulnerable communities.

“Addressing energy poverty and fostering energy equity is complex, requiring multidimensional planning and investment across sectors like energy, water, health and education”

What factors do you believe are currently underestimated or misunderstood in global oil price and demand forecasts?

It depends on the forecasting model and the organization producing the data. Traditionally, oil demand forecasts relied on models grounded in market realities, focusing on economic indicators such as population growth and economic prosperity. However, in recent years, organizations like the IEA have adopted policy-based forecasting models, analyzing countries’ energy and environmental policies, such as net-zero commitments, to predict future demand.

While this approach can provide useful scenarios, it is prone to inaccuracies because policies are dynamic and subject to shifts in political environments, geopolitical tensions, and other external factors. As a result, some recent forecasts, including those by the IEA, have been less accurate.

Additionally, certain emerging factors remain underestimated even by traditional models. For example, the energy demand driven by AI is unconventional and rapidly evolving, with no proven methods yet to measure its impact. AI energy use is growing exponentially but could also increase efficiency in the future, making it a significant but poorly understood variable in current forecasting methodologies. These factors underscore the challenges of achieving accurate and reliable oil and energy demand forecasts.

“AI energy use is growing exponentially but could also increase efficiency in the future, making it a significant but poorly understood variable in current forecasting methodologies”

How does the policy-driven nature of the current energy transition compare to past transitions, which were primarily driven by technology and economics, and what implications does this have for its pace and outcomes?

The short answer is that a policy-driven energy transition tends to have a short lifespan, much like the policies themselves. Policies are often shaped by immediate conditions and aimed at addressing short-term problems. As mentioned earlier, policies swing and change depending on various factors, such as political environments and economic conditions. A transition based solely on policies, rather than market realities, is unlikely to be sustainable or durable.

Another critical weakness of a policy-based transition is the mismatch between the pace of policy-setting and the time required to gather data and validate the feasibility of these policies. Policies are often set hastily, with specific targets, and fail to anticipate many factors. For example, the Biden administration’s goal of widespread EV adoption by 2030 may lose priority under the next administration due to shifting realities, such as increased demand from data centers and AI, and challenges related to grid expansion and renovation. This makes the policy unsustainable and not durable, and significant resources already invested in it, risk going to waste once priorities shift.

Beyond that, decisions driven by policies that lack robust economic backing or data often lead to unintended consequences. For instance, during the post-COVID years, many banks divested from fossil fuels to align with policy trends favoring renewables, leading to supply lags in the energy market. Similarly, energy transition policies have overlooked the additional demand for oil that the transition itself creates, further complicating supply dynamics.

Another critical oversight in energy transition policies is the lack of comprehensive life cycle analysis for alternative energy sources. The additional demand for energy and critical minerals, as well as the emissions involved in their life cycles are often overlooked, as is the failure to understand the potential consequences of carbon accounting on affordability and energy access. These oversights highlight the importance of grounding

energy transitions in market realities and long-term economic models rather than relying on short-lived policy priorities.

What inspired your focus on energy security and economics, and what has been the most rewarding part of your career so far?

I have been working in the energy field for more than two decades, but my specific focus on energy security began in 2007 when I chose it as the topic for my Ph.D. dissertation. I was deeply fascinated by the interplay between energy, economics, and geopolitics, and how they collectively influence energy security, as well as its critical impact on national security and economic prosperity. Since then, this area has captivated me and shaped my professional journey.

Throughout my career, I've been fortunate to travel the world, collaborate with numerous companies and governments, and meet many remarkable people in this field—some of whom became lifelong friends and mentors who have taught me invaluable lessons. However, the most rewarding part of my career has been the opportunity to work with underserved communities, focusing on providing them with access to reliable energy and safe water.

It has been an incredibly complex and challenging endeavor, one that often tests my determination and hope. Yet even small progress in these efforts is profoundly fulfilling. The kindness and gratitude of people in these communities have been humbling and taught me invaluable lessons about resilience and the power of even the smallest contributions.

“I was deeply fascinated by the interplay between energy, economics, and geopolitics, and how they collectively influence energy security”

Given your varied and extensive experiences, what advice would you give young professionals entering the energy industry?

The energy sector is a fascinating field with endless opportunities to learn, explore, and contribute. It plays a critical role in our everyday lives and future prosperity. Every effort in this industry is not just about addressing the needs of today but also about creating a lasting legacy for future generations. The opportunities are vast, and with dedication, anyone can thrive in this sector.

For young professionals, my advice is to maintain curiosity, stay updated on current trends and narratives, but always cross-reference information and develop your own unique understanding and judgment of what is happening and what may come next. Creativity and critical thinking are essential in navigating the complexities and shaping meaningful contributions in this field. This approach will empower young professionals to thrive in this dynamic and impactful industry.

As a woman in this field, I would particularly like to encourage young women to consider careers in energy. I have witnessed an encouraging growth in female participation, but it remains insufficient, especially in leadership positions. Among the many countries I have traveled to, worked in, and lived in, what is happening in Saudi Arabia in terms of female participation and leadership in the energy industry is truly impressive. The leadership vision within Saudi Arabia's energy ecosystem, which actively encourages female participation and supports their leadership development, is commendable.

As a person who values data, but more importantly the quality and reality behind it, I find the progress in Saudi Arabia particularly remarkable. When HRH Prince Abdulaziz bin Salman assumed office as Energy Minister in 2019, only eight Saudi women were working for the Saudi Energy Ministry. By December 2024, this number had grown to 675, with an additional 128 women anticipated to join by February 2025, bringing the total to 803 female employees. Beyond the numbers, what truly stands out is the significant increase in female leadership positions, reflecting the transformative and inclusive leadership. This progress serves as a powerful source of inspiration for young women everywhere, and I hope more countries around the world will adopt this vision and drive meaningful change in fostering female participation and leadership in the energy sector.

NESR'S APPROACH TO THE TRANSITION



How is NESR leading the way in energy transition and advancing clean energy solutions within the industry?

It has become clear in recent years that hydrocarbons will remain a dominant share of the energy mix moving into the future, but that doesn't preclude the O&G industry from becoming more sustainable. At NESR, our simple thesis is that the “waste streams” that we produce alongside oil, including waste gas that is flared, produced water that is dumped, and waste heat, can be captured and re-used as part of a broader decarbonization of the energy value chain. We can capture waste gas to generate extra energy or petrochemicals, clean up water to offset freshwater consumption and generate minerals, and harness heat for zero-emissions power. This is the low-hanging fruit for achieving circularity and advancing clean energy solutions in the O&G industry.

In what ways are you assisting NESR customers to achieve their decarbonization and sustainability goals?

In the area of produced water, NESR has identified unique technologies from outside of the O&G industry, and has adapted these technologies to help our industry re-use the water and generate valuable minerals. In Saudi Arabia, we recently concluded a second, successful pilot of one of these technologies, referred to as Zero Liquid Discharge (ZLD), which can enable the industry to completely offset its freshwater consumption by re-using the otherwise hypersaline water that is produced from the reservoirs. In addition to the positive water impact, this technology would also eliminate the carbon footprint of industrial desalination (e.g. seawater reverse osmosis) and water trucking & logistics.

What role do Voluntary Carbon Markets (VCMs) play in propelling the decarbonization journey for MENA and the broader energy sector?

VCMs play a critical role in helping the industry ascribe value to decarbonization, through the generation & trading of carbon offsets. Regulations are the first step to driving the decarbonization of the energy sector, but disparate laws across multiple countries present a hurdle to certain decarbonization projects (e.g. produced water re-use or flare elimination projects), particularly if those projects are complex without a straightforward CO2e offset impact like those in forestry or agriculture. Therefore, VCMs and more robust CO2e accounting methodologies are needed so that these complex decarbonization projects in the MENA energy industry can capture the full value of their positive impact.

Blake Gendron

Vice President of Investor Relations and NEDA Segment



Aramco Transition Minerals: Supporting the Kingdom's Role in a More Sustainable Energy Future

Aramco Transition Minerals (ATM), a newly established organization under Upstream, represents a strategic expansion of Aramco's vision to align with the global shift towards more sustainable energy solutions. This initiative underscores the company's contributions towards addressing future energy challenges while leveraging Saudi Arabia's natural and technological advantages.

"Our decision to support the exploration, extraction, and processing of transition minerals represents more than just a strategic pivot; it is a bold statement of intent to becoming a proactive leader of the future energy landscape," affirms Nasir Al-Naimi, President of Upstream.

The establishment of ATM is informed by Saudi's Vision 2030, aiming to diversify the economy, utilize advanced technologies, and position the Kingdom as a strategic hub in the global value chain. Transition minerals—such as lithium, silicon, copper, nickel, rare earth elements, and graphite—are foundational to these efforts, underpinning technologies like electric vehicles (EVs) and solar panels. Through reliable domestic supply of these minerals, ATM is poised to support the localization of nascent industries while tapping into global demand.

Aramco's approach in the transition minerals sector is ambitious yet grounded in the company's core strengths.

With a focus on exploration, mining, and processing, ATM seeks to leverage Aramco's resources and cost advantages in an effort to try and establish a resilient minerals value chain within Saudi Arabia and beyond. The venture aspires to contribute meaningfully to Vision 2030 by supporting industrial diversification. This strategic move is as much about reinforcing Aramco's business as it is about maintaining its leadership in a rapidly evolving energy sector.

One of the most compelling aspects of ATM's integration into Aramco's operations is its potential to harness existing expertise in drilling, geological exploration, and



resource management. For instance, the discovery of aquifers with high lithium concentrations offers a unique opportunity to capitalize on Aramco's proficiency in the upstream sector. By utilizing advanced technologies such as the Multi-Core Scanner and AI-powered Saudi Aramco Geophysical Robot (SAGR) drone systems, ATM is developing efficient methods to identify and extract transition minerals. Furthermore, the company's supercomputing capabilities provides key insights into geological data, improving the potential to locate and develop mineral resources.

Collaborations with innovative startups in direct lithium extraction (DLE) technology have already proven fruitful, with brines from Aramco's oilfields being tested for extraction methods. A field pilot at one of Ghawar's Gas-Oil Separation Plants (GOSPs) is scheduled for 2025, marking what may become a significant milestone in ATM's journey.

Processing transition minerals is an energy-intensive endeavor, often requiring substantial chemical inputs. ATM is set to leverage byproducts from Aramco's oil and gas activities, such as sulfur and methanol, to source some of such chemical inputs. Additionally, Saudi Arabia's low-energy costs provide a competitive edge in this resource-intensive domain. By integrating these synergies, ATM aims to position itself as a global leader in transition minerals, reinforcing Aramco's role in the energy transition.

The strategic importance of transition minerals extends beyond their immediate applications in renewable technologies and EV batteries. Mining these materials contributes significantly to energy security, a cornerstone of the energy trilemma that balances affordability, sustainability, and reliability. By aiming to develop a robust domestic transition minerals sector, Aramco hopes also to be contributing to the stability and resilience of changes to the global energy mix, aiding





the accessibility and affordability of critical materials. Partnerships are a cornerstone of ATM's strategy, allowing the venture to pool resources, expertise, and innovations. Collaborations are foundational in accelerating ATM's entry into the mineral sector. The announced Joint-Venture (JV) with Ma'aden, Saudi Arabia's national mining champion, facilitates the exploration and mining initiatives within the Kingdom. These partnerships extend globally, with plans to localize processing technologies and secure feedstocks, thereby capturing additional value pools in mineral processing. By aligning with innovative startups and global players, ATM aims to build a robust network to support its ambitious goals.

The potential synergies between ATM and other Aramco business lines and affiliates further underscore the value of this initiative. The upstream crude oil business could potentially leverage locally extracted minerals, reducing import dependencies. The downstream sector also relies on minerals for key components of its value chain, such as catalysts. These interconnected opportunities

highlight the holistic approach Aramco is taking to potentially integrate ATM into its broader operations.

Aramco Transition Minerals signal the Company's steadfast support and contribution to orderly, equitable and sustainable energy future. By combining its expertise, advanced technologies, and strategic partnerships, Aramco is not only investing in its business's future but also aims to further the Kingdom's economic diversification and sustainability goals. As the world increasingly turns to transition minerals to power its future, ATM is positioning itself to shape a resilient and more sustainable global energy landscape.

Bonds... Green Bonds: Aligning Finance, Sustainable Growth and Climate goals

*Dr. Sijesh Aravindhakshan,
Economist, Domestic Analysis Department
Saudi Aramco*



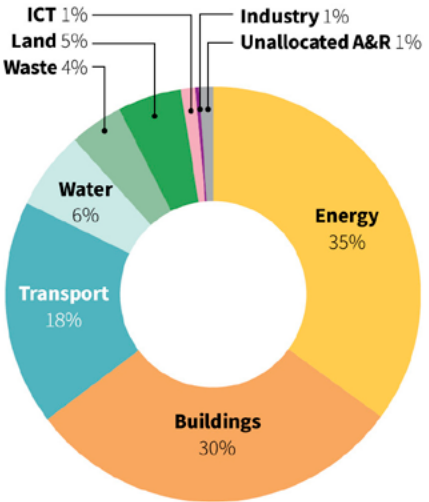
A green bond is a fixed-income financial instrument designed to channel investment into ecologically sustainable projects that address climate and environmental challenges. According to the World Bank, bonds issued to finance projects that focus on mitigating or adapting to climate change are classified as "green." Mitigation projects include solar and wind energy installations, waste management to reduce methane emissions, and afforestation. Adaptation projects include initiatives such as watershed management to prevent flooding, climate-resilient agricultural systems, and sustainable forest management. The International Finance Corporation (IFC) also supports projects to conserve biodiversity and protect oceans and water resources.

The transition to a low-carbon economy will require trillions of dollars of investment, and green bonds are expected to play a critical role in financing clean energy and other sustainability-focused projects now and in the future. Green bonds serve two main purposes: generating financial returns and advancing environmental goals. At the corporate level, the issuance of green bonds introduces an additional layer of accountability through third-party verification. In addition, the issuance of green bonds cultivates a pool of environmentally conscious investors, thereby increasing the dynamism of financial markets.

Let's explore the global market for green bonds. Since the European Investment Bank introduced the concept

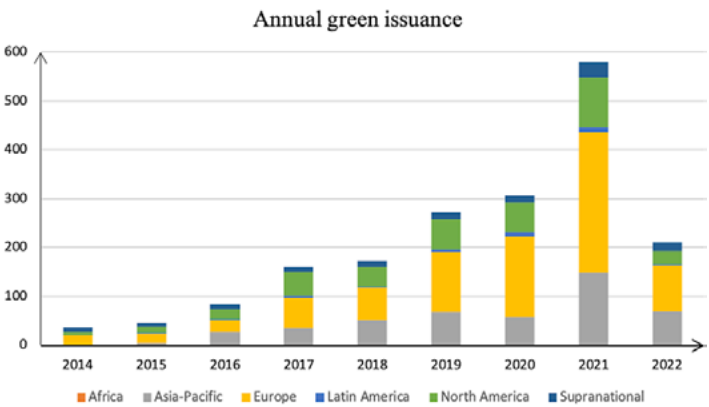
in 2007, green bonds have made significant progress in supporting climate-related programs and initiatives. According to the Climate Bonds Initiative, total green bond issuance reached \$2.8 trillion by the end of 2023, reflecting the growing interest in sustainable finance. Green bond sales have grown steadily over the past decade, with a notable exception in 2022. Last year, green bond sales increased by 15%, driven by expectations of lower interest rates in the US and Europe.

Use of Proceeds 2021



© Climate Bonds Initiative 2022

According to reports from the Climate Bonds Initiative, over two-thirds of the proceeds from green bonds are being invested in the energy, buildings, and transport sectors. Recently, the transport sector has seen significant growth, doubling its share to account for over a fifth of total green finance by 2023. Although investment in water and waste management has risen sharply since 2020, its overall share remains small compared to other sectors. Conversely, the allocation of green bonds to investments in the building sector has declined from 2021, falling from 29% to 18%.



Geographically, Europe leads with almost half of all green bond issuance, followed by the Asia-Pacific region and North America. Latin America and Africa continue to have relatively small shares. In terms of individual countries, the US, China, and Germany top the list, with other European countries following closely behind. Saudi Arabia ranks 24th in terms of green bond issuance, reflecting its growing role in the green finance landscape.

According to the Saudi Ministry of Finance (MoF), meeting the country’s climate commitments will require significant investment from both the public and private sectors. Green bonds are an important tool for financing projects that will help reduce emissions by 278 million metric tons of CO2 per year by 2030 and achieve net-zero emissions by 2060. The Ministry of Finance and the Public Investment Fund (PIF) have established a Green Financing Framework (GFF), which outlines priority areas for investment in line with Vision 2030 and the Nationally Determined Contributions under the Paris Agreement. The GFF is aligned with the Green

Bond Principles (GBP) 2021 and focuses on eight key sectors, including renewable energy, clean transport, and sustainable water management. Under this framework, the PIF has issued six green bonds, totaling \$8.5 billion as of September 2023, with the proceeds used to finance environmentally sustainable projects.

Research indicates that both companies and investors gain from green bonds. In a study of 1,070 green bonds issued by 464 companies, Badia, Cortez, and Silva found that companies issuing green bonds experience better short-term stock performance than those that do not, as investors value the green attributes that signal a company’s commitment to sustainability. Green bonds are often associated with a “green premium” where the investors may accept lower returns for the benefit of sustainable investment. However, the green certification impacts the green bond premium and varies by bond rating and other factors. For example, AAA-rated green bonds usually have a higher financing cost and a BBB-rated green bonds have lower financing cost when compared to similar conventional counterparts (Wu, 2022) .

Given Saudi Arabia’s robust economic growth and strong credit rating, green bond issuance is expected to increase significantly, facilitating the financing of critical energy and environmental projects. With one-third of global green bond proceeds allocated to the energy sector, Saudi Aramco has the potential to issue green bonds to broaden its investor base and diversify its funding sources. This strategy would improve the company’s access to capital, promote long-term sustainability, and contribute to climate change mitigation and adaptation efforts. By issuing green bonds, Saudi Aramco would further align with the country’s Nationally Determined Contributions (NDCs), thus reinforcing Saudi Arabia’s position as a key player in the global green finance movement.

Global Oil and Gas Investment Outlook: Comparing Different Views and the Need for More Investment

Nawaf Almutairi,
Petroleum Strategy Engineer,
Saudi Aramco



As the race to preserve and efficiently utilize national resources continues, experts rely on various approaches to maintain equilibrium within the oil and gas industry. Investments are a common source of both funding and navigating solutions, which is why understanding differing views is critical for informed decision-making. The two articles discussed present perspectives from Wood Mackenzie, the International Energy Forum (IEF), and S&P Global before assessing a balanced approach for a stable energy market.

Wood Mackenzie’s Perspective: Managing Peak Demand with Steady Investment

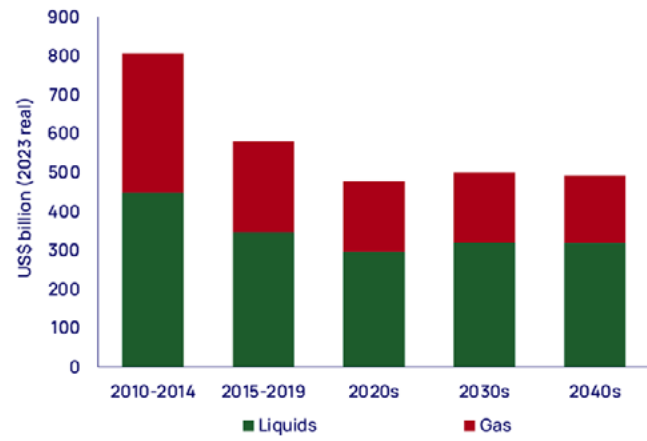
Oil and gas investing took a massive hit during the COVID-19 pandemic, with economic recovery only 1/3rd as of 2023. This is still less than 50% of 2014 peak spending. Despite these figures, Wood Mackenzie offers a cautious yet hopeful outlook as the steady decline of oil and gas won’t happen for another decade. Global oil demand will reach a peak of 108 million barrels per day (b/d) and in the meantime, the investment side will target low-cost and low-risk methods of meeting the demand. Even with a steady decline, oil consumption is projected to hover above 90 million b/d until 2050.

Since oil and gas are depleting natural resources, they must be continuously sourced. Without investments, supply tanks and producing fields will be depleted. Given these facts, the public sentiment around the capital decline in upstream investment is unfavorable. Why

would you spend less to maintain a necessary resource and meet increasing demand?

After the 2015 and 2020 price shocks, investment portfolios are subject to strict scrutiny and only the highest ranked projects proceed. Fortunately, improved technology, capital efficiency, and streamlined methods have resulted in a 60% cost reduction and 3x more production. This very capital efficiency is what will keep the \$500 billion spending sufficient to meet demand over the next 10 years. This annual investment includes everything from exploring new oil fields to maintaining and upgrading current facilities.

Wood Mackenzie recognizes that upstream investing will be an uphill battle with inflation with maintenance expenses, naturally depleting oil reserves, and more. For example, producing oil from more complex and costly projects, like deep-sea drilling, may become more expensive. Therefore, keeping existing equipment in good shape and updating it will be crucial to avoid production declines and ensure a steady supply. All in all, Wood Mackenzie agrees with the status quo of investing and is confident in the oil and gas industry’s future.



flexible yet resilient.

Oil production is skyrocketing in America, which takes up over 60% of capital expenditure growth until 2030. Outside of the United States, Latin America (specifically Brazil and Guyana) is an increasingly large driver of non-OPEC crude oil supply. About 2.2 million barrels per day (mb/d) have been sanctioned for production. In fact, Latin America is expected to surpass North American annual capex for the first time in 2 decades on a year-on-year basis. Without increased upstream investment, conventional oil production will drop by 20%. This can drive potential energy shortages and more price spikes.

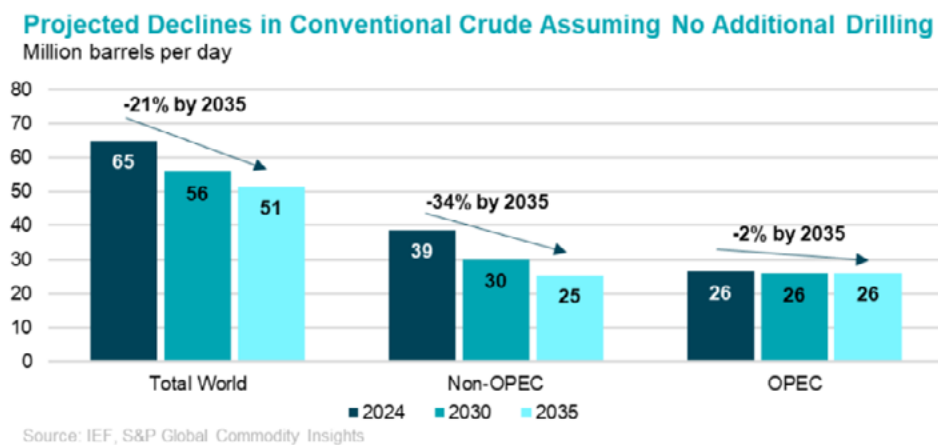
IEF and S&P Global Report: Need for Increased Investment

In contrast to Wood Mackenzie's view, the IEF and S&P Global report calls for significantly more investment in the oil and gas sector—up to \$738 billion by 2030 and \$4.3 trillion total investment between 2025 and 2030 to accommodate market demand. The report argues that investment in this decade will have a cascading effect in decades to come, thus allowing upstream investment to offset forecasted production declines while also meeting demand.

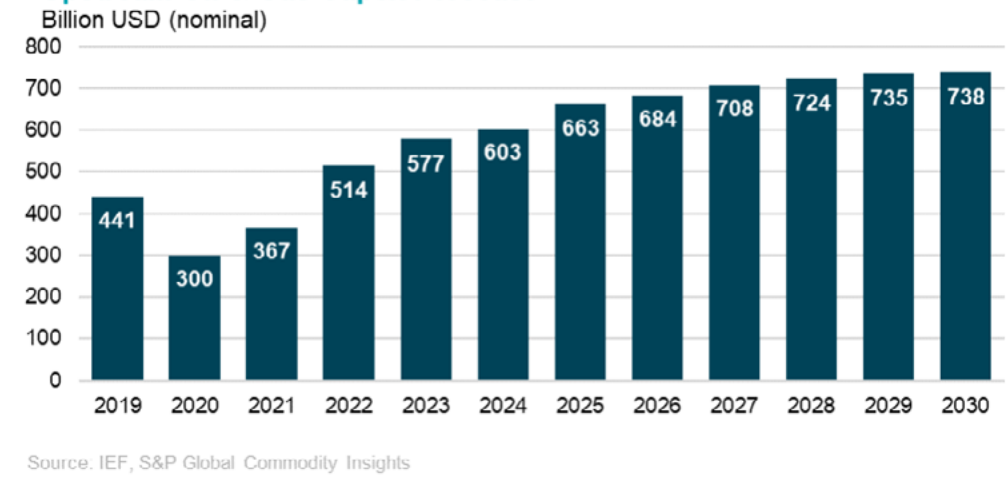
Outside of efficient drilling mechanics or production capacity, proper investment guarantees a more seamless energy economy, transition, and security. The past two years are a prime example of chaotic transitions, from price shocks, oil shortages during political tensions, and war to supply chain bottlenecks amid a global pandemic. Increased investment will support the energy transition in a way that allows the market to be simultaneously

Sustainability is also an inevitable energy transition that needs to be monitored and executed correctly. Companies are reallocating spending to decarbonizing operations, thus decreasing scopes 1 and 2 carbon emissions. This practice not only complies with regulations and investor expectations but also helps companies achieve their environmental goals. Higher upstream capex can be correlated with increased spending on methane abatement, flaring reduction, operational and energy efficiency, and CCUS.

The projected \$738 billion annual investment mentioned at the beginning of this analysis includes spending on new projects, upgrading existing infrastructure, adopting new technologies, stabilizing drivers to market volatility, and working towards a more sustainable future. This investment is crucial to keep up with rising demand and to avoid any supply disruptions.



Upstream Oil & Gas Capex Forecast



Balancing Perspective: Investing for the Future

Considering both viewpoints, a balanced approach is necessary. Wood Mackenzie's prediction of peak oil demand suggests that current investment levels may be adequate for managing demand over the next decade—but only if capital efficiency is maintained. On the other hand, the IEF and S&P Global report supports immediate increased spending to curb potential threats to market stability, energy transition, and supply.

A middle-ground perspective appreciates equilibrium at \$500 billion a year but also understands that risk is omnipresent, especially within the natural resources space. Even though upstream investment spending has recovered from the 2020 low, it still has a long way to go. It is crucial to not only maintain current investments and supply but also proactively find ways to mitigate potential risks. For example, more investment in sustainable energy is key with countries adding more sanctions for outdated and harmful oil production procedures.

Technology will always play a key role in making investments resilient. Both Wood Mackenzie, and the IEF and S&P Global agree that emerging technologies will help reduce costs and improve production. Investing in innovative solutions, like advanced drilling techniques and digital tools, will be important for keeping costs down and improving productivity.

Statistics from both sources prove that demand is increasing, and it will be a while before demand hits a steady decline. Thus, it is critical to address the potential risks of supply shortages such as price shocks and limited availability. The reports highlight the need for investing in new projects and maintaining existing infrastructure to prevent abrupt supply disruptions; a prime example being Russia and Ukraine geopolitical tensions. A balanced strategy should include investing in traditional oil and gas capital portfolios (especially for booming markets such as Latin America) while also supporting the growth of renewable and low-carbon technologies. This approach will help ensure that energy needs are met while also supporting environmental initiatives.

In summary, although there are different views on the future of oil and gas investment, substantial investment is needed. Wood Mackenzie's forecast of peak oil demand suggests that maintaining current investment levels might be sufficient, but challenges will arise. The IEF and S&P Global report emphasizes the need for increased investment to avoid potential supply shortages and ensure energy security and transitions. A balanced approach that includes both traditional oil and gas projects and emerging technologies will be key to navigating the changing energy landscape effectively. By adopting a strategic investment plan, the sector can ensure a stable energy supply while supporting the transition to a more sustainable future.

Economic Evaluation of Water Management Solutions in Reservoir Engineering

Osama Kheshaifaty,
Petroleum Engineer,
Safaniya Reservoir Management Department,
Aramco



Introduction

Managing high water-cuts in mature oil reservoirs poses a significant challenge, affecting not only operational costs but also oil production efficiency and ultimately, a reservoir’s profitability. High water cut leads to increased costs for water handling, treatment, and disposal, resulting in lower net oil recovery and decreased profitability.

Within the broader context of a field’s water management strategy – a comprehensive framework aimed at optimizing hydrocarbon recovery while minimizing water-related costs and environmental impacts – various solutions are employed to tackle high water cut issues. These solutions, including sidetracking, water shutoff techniques, and well abandonment with re-drilling, serve as tactical implementations within the overarching water management strategy. This article focuses on economically evaluating these discrete solutions on a well-level, comparing their effectiveness and providing insights for informed decision-making in reservoir management.

The analysis employs a discounted cash flow model, incorporating key parameters such as production profiles, operating expenditures, and capital investments. Using Net Present Value (NPV) and Incremental NPV (NPV) as primary metrics allows for a rigorous economic assessment of each solution’s economic merits.

The Importance of Assumptions in Economic Analysis

Assumptions are a key element of any economic analysis. They guide cash flow projections, present worth calculations, and inform risk assessments. However, overly optimistic or incorrect assumptions may lead to flawed analysis and decisions. Therefore, each assumption must be carefully justified to ensure that it reflects realistic scenarios based on data and expert judgment.

Given the specific context of this study, we assume that all operations take place in an offshore environment, characterized by unique logistical and cost structures distinct from land-based projects.

Key Assumptions:

- 1. Oil Price:** A fixed price of \$70 per barrel is assumed in the analysis.
- 2. Discount Rate:** Reflects the time value of money and risk profile, fixed at 10% in this evaluation.
- 3. Production Forecast:** Estimated oil and water

production rates are based on synthetic figures for illustrative purposes. In practical applications, these forecasts should be derived from simulation models.

4. Success Rates: The analysis assumes a 100% success rate for each strategy. In reality, the expected NPV (ENPV) is often calculated by considering the probability of each scenario’s success, multiplied by its NPV.

5. Regulatory Costs: Compliance costs with environmental regulations and carbon intensity impacts are not included in this analysis but should be considered in real-world applications. Rough estimates suggest these costs could range from 5-15% of total operating expenses.

6. Time Horizon: The period over which the analysis is conducted (10 years in this evaluation).

7. Recovery Impact: In cases involving sidetracking or well abandonment, any potential reduction in recovery due to leaving bypassed oil is accounted for in Year 10 of the analysis as a long-term impact. This can be calculated by factoring in the volume of unrecovered oil and adjusting the price over time.

8. Operational Costs: Set at \$15 per fluid barrel, plus \$3 per barrel of water produced for handling. Additional costs from facility maintenance and other field services are not included.

9. Production Limit: The well is shut-in at an optimal water cut threshold determined by economic analysis, considering both revenue generation and expense minimization. In this analysis, it is assumed to be at 80% water cut.

10. Prices: Inflation and price escalation were neglected for simplicity.

11. Taxes and Royalties: Not applicable in this simplified analysis, but actual projects should factor in relevant taxation schemes and royalty payments.

These assumptions serve as the basis for the economic evaluation of each water management strategy. It is important to note that changes in any of these assumptions can significantly alter the analysis outcomes. Therefore, sensitivity analysis and scenario testing are employed to assess the robustness of the results against varying conditions.

The Importance of Assumptions in Economic Analysis

Base Scenario (Do-Nothing Option)

In the base scenario (do-nothing option), it is assumed that the well continues to produce with an increasing water cut, leading to declining oil production and rising costs. The NPV of this scenario serves as the baseline against which other strategies are compared.

Scenario Specific Assumptions:

- Production:** 2000 BPD gross fluid rate initially, with 10% annual decline
- Water Cut:** 50% initially, increasing by 10% annually
- Cost Factors:** No additional costs from facilities maintenance or other services; no impact on recovery

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Oil Production (BOPD)	1,000	720	486	290	-	-	-	-	-	-	-
Oil Price (\$/Bbl)	\$ 70	\$ 70	\$ 70	\$ 70	-	-	-	-	-	-	-
Gross Oil Revenue (\$)	\$ 25,550,000	\$ 18,396,000	\$ 12,417,300	\$ 7,450,380	-	-	-	-	-	-	-
Additional CapEx (\$)	-	-	-	-	-	-	-	-	-	-	-
Water Cut (%)	50%	60%	70%	80%	-	-	-	-	-	-	-
Gross Fluid Rate	2,000	1,800	1,620	1,458	-	-	-	-	-	-	-
Water Production (BWPD)	1,000	1,080	1,134	1,166	-	-	-	-	-	-	-
Water Handling Cost (\$)	\$ (1,095,000)	\$ (1,142,400)	\$ (1,341,730)	\$ (1,377,398)	-	-	-	-	-	-	-
Other Costs (\$)	\$ (10,950,000)	\$ (9,455,000)	\$ (8,865,500)	\$ (7,965,500)	-	-	-	-	-	-	-
Recovery Impact (\$)	\$ -	\$ -	\$ -	\$ -	-	-	-	-	-	-	-
Net Revenue (\$)	\$ 13,505,000	\$ 7,798,600	\$ 2,306,070	\$ (1,809,378)	-	-	-	-	-	-	-
Discounted Cashflow @ 10%	\$ 13,505,000	\$ 6,689,455	\$ 1,905,843	\$ (1,399,412)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Initial CapEx (\$)	\$ -	-	-	-	-	-	-	-	-	-	-
NPV (@10%)	\$ 20,740,885	-	-	-	-	-	-	-	-	-	-
Cumulative Oil Produced (MMBbl)	911,624	-	-	-	-	-	-	-	-	-	-
Cumulative Water Produced (MMBbl)	1,598,846	-	-	-	-	-	-	-	-	-	-

Summary: The base scenario provides a baseline NPV to which the other scenarios’ NPVs are compared, with cumulative oil production of 0.91 MMBBLs and cumulative water production of 1.6 million barrels.

Method 1: Sidetracking

Sidetracking involves drilling a new wellbore from the existing well to bypass water-encroached zones and access untapped hydrocarbon reservoirs. This method aims to boost oil production by accessing more productive areas of the reservoir.

Scenario Specific Assumptions:

- No production in year 1 due to operations
- **Initial CapEx:** \$500,000
- **Production:** 2500 BPD gross fluid rate starting in Year 2, declining by 10% annually
- **Water Cut:** 10% initially, increasing by 15% annually

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Oil Production (BOPD)	2,470	2,220	2,000	1,810	1,650	1,510	1,380	1,270	1,170	1,080	1,000
Oil Price (\$/BBL)	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70
Gross Oil Revenue (\$)	\$ 172,800	\$ 155,400	\$ 140,000	\$ 126,700	\$ 114,300	\$ 102,700	\$ 92,600	\$ 82,900	\$ 74,900	\$ 67,600	\$ 61,000
Additional CapEx (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Water CapEx (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Gross Fluid Rate	2,500	2,250	2,025	1,823	1,641	1,476	1,329	1,200	1,080	970	870
Water Production (BOPD)	250	225	203	182	164	148	133	120	108	97	87
Water Handling Cost (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Other CapEx (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Net Revenue (\$)	\$ 172,800	\$ 155,400	\$ 140,000	\$ 126,700	\$ 114,300	\$ 102,700	\$ 92,600	\$ 82,900	\$ 74,900	\$ 67,600	\$ 61,000
Recovery Impact (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Revenue (\$)	\$ 172,800	\$ 155,400	\$ 140,000	\$ 126,700	\$ 114,300	\$ 102,700	\$ 92,600	\$ 82,900	\$ 74,900	\$ 67,600	\$ 61,000
Discounted Cashflow @ 10%	\$ 172,800	\$ 155,400	\$ 140,000	\$ 126,700	\$ 114,300	\$ 102,700	\$ 92,600	\$ 82,900	\$ 74,900	\$ 67,600	\$ 61,000
Additional CapEx (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Net Present Value (\$)	\$ 172,800	\$ 155,400	\$ 140,000	\$ 126,700	\$ 114,300	\$ 102,700	\$ 92,600	\$ 82,900	\$ 74,900	\$ 67,600	\$ 61,000
Cumulative Oil Produced (Million BBL)	2,470	4,690	6,690	8,500	10,310	12,120	13,930	15,740	17,550	19,360	21,170
Cumulative Water Produced (Million BBL)	250	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750

Summary: Sidetracking yields significant increase in NPV compared to the base scenario, with cumulative oil production of 7.1 MMBBLs and cumulative water production of 2.4 MMBBLs.

Method 2: Water Shutoff Techniques

Water shutoff techniques involve using mechanical or chemical methods to reduce water production from specific zones within the well. For instance, mechanical methods may include installing bridge plugs or packers to physically isolate high-water-producing zones, while chemical methods might employ polymers or gels to selectively block water flow in those areas. This method targets areas where water production is disproportionately high relative to oil.

Scenario Specific Assumptions:

- No production in year 1 due to operations
- **Initial CapEx:** \$500,000
- **Production:** 2500 BPD gross fluid rate starting in Year 2, declining by 10% annually
- **Water Cut:** 10% initially, increasing by 15% annually

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Oil Production (BOPD)	2,470	2,220	2,000	1,810	1,650	1,510	1,380	1,270	1,170	1,080	1,000
Oil Price (\$/BBL)	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70
Gross Oil Revenue (\$)	\$ 172,800	\$ 155,400	\$ 140,000	\$ 126,700	\$ 114,300	\$ 102,700	\$ 92,600	\$ 82,900	\$ 74,900	\$ 67,600	\$ 61,000
Additional CapEx (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Water CapEx (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Gross Fluid Rate	2,500	2,250	2,025	1,823	1,641	1,476	1,329	1,200	1,080	970	870
Water Production (BOPD)	250	225	203	182	164	148	133	120	108	97	87
Water Handling Cost (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Other CapEx (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Net Revenue (\$)	\$ 172,800	\$ 155,400	\$ 140,000	\$ 126,700	\$ 114,300	\$ 102,700	\$ 92,600	\$ 82,900	\$ 74,900	\$ 67,600	\$ 61,000
Recovery Impact (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Revenue (\$)	\$ 172,800	\$ 155,400	\$ 140,000	\$ 126,700	\$ 114,300	\$ 102,700	\$ 92,600	\$ 82,900	\$ 74,900	\$ 67,600	\$ 61,000
Discounted Cashflow @ 10%	\$ 172,800	\$ 155,400	\$ 140,000	\$ 126,700	\$ 114,300	\$ 102,700	\$ 92,600	\$ 82,900	\$ 74,900	\$ 67,600	\$ 61,000
Additional CapEx (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Net Present Value (\$)	\$ 172,800	\$ 155,400	\$ 140,000	\$ 126,700	\$ 114,300	\$ 102,700	\$ 92,600	\$ 82,900	\$ 74,900	\$ 67,600	\$ 61,000
Cumulative Oil Produced (Million BBL)	2,470	4,690	6,690	8,500	10,310	12,120	13,930	15,740	17,550	19,360	21,170
Cumulative Water Produced (Million BBL)	250	500	750	1,000	1,250	1,500	1,750	2,000	2,250	2,500	2,750

Summary: Water shutoff techniques provide a major increase in NPV when compared to the no intervention case, but lower than the sidetracking scenario. The cumulative oil production for this scenario is 1.9 MMBBLs and the cumulative water production is 2.3 MMBBLs. Note that there is a recovery impact which should be estimated through simulation modelling for more accurate financial modeling.

Method 3: Well Abandonment and Re-drilling

Well abandonment and re-drilling may be considered when other methods are not viable. This involves abandoning the existing well and drilling a new one in a different location or a different reservoir zone.

Scenario Specific Assumptions:

- No production in year 1 due to operation
- **Initial CapEx:** \$20,000,000 cost of abandonment and drilling new well
- **Production:** 4000 BPD gross fluid rate starting in Year 2, declining by 10% annually
- **Water Cut:** 0% initially, increasing by 5% annually first 3 years, and 10% annually after

Year	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Oil Production (BOPD)	4,000	3,600	3,240	2,916	2,621	2,359	2,123	1,911	1,720	1,548	1,393
Oil Price (\$/BBL)	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70	\$ 70
Gross Oil Revenue (\$)	\$ 280,000	\$ 252,000	\$ 226,800	\$ 204,120	\$ 183,360	\$ 165,120	\$ 148,860	\$ 133,830	\$ 120,340	\$ 108,240	\$ 97,510
Additional CapEx (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Water CapEx (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Gross Fluid Rate	4,000	3,600	3,240	2,916	2,621	2,359	2,123	1,911	1,720	1,548	1,393
Water Production (BOPD)	400	360	324	292	262	236	212	191	172	155	139
Water Handling Cost (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Other CapEx (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Net Revenue (\$)	\$ 280,000	\$ 252,000	\$ 226,800	\$ 204,120	\$ 183,360	\$ 165,120	\$ 148,860	\$ 133,830	\$ 120,340	\$ 108,240	\$ 97,510
Recovery Impact (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Revenue (\$)	\$ 280,000	\$ 252,000	\$ 226,800	\$ 204,120	\$ 183,360	\$ 165,120	\$ 148,860	\$ 133,830	\$ 120,340	\$ 108,240	\$ 97,510
Discounted Cashflow @ 10%	\$ 280,000	\$ 252,000	\$ 226,800	\$ 204,120	\$ 183,360	\$ 165,120	\$ 148,860	\$ 133,830	\$ 120,340	\$ 108,240	\$ 97,510
Additional CapEx (\$)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Net Present Value (\$)	\$ 280,000	\$ 252,000	\$ 226,800	\$ 204,120	\$ 183,360	\$ 165,120	\$ 148,860	\$ 133,830	\$ 120,340	\$ 108,240	\$ 97,510
Cumulative Oil Produced (Million BBL)	4,000	7,600	11,200	14,800	18,400	22,000	25,600	29,200	32,800	36,400	40,000
Cumulative Water Produced (Million BBL)	400	800	1,200	1,600	2,000	2,400	2,800	3,200	3,600	4,000	4,400

Summary: Well abandonment and re-drilling result in a higher NPV compared to the base case, with cumulative oil production of 7.1 MMBBLs and cumulative water production of 2.5 MMBBLs. Note that there is a major recovery impact that quantifies the losses from remaining oil. This is a complex number to obtain, but can typically be estimated through simulation modelling.

Comparative Evaluation

Incremental NPV is used to evaluate the financial impact of one investment or project over another by comparing their NPVs. NPV helps determine if the incremental benefits of one option justify the additional investment compared to another option. disproportionately high relative to oil.

To calculate Incremental Cash Flows:

- Subtract the cash flows of the base option (e.g. the current or less expensive option) from the cash flows of the alternative option (e.g. the proposed or more expensive option).
- Incremental Cash Flow = Cash FlowAlternative Option - Cash FlowBase Option Use the NPV formula to calculate the NPV of the incremental cash flows

Interpretation:

- NPV: Indicates that the alternative option adds value compared to the base option and is financially favorable.
- NPV: Suggests that the base option is better, as the alternative does not justify the additional investment.

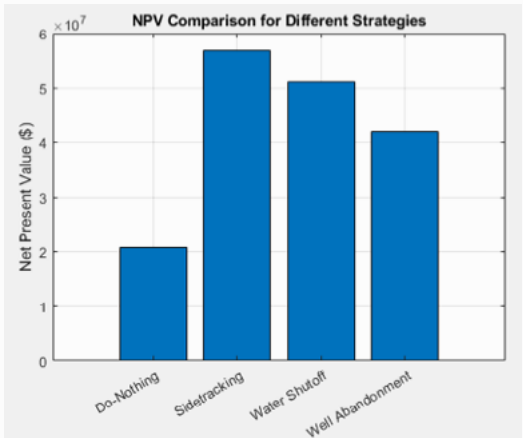


Figure 1: Bar chart of the NPV of each method

Sidetracking vs. Base Scenario:

NPV= Discounted Sum of Water Shutoff Cash Flows - NPV= \$36.1 Million

The results Indicate that the sidetracking option adds value compared to the base option where no action is taken, and is therefore financially favorable.

Comparing Water Shutoff vs. Sidetracking:

NPV= Discounted Sum of Water Shutoff Cash Flows - Sidetracking Cash Flows NPV= -\$6.2 Million

Negative value indicating that sidetracking is more financially favorable, but requires higher initial CapEx. taken, and is therefore financially favorable.

Comparing Well Abandonment & Re-drilling vs. Sidetracking:

NPV= Discounted Sum of P&A and Re-drill Cash Flows Subtracted from Sidetracking Cash Flows NPV= -\$14.5 Million

Negative value indicating that sidetracking is more financially favorable, and requires lower initial CapEx.

NPV Insight: For the one-well case presented, sidetracking provides the highest NPV, followed by water shutoff. It is important to note the magnitude of the NPV, as smaller values indicate equivalent or close economic outcome. Other technical considerations are to be factored in for comprehensive decision making.

Strategy Alignment: A key consideration when selecting a water management strategy at the well level is ensuring alignment with the broader field development plan and depletion strategy. Any chosen solution - whether sidetracking, water shutoff, or another technique - must complement the overall goal of maximizing hydrocarbon sweep efficiency and ultimate recovery across the entire field. Therefore, it is crucial to consider how individual well interventions fit into the larger reservoir management framework, considering factors such as fluid movement, pressure maintenance, and injection/production patterns to optimize cumulative recovery and minimize stranded resources.

Additional considerations:

- Producing large amounts of water alongside oil can lead to environmental concerns, including increased energy consumption and greenhouse gas emissions. Evaluating the environmental footprint of each water management strategy is essential to minimizing harm and meeting sustainability goals.
- The initial capital expenditure (CapEx) required for each water management method varies significantly, with some options requiring substantial upfront investments.
- Understanding the success rate and reliability of each water management method is critical to mitigating risks and informing decisions. Historical performance data can help identify potential pitfalls and guide the selection of the most effective approach for a given field or asset.

Advanced Analytical Techniques

Incorporating Sensitivity Analysis

Sensitivity analysis helps identify the most influential factors affecting the economic outcomes of each water management strategy. For example, a sensitivity chart could show that the NPV for sidetracking is highly sensitive to oil price fluctuations, while the NPV for water shutoff is more influenced by intervention success rates.

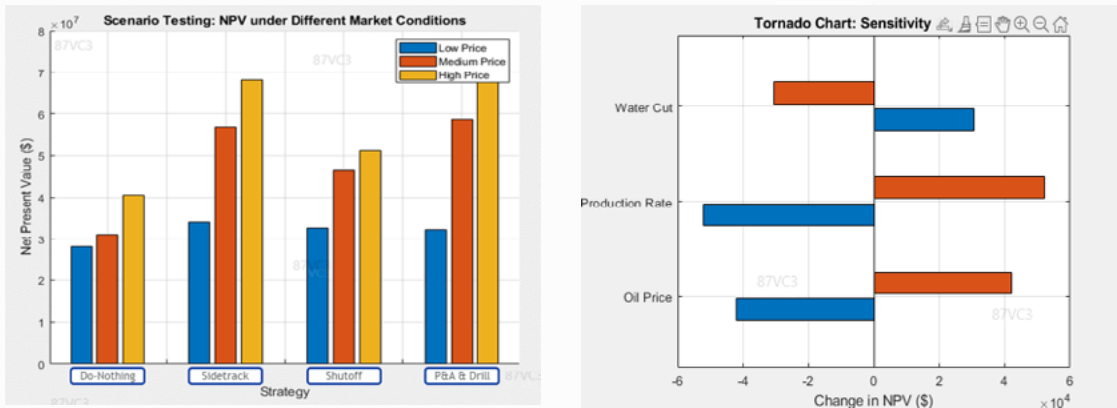


Figure 2: : Examples of sensitivity analysis for evaluating price impact on each method's NPV (left), and variability in production parameters' impact on NPV (right)

Handling Uncertainty: Monte Carlo Simulation

Incorporating Monte Carlo simulation into cash flow models is essential for handling the uncertainty inherent in reservoir management. By simulating thousands of scenarios with different combinations of variables—such as oil prices, production rates, and water cut percentages—a probabilistic distribution of potential outcomes can be generated. This distribution provides valuable insights into the risk and reward profiles of each strategy, helping decision-makers to choose the option with the best balance of expected return and risk.

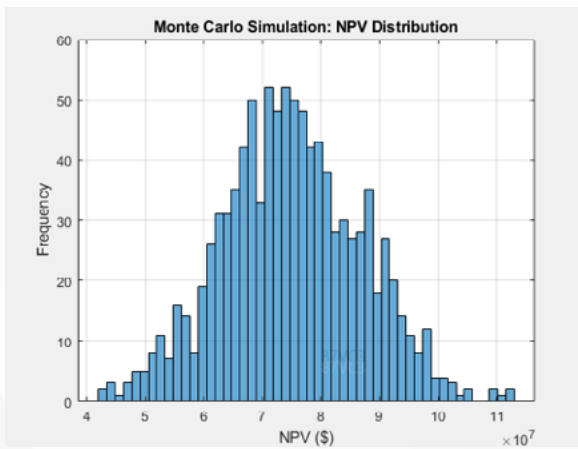


Figure 3: : Monte Carlo Simulation results – Distribution of NPV values

Risk Quantification & Expected Value

In risk quantification, the concept of Expected Value (EV) is used to quantify the potential outcomes of a decision under uncertainty. EV is calculated by weighting each possible outcome by its probability and then summing these weighted values. This approach provides a single value that represents the average outcome if the scenario were repeated many times. For example, if there are multiple scenarios for oil prices, production rates, and water cut percentages, the expected NPV can be calculated by considering the probability of each scenario and summing the NPVs multiplied by their respective probabilities. This metric helps in making informed decisions by considering both the potential returns and the associated risks.

Environmental Impact & Regulatory Considerations

Environmental impact and regulatory compliance are crucial factors in the implementation of water management strategies in reservoir engineering. High cumulative water production can lead to significant environmental concerns, such as increased carbon intensity and greater energy consumption for water handling processes. Additionally, strict regulations on water disposal, emissions, and carbon footprint must be factored into the economic evaluation, as non-compliance can lead to fines and operational disruptions. Considering these environmental and regulatory impacts is essential for making informed decisions that are not only economically viable but also environmentally responsible, ensuring sustainable reservoir management.

Conclusion

In conclusion, this analysis highlights the importance of distinguishing between water management strategies and solutions. While solutions focus on addressing immediate well-level high water production, strategies encompass a broader perspective, aligning with long-term business objectives and organizational capabilities. Effective economic evaluation of water management solutions demands attention to detail, combining incremental net present value analysis with statistical tools like Monte Carlo simulations, sensitivity analyses, and expected value calculations. By incorporating this comprehensive method, reservoir engineers can craft robust frameworks for decision-making, guaranteeing that selected solutions reach an optimal balance between technical feasibility and economic viability. Ultimately, this strategic mindset fosters more resilient reservoir management practices and unlocks long-term value.

PetroBot: The AI Assistant Driving a Revolution in Production Engineering



Sammer Alomair,
Associate Petroleum
Engineering System Analyst,
Saudi Aramco



Abdulaziz Alsultan,
Lead Operations
Producing Advisor,
Saudi Aramco



Mohammed Mukhtar,
Senior Petroleum
Engineer,
Saudi Aramco



Ahmed Alqahtani,
Senior Petroleum
Engineering System Analyst,
Saudi Aramco

PetroBot, a cutting-edge chatbot designed for oil and gas production engineering, aims to revolutionize the way production engineers work by acting as an engineering assistant. This article explores the development, deployment, and future vision of PetroBot, highlighting its potential to significantly enhance performance and efficiency in production engineering tasks.

What Does PetroBot Do?

The energy industry is constantly evolving, and production engineers face the challenge of managing vast amounts of data and complex workflows. PetroBot is designed to address these challenges by providing instant access to curated knowledge bases, extracting key metrics, and answering technical questions. The objective is to investigate the viability of integrating PetroBot into production engineering operations to reduce time spent on routine tasks, improve decision-making, and boost accuracy.

How Does PetroBot Add Value?

PetroBot adds significant value to a production engineer's day-to-day work in several concrete ways:

Instant Access to Information: Production engineers often spend considerable time searching for specific

information across various documents and databases. PetroBot provides instant access to curated knowledge bases, allowing engineers to find the information they need within seconds rather than hours. This efficiency enables engineers to focus on more critical tasks and decision-making processes.

Accurate Data Extraction: Manual data extraction is prone to errors and inconsistencies. PetroBot automates this process, ensuring that key metrics and technical data are accurately extracted and presented. This accuracy is crucial for making informed decisions and maintaining operational integrity.

Expert Answers to Technical Questions: Production engineers frequently encounter complex technical questions that require expert knowledge. PetroBot is trained to understand and respond to these questions, providing expert answers that are directly relevant and actionable. This capability enhances the engineer's ability to troubleshoot issues and optimize operations.

Reduced Time on Routine Tasks: By automating routine tasks such as data extraction, summarization, and information retrieval, PetroBot frees up valuable time for production engineers. This allows them to focus on more strategic and complex tasks, ultimately improving

overall productivity and efficiency. Enhanced Decision-Making: PetroBot's ability to provide comprehensive summaries and insights from technical documents enables engineers to gain deeper insights and make more informed decisions. This enhanced decision-making capability can lead to improved operational performance and reduced downtime.

How Does PetroBot Work?

A comprehensive literature review and process engineering design were conducted to determine the compatibility of PetroBot with existing systems and parameters, such as document formats, technical specifications, and operational workflows. Simulation studies were performed to verify the model and optimize the system on various parameters, characterizing the relationship between data input, model performance, and user satisfaction.

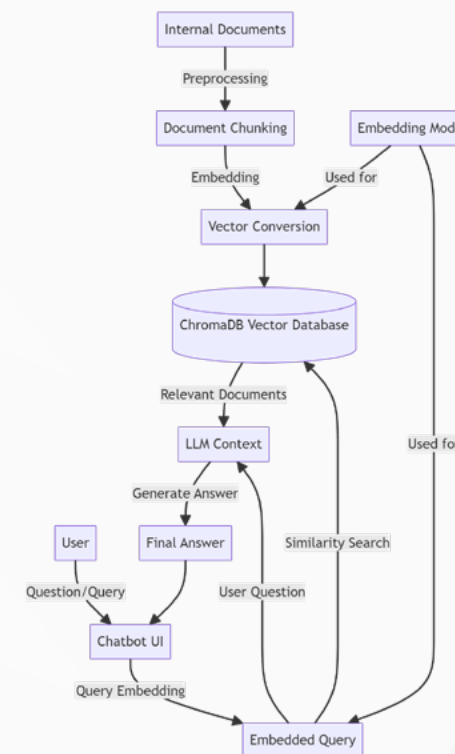


Figure 1: Demonstration of the PetroBot workflow showcasing how the query is processed to produce an expert response

The Results

Simulation results demonstrate promising outcomes. The model has shown the optimal inlet data formats to range from structured documents to unstructured text. Data volume was directly proportional to the accuracy of the generated responses, although at higher complexity levels, that effect is diminished due to the rate of information transfer between the model and the user.

From the wide variety of LLMs available commercially, Llama-7B emerged as the most efficient models due to their high accuracy and low computational requirements. Given an optimal design, PetroBot can yield significant improvements in task completion time and accuracy, benchmarked against traditional methods.

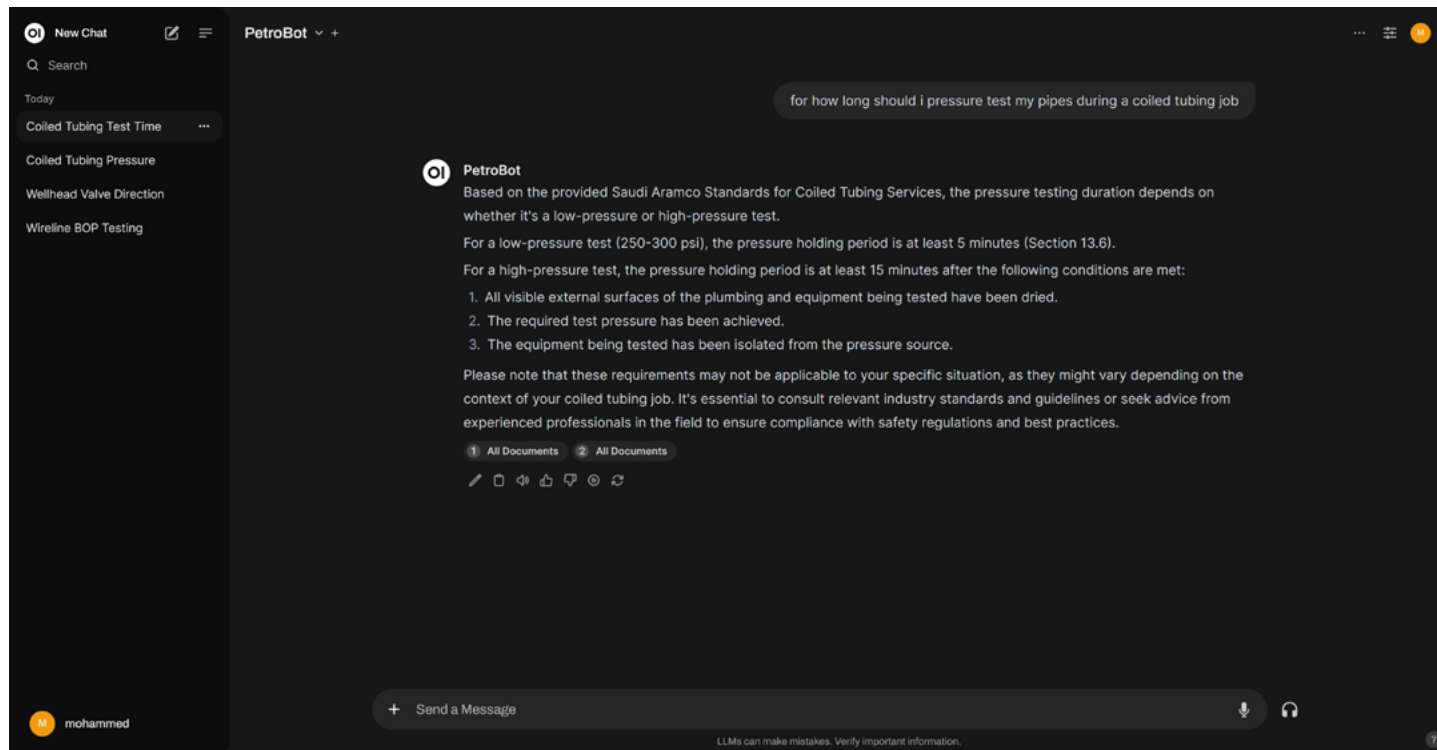
Conclusion

PetroBot presents a sustainable solution for increasing the efficiency and accuracy of production engineering tasks. The system demonstrates significant potential for improving decision-making, reducing time spent on routine tasks, and boosting overall performance. Further research and implementation efforts are warranted to fully realize the benefits of this approach.

As we reflect on our journey in developing PetroBot, we'd like to distill some key learnings and recommendations for fellow researchers and practitioners looking to integrate similar AI-powered solutions in their organizations:

Start small: Begin by identifying a specific pain point or use case where AI can bring immediate value. In our case, it was streamlining data extraction and providing expert answers to technical questions.

Collaborate with stakeholders: Engage closely with end-users (in this case, production engineers) to ensure that the tool meets their needs and expectations. Regular



feedback loops helped us refine PetroBot’s functionality and user interface.

Curated knowledge bases matter: Invest time in creating high-quality, domain-specific knowledge bases that can serve as a foundation for your AI-powered solution. This will enable accurate and reliable outputs.

Experiment and evaluate multiple models: Don’t settle on a single AI model without exploring alternatives. Our evaluation of different Large Language Models (LLMs) led us to select the most suitable one for PetroBot.

Monitor and adjust: Continuously monitor the performance of your AI solution and gather user feedback to identify areas for improvement. Be prepared to fine-tune and adapt your system accordingly.

By following these guidelines, organizations can accelerate the adoption of AI-driven tools like PetroBot, unlocking new efficiencies and innovations in production engineering and beyond.

Future Vision

The development of PetroBot marks a significant achievement in the field of production engineering. The vision for PetroBot and the roadmap we have created aims to make further improvements, ensuring that the goal of accelerating a production engineer’s job by a significant amount is realized. The team is excited to execute and iterate on this vision, paving the way for a more efficient and effective production engineering workforce.

CALLING ALL WRITERS & CREATIVES

SandRose Magazine cordially invites you to submit your work for a chance to be featured.

We are seeking submissions from talented individuals, encompassing a range of genres including technical articles, general interest pieces, and captivating artwork.

To share your work with us, please contact us at:

SANDROSE@SPE-KSA.ORG

We look forward to receiving your submissions and sharing your work to our community of 30,000+ readers.

*Sincerely,
Yazeed Aldughaiter
Editor-in-Chief of SandRose Magazine*



SCAN THIS CODE TO VISIT
THE SANDROSE WEBSITE

SandRose Technical Paper Digest

Curated by Deema Albeesh and Yazeed Aldughaither

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

Impacts of Electricity Price Reform on Saudi Regional Fuel Consumption and CO2 Emissions

AREAS OF INTEREST: ENERGY PRICE REFORM, ELECTRICITY DEMAND, CO2 EMISSIONS, SAUDI ARABIA

Authors: *Abdulah Darandary; Jeyhun I. Mikayilov; Salaheddine Soummene*

Paper#: j.eneco.2024.107400

Energy Economics

Link: <https://doi.org/10.1016/j.eneco.2024.107400>

In an effort to manage the rapidly growing national electricity demand, Saudi Arabia implemented two energy price reforms in 2016 and 2018. The effect of these reforms on electricity demand and on carbon emissions was analyzed in this paper. To account for regional variations in energy supply and in demand drivers, analyses were conducted for the Central, Eastern, Western and Southern regions separately as per their fuel mix and different sectors. The combined analyses show that between 2016 and 2019 the average energy demand was curbed from an annual increase of 5.3% to an annual decrease of 8.8%, and a total of 81-102 million tons of carbon emissions were avoided. The authors infer that energy price reforms can be an advantageous tool for promoting conscious energy consumption and for achieving climate change mitigation goals. They also suggest that such implicit carbon policies are more helpful in maintaining international competitiveness as apposed to direct policies such as carbon taxes and trading schemes.



On the Valuation of Natural Resources: Real Options Analysis of Marginal Oilfield-Development Projects Under Multiple Uncertainties

AREAS OF INTEREST: ASSET AND PORTFOLIO MANAGEMENT, MARKET ANALYSIS, RISK MANAGEMENT, ENERGY ECONOMICS, RESERVES EVALUATION, STRATEGIC PLANNING AND MANAGEMENT

Authors: *Theophilus Acheampong*

Paper#: SPE-204232-PA

SPE Production & Operations

Link: <https://doi.org/10.2118/204232-PA>

Real options analysis (ROA) is demonstrated to be more adequate than traditional discount-cash-flow (DCF) methodologies, such as net present value (NPV), for the valuation of undeveloped marginal oil fields. Marginal fields can be a risky investment due to their higher sensitivity to uncertainties such as reservoir size, remoteness of fields compared to infrastructure, crude oil type, development costs and oil prices. DFC methodologies neglect some uncertainties, resulting in inaccurate profit and cash flow forecasts, and leading to wrong timing of investment in development, abandonment or expansion. The applicability and value of ROA was established for the case of a marginal discovery in the UK Continental Shelf, which can empower management decision making in field-development and capital investment.



Optimizing the Value of a CO2 Water-Alternating-Gas Injection Project under Geological and Economic Uncertainties

AREAS OF INTEREST: CO2 EOR, CO2 STORAGE, OPTIMIZATION PROBLEM, ARTIFICIAL INTELLIGENCE

Authors: *Precious Ogbeiwi; Karl D. Stephen*

Paper#: SPE-219458-PA

SPE Journal

Link: <https://doi.org/10.2118/219458-PA>

This case study introduces a proxy to the typical robust optimization (RO) routines for an alternating water and CO2 injection project within an oil reservoir in the Niger-Delta. The Markowitz classical theory was used to approximate the objective function comprised of process design variables and geological and economic uncertainties. Considering the high cost of numerical simulations required for optimization problems, this approximation decreased that expense and enabled faster decision making, while still accounting for uncertainties. The utilized input data is from current petroleum economic variables in Nigeria along with geological analogues in Brazil, China and Canada. The analysis facilitated a geological and economic risk-informed investment decision in a water-alternating-gas project in the Niger-Delta oil reservoir.



Toward 2050: Critical Analysis of Energy and Economic Requirements of Carbon Capture and Storage in Post-Combustion Capture

AREAS OF INTEREST: CO2 CAPTURE, CO2 STORAGE, DIRECT AIR CAPTURE, SUBSURFACE STORAGE

Authors: *P. Parisi; S. Arca; M. Ciulla; F. Morodei; W. Palozzo; P. Di Profio; E. D'Alessandro*

Paper#: SPE-220020-MS

SPE Europe Energy Conference & Exhibition

Link: <https://doi.org/10.2118/220020-MS>

The 2023 IEA Net Zero report projects CCS will reduce cumulative emissions by 8% and capture 6 billion tons annually by 2050. This work estimates the economic and energy efforts required to achieve this goal, focusing on post-combustion processes in a CCGT power plant using Shell-Cansolv DC-103 solvent. Analysis includes energy surplus, CAPEX, and OPEX. Findings suggest 5000 plants, costing \$1.24 trillion, need to be built by 2050, adding a 25% energy cost, potentially increasing CO2 emissions. The study underscores the need for significant investment in efficient CO2 capture technologies to meet climate-neutrality goals.



HARMONIZING INDOOR AIR QUALITY:

A Natural Approach to Sustainable Management

The visible pollution may appear to come from outside the windows of our homes, but recent studies have revealed that the very walls we live within are significant sources of indoor air pollutants. Basic activities like cooking, cleaning, painting, and washing emit various pollutants. Although air purifiers and filters are available, they are often beyond the reach of the average person. Therefore, for sustainable management of this issue, certain indoor plants have the natural ability to purify indoor air through a process called phytoremediation.

Indoor air quality can be significantly impacted by external pollution, as seen in Delhi (figure 1), where the AQI is 180 indoors despite an outdoor AQI of 300. Factors like outdoor air infiltration, poor ventilation, and indoor pollutants such as dust, cooking fumes, and chemicals contribute to this. Similarly, in Riyadh, while outdoor air quality is unhealthy at 180, indoor air quality of 100 still poses a moderate risk. These conditions show that even indoors, the air can be polluted, affecting health, especially for sensitive groups.

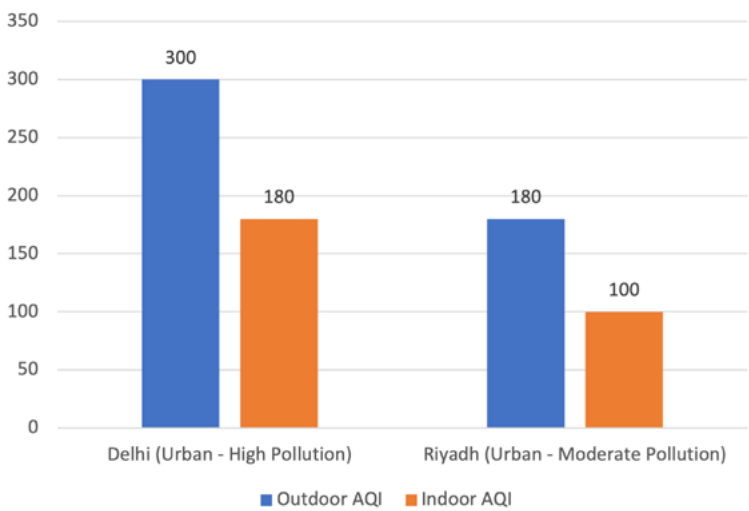


Figure 1: Comparison of Indoor and Outdoor AQI in Various Regions (based on WHO Study)

These plants produce excess oxygen improving air quality and psychological well-being for people living and working in crowded places. They also absorb other organic air pollutants such as xylene, toluene, and formaldehyde released from cleaning agents, furniture, and air conditioners, converting them into non-toxic substances and releasing oxygen as a by-product with help of phytoremediation.

Plants, often underappreciated for their role in our indoor environments, possess an inherent capacity to purify the air we breathe. Through a process known as phytoremediation, certain indoor plants have the remarkable ability to cleanse the air by absorbing and neutralizing pollutants emitted from everyday activities such as cooking, cleaning, and using household products.

Phytoremediation is an environmental restoration mechanism that utilizes plants and their associated microorganisms to reduce the toxic effects of contaminants in the environment. It is also a sustainable approach to environmental cleanup that leverage the natural abilities of plants to mitigate pollution. The process involves plants absorbing, degrading, or sequestering pollutants from the environment.

By strategically incorporating specific plant species (table 1) into our indoor spaces, we can actively combat the pollutants that compromise our air quality. Not only do these plants act as natural air purifiers, but they also contribute to cooling the surrounding environment and play a significant role in removing suspended particulate matter, effectively enhancing the overall air quality.

No.	Common Name	Scientific Name	Targeted Pollutants
1.	Aloe Vera	<i>Aloe Vera</i>	Benzene, Formaldehyde, Carbon dioxide, Carbon monoxide
2.	Bamboo Palms	<i>Chamaedorea seifrizii</i>	Formaldehyde, Benzene, Carbon monoxide, Xylene, Chloroform
3.	Spider Plant	<i>Chlorophytum comosum</i>	Benzene, Formaldehyde, Carbon monoxide, Xylene
4.	Snake Plant	<i>Sansevieria trifasciata</i>	Formaldehyde, Trichloroethylene, Xylene, Toluene, Benzene; also absorbs carbon dioxide
5.	Money Plant	<i>Epiprem numaureum</i>	Formaldehyde, Xylene, Toluene, Benzene, Carbon monoxide
6.	Janet Craig	<i>Dracaena deremensis</i>	Formaldehyde, Xylene, Toluene, Benzene, Trichloroethylene
7.	Lady Palm	<i>Rhapis excels</i>	Carbon monoxide, Formaldehyde, Benzene, Toluene
8.	Rubber Plant	<i>Ficus robusta</i>	Carbon monoxide, Formaldehyde, Trichloroethylene
9.	Dragon Tree	<i>Dracaena marginata</i>	Xylene, Trichloroethylene, Toluene
10.	Areca Palm	<i>Dypsis lutescens</i>	Xylene, Toluene

Table 1: Common plants to improve indoor air quality





Plants are the fundamental oxygen pumps responsible for our survival and have special features to combat pollutants (partly due to the symbiotic relationship with beneficial root zone microbes) produced within our homes. Plants also produce positive results in offices, which are often enclosed with air conditioners. Moreover, these indoor plants require minimal maintenance and light, making them ideal for both conscientious gardeners and busy individuals.

Therefore, it is imperative to encourage this economic and low-cost approach in both homes and workplaces to transform pollutants into harmless by-products as well as releasing oxygen into the environment.

ABOUT THE AUTHOR:

Dr. Hishmi Jamil Husain

Dr. Hishmi Jamil Husain is a renowned sustainability leader, serving as Lead Strategy Market & Analyst at Aramco with an impressive educational background and numerous accolades, including the Young Scientist Award and Lifetime Achievement Sustainability Excellence Award, he is a prominent figure in global conservation efforts. As an author of two books and numerous articles, his thought leadership covers critical topics such as nature-based solutions and climate change mitigation continue to inspire positive change on a global scale. With international experience across 13 countries, Dr. Hishmi's vision and expertise continue to shape sustainable practices worldwide.



OWN YOUR DATA.

KNOW YOUR DATA.

USE YOUR DATA.



The Rise of Citizen Development



BY YARA ALSHEHRI

Digital Solutions Analyst,
Upstream Digital & Computing
Strategy Department,
Saudi Aramco



In today's fast-paced digital world, the ability to innovate swiftly and efficiently has become a critical success factor for businesses across industries. One of the most transformative trends driving this innovation is Citizen Development. This paradigm shift empowers non-IT employees to create and deploy applications using low-code or no-code platforms, bridging the gap between business needs and IT capabilities.

Citizen Developers are employees who, with the help of intuitive software tools, can build applications without needing extensive coding knowledge. These individuals often come from diverse backgrounds within the organization, including engineering, operations, safety, and finance. The common thread among them is their deep understanding of business processes and pain points, which positions them perfectly to create solutions that address specific organizational needs.

This movement democratizes software development, shifting some reliance away from overburdened IT departments and directly into the hands of those who experience the problems firsthand. With platforms like Apple's Swift Playgrounds, Google's App Maker, and Microsoft PowerApps, employees can quickly develop applications that streamline workflows, automate repetitive tasks, and enhance productivity.

Additionally, Robotic Process Automation (RPA) serves as a prime example of a Citizen Development platform. RPA platforms allow users to automate repetitive, rule-based tasks by configuring software robots, reducing reliance on traditional IT support and accelerating operational efficiency. For instance, in the Oil & Gas industry, RPA can be employed to monitor pipeline data where sensors continuously feed information into a central system. RPA bots can then analyze this data, detect anomalies indicating potential leaks or pressure issues, and promptly alert human operators. This integration not only improves response times but also enhances overall safety and operational efficiency.

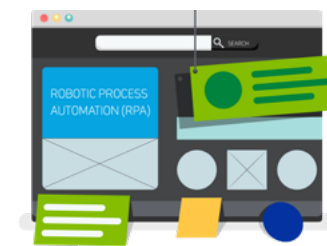
WHY NOW?

Advances in technology are re-shaping the role of the traditional IT professional. At first glance, it seems as though major AI players are simplifying computer usage to the point where programmers might become obsolete. Is IT actually putting IT out of business? Although this perspective might sound sarcastic or ironic, the reality is that advancements in technology have led to the creation of tools that make data analysis and application development remarkably straightforward. Regardless of one's technical expertise, having access to data is now the key to leveraging these powerful new tools.

A MOVEMENT GAINING MOMENTUM!

Citizen Development is becoming increasingly popular as enterprises recognize its potential to accelerate innovation and solve business challenges. This approach allows businesses to benefit from faster development cycles and more tailored solutions, thereby enhancing overall efficiency. Leadership teams are increasingly backing Citizen Development, seeing its value in driving productivity higher across various departments.

The advent of low-code and no-code platforms is the technological foundation making this movement possible, providing easy access to powerful development tools. For Citizen Development to thrive, it is crucial for organizations to implement structured programs and guidelines to ensure consistency, quality, and security. Employees feel more empowered as they take ownership of their tools and solutions, leading to increased job satisfaction and engagement.



EMPOWERING DATA MANAGEMENT THROUGH CITIZEN DEVELOPMENT!

Citizen Development empowers end users to directly engage with their data, allowing them to identify and address issues promptly. As they take ownership of their data, they can resolve any discrepancies, thereby enhancing the overall data quality within the organization—a significant benefit of democratizing computing.

Furthermore, Citizen Development has positive side effects for organizations. It draws user attention to data, and in doing so encourages users to focus on relevant, high value data. By actively using the data for analysis, users can determine which data is crucial and ensure it is collected in a timely manner. The people who are collecting data are the same as the ones analyzing and using it. This leads to improved data collection methods and the retirement of obsolete data, resulting in more representative, streamlined and efficient databases.

A WIN-WIN SITUATION: EMBRACING A SUSTAINABLE FUTURE WITH CITIZEN DEVELOPMENT

It is not often that one comes across opportunities where everyone benefits. Citizen Development, however, counters the trends and exemplifies a case where all gain. It offers benefits for all parties involved: users gain empowerment and the ability to perform insightful analyses, management benefits from streamlined processes driven by data-driven solutions, and IT employees experience reduced workloads and fewer backlog requests.

Citizen Development not only improves immediate data practices but also lays the foundation for sustainable growth. By empowering users to innovate and optimize workflows, organizations create a culture of agility and responsiveness. This proactive approach ensures that data-driven decisions continue to drive success and resilience in an ever-evolving landscape. This exciting journey is just beginning. Enable, Engage, and Embrace the future with Citizen Development!

A DAY IN THE LIFE OF A DRILLING FOREMAN

Working as a drilling foreman on an offshore rig is a unique experience. It comes with numerous challenges, significant responsibilities, and, surprisingly, moments of tranquility amid high stakes. My day usually starts early, around 5 AM, just before sunrise. A good night's sleep is crucial because a clear mind is essential for handling unexpected situations. Each day on the rig presents a distinct set of problems that must be addressed quickly to keep operations running smoothly and avoid costly delays.

I begin my day by going to the office, where I meet with the night shift foreman to discuss key updates. Together, we review the operations from the previous night, address any observations, check the progress of logistics such as boat deliveries, and ensure that the morning report—arguably the most important task—is accurate before submitting it to senior management.

Effective communication between the night and day foremen is essential for maintaining smooth and

efficient operations. My primary goal is to oversee and manage the safe and timely delivery of wells while adhering to Aramco's high safety standards. This involves coordinating with drilling contractors and other companies to keep operations efficient and cost-effective while minimizing potential risks.

Once the handover is complete, we conduct a daily safety meeting with the drilling contractor crew, which includes the rig manager, crew supervisor, offshore barge engineer, and other key personnel. Third-party contractors, such as the drilling fluid engineer, also attend the meeting to ensure everyone is aligned for the day's work.

The meeting always begins with a safety briefing, during which we review recent incidents across the drilling operations and provide weather updates, as this is essential for planning logistics. After the safety briefing, I outline the expectations for the day's operations, share lessons learned from the previous day, and emphasize

the importance of maintaining safety. This meeting is a collaborative effort, allowing everyone to discuss their needs and any issues.

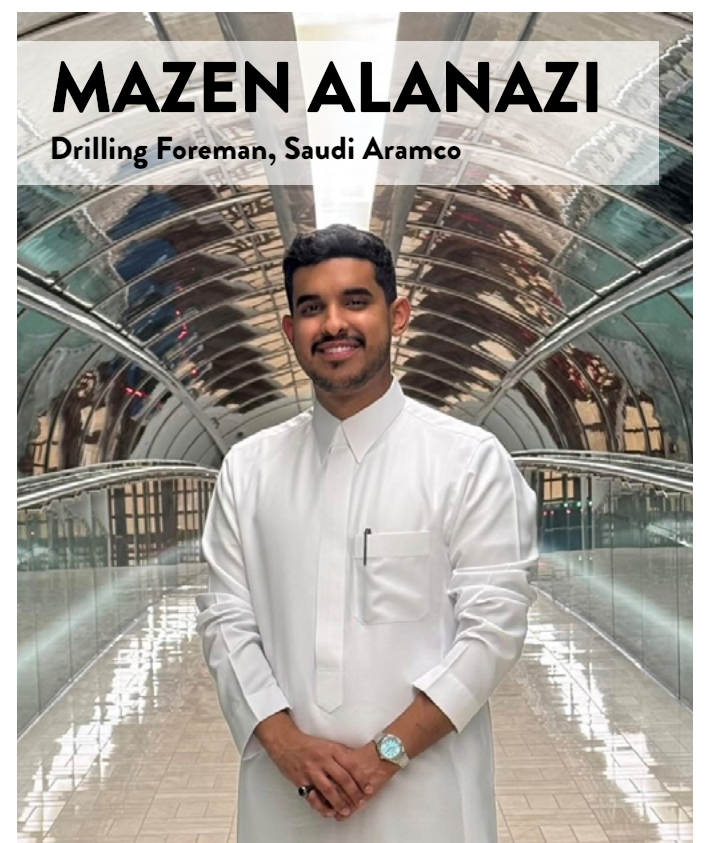
For the rest of the morning, I answer emails, take phone calls, and coordinate logistics for tools and personnel. I walk around the rig to inspect crucial equipment, such as the Blowout Preventer (BOP) and its related components. The BOP is considered the most essential safety equipment on the rig, so daily pressure checks must be recorded to ensure safe drilling operations. I also meet with third-party contractors, including directional drillers and mud loggers, to review their data and ensure operational expectations align. Additionally, I check the drilling fluid parameters, such as rheology, and discuss other essential aspects with the mud engineer to ensure the drilling fluid is appropriately maintained.

In the afternoon, I continue addressing any outstanding emails and send out the afternoon report. I take another walk around the rig, focusing this time on identifying

any improvements or maintenance needed. This is also an opportunity to speak with the junior contractor crew to ensure everyone is on the same page and working safely. I wrap up my workday after completing the handover with the night shift foreman at 5 PM.

Despite the demands of my job, I make it a priority to unwind during my off hours. I enjoy playing ping pong with the crew and walking around the helipad, especially during sunset. The sunsets here are some of the most beautiful I've ever seen, providing a brief moment of tranquility in an otherwise high-stress environment. I'm also an avid reader and enjoy Jonathan Livingston Seagull by Richard Bach. I often turn to self-help and fiction genres to dive into a good book. However, my favorite way to relax is by playing video games. As an enthusiastic gamer, immersing myself in amazing games offers deep escapism and creativity. My favorite games include Final Fantasy VII, Metal Gear Solid, and Elden Ring.

Being a foreman is a demanding, high-pressure role, but I genuinely love it. It's an honor to serve my country while leading my crew and ensuring that wells are delivered safely and on time. Each day brings new challenges, but teamwork, problem-solving, and constant pursuit of knowledge make the job both enjoyable and rewarding.





YLAB CAFÉ SESSION ON ARAMCO BEFORE AND AFTER THE IPO

By Faisal N. Aldossary

Aramco, one of the world's largest globally integrated energy companies, has demonstrated foresight and adaptability in navigating complex market dynamics and shifting regulatory environments. Notably, the company successfully executed the largest Initial Public Offering (IPO) in history while upholding a steadfast commitment to transparency in public disclosures as well as shareholder value amidst times of economic and geopolitical volatility. Vice President & Assistant Controller, Musaad Al-Sayouhi, characterized this process with a singular word: resilience. But where does such resilience stem from?

The Young Leaders Advisory Board (YLAB), a group of young professionals tasked with the mission of "preparing the company for the youth, and preparing the youth for the company", coordinates interactive and informative events on a recurring basis. Amongst these are the YLAB Café sessions which aim to shed light on thought-provoking topics of strategic importance by hosting prominent industry figures and subject-matter experts.

The most recent YLAB Café session delved into the intricacies of process and implications of the company's Initial Public Offering (IPO) in December 2019 and took place on November 11th, 2024 at the EXPEC Advanced Research Center (EXPEC-ARC). With the presence of an esteemed guest, Musaad Al Sayouhi, Vice President & Assistant Controller under the Finance business line, and the deft moderation of YLAB member



Sara Alshamri, the enthralling discussion revolved around Mr. Al-Sayouhi's involvement and perspective within the overall development and preparations for the company's IPO, how it has evolved since then, as well as its future outlook.

Prior to Aramco's becoming a publicly traded company, it was wholly-owned by the government and described to exhibit high degrees of confidentiality, with financials only available to a select number of groups within the company and government. In 2016, a combination of opportunity and preparation led to Mr. Al-Sayouhi joining the Finance IPO Readiness team, which was responsible for preparing the company to be listed publicly as early as Q1 2017.

As such, Aramco needed to transform from a privately-owned company with limited reporting obligations to a transparent enterprise with an obligation to disclose information publicly to investors and other stakeholders. This required strict adherence to relevant financial disclosures for publicly-listed companies.

As Aramco geared up for its historic IPO, the company faced significant pressure to rapidly adapt its financial disclosure practices to meet the stringent demands of public listing. Specifically, Aramco accelerated its transition from biannual disclosures to quarterly public reporting, necessitating enhanced transparency in its financial statements.

Moreover, the company adopted International Financial Reporting Standards (IFRS)-compliant segment reporting, incorporating an expansive range of financial metrics. By expediting these compliance measures, Aramco ensured alignment with the rigorous financial disclosure requirements expected of listed entities, thereby enabling a successful IPO.

For instance, the company mindset shifted to evaluating upstream and downstream individually in terms of performance and profitability, rather than as a lump sum. This change in Aramco's processes created a sort of "healthy tension," as described by Mr. Al-Sayouhi, leading

to a step-change within the company's approach towards improving performance in each business line rather than strictly focusing on the checks and balances of "non-direct expenditures (NDE), manpower, and capital."

With its headcount of over 70,000 employees, the global reach of the company cannot be understated with over 370 affiliates worldwide. When asked about the journey to becoming a publicly traded company, Mr. Al-Sayouhi mentioned that "[Aramco] steadily grew at a pace relevant to its era." Whether that was gas commercialization in the 1980s or the Accelerated Transformation Program (ATP) in 2010, Aramco has always strived to not only keep up with, but rather set the pace of the energy industry; a strong characteristic that has only reinforced the company's public value.

Looking at the state of Aramco in 2024, half a decade since its initial listing on the public market, the company has continued to flourish and evolve in numerous avenues. From venturing into new verticals such as renewables (New Energies) and digital technologies (Aramco Digital), to penetrating existing markets overseas with retail businesses in South America and Pakistan, or the countless collaborations and integrations, such as with Al-Qadsiah FC and Saudi Basic Industries Corporation (SABIC), it remains clear that the company has a prosperous and diversified future ahead of it.

The resounding bells of success of Aramco's IPO launch still ring just as loud today as they did in 2019, thanks to extensive efforts during the IPO preparations. While Mr. Al-Sayouhi attributes the company's ever-growing success to its resilience, he also mentions that its prominent position comes from its outstanding community and the foundation they have set for future generations: a tradition that will undoubtedly carry on with today's young professionals.

The opinions, views, and statements expressed in this article are presented solely for informational purposes and do not necessarily represent the official positions, policies, or endorsements of Aramco or any other entity mentioned therein.

Xpress™ Xtreme Pressure-Balanced Liner Technology Delivers Operational Confidence and Peace of Mind

Weatherford liners are engineered to withstand challenging downhole conditions and adapt to the dynamic needs of the industry. Now, with this latest innovation, they have set a new standard for liner systems.

The Xpress Xtreme pressure-balanced liner technology offers a game-changing solution for challenging well environments that ensures enhanced well integrity and improved operational efficiency. The unique isolated design and high intensification capabilities offers exceptional resilience in harsh debris environments.

These features streamline running and cementing processes, minimizing downtime, and optimizing overall well construction and completion efficiency. This groundbreaking pressure-balanced technology delivers unequalled zonal isolation, ensuring optimal control of reservoir fluids and preventing unwanted gas or water intrusion.

With a focus on reliability and performance, the advanced Xpress Xtreme pressure balanced liner technology empowers operators to overcome complex well challenges, improve operational efficiency, and maximize production potential.





SPE AI SYMPOSIUM HIGHLIGHTS AI'S VITAL ROLE IN ENERGY SECTOR

Navigating the Nexus – Where Energy Meets AI and Sustainability

An event highlighting the vital role artificial intelligence (AI) is playing in driving innovation within the energy sector, particularly in advancing sustainability initiatives, was hosted Feb. 4 and 5 by Aramco and organized by the Society of Petroleum Engineers at the Grand Hyatt in Al Khobar.

The SPE AI Symposium: Navigating the Nexus — Where Energy Meets AI and Sustainability, chaired by Seba S. Al Maghlouth, supervisor of the Innovation and Digitalization Unit in the Safaniyah Reservoir Management Department, examined AI's revolutionary power to optimize resource management, enhance energy efficiency, and play a part in reducing the environmental footprint.

The conference brought together industry and government leaders, innovators, and experts from 17 countries, with 675 registered attendees representing 73 companies. Abdul Hameed A. Al Dughaiter, Aramco's executive vice president of EXPEC and Drilling, led a sizable delegation of our senior management at the event.

AI will 'transform the way we operate'

Waleed A. Al Mulhim, senior vice president of Petroleum Engineering and Development, spoke about the significant impact AI is already having on the energy sector.

"Digital transformation has long been a cornerstone of the energy industry. For decades at Aramco, we've always championed a culture of innovation to meet the world's energy demands. — **Waleed A. Al Mulhim**



"Now, AI is poised to drive even more groundbreaking developments, tackle complex challenges, and transform the way we operate and make decisions," he added. "Across the Upstream value chain, we are integrating AI across our operations to optimize production, improve asset reliability, and enhance safety — unlocking new potential and driving measurable results."

'Imperative to innovate'

One of the reasons that Aramco is already well-placed to "unlock the transmitted power of AI" is the focus that we have placed on building a future-ready infrastructure such as the advanced data centers, said Sami A. Ajmi, senior vice president of Digital and Information Technology (A). Ajmi said that infrastructure and connectivity, including a robust fiber network and satellite technology, are key to Aramco "building not just a foundation but a digital highway for AI to thrive, transforming our operations and enabling innovation at an unprecedented scale.

"At Aramco, we leverage AI to think about innovation in the energy sector and find a pathway to improve the sustainability of our operations. The urgency of our mission is clear. As global energy demand rises, so does the imperative to innovate. — **Sami A. Ajmi**



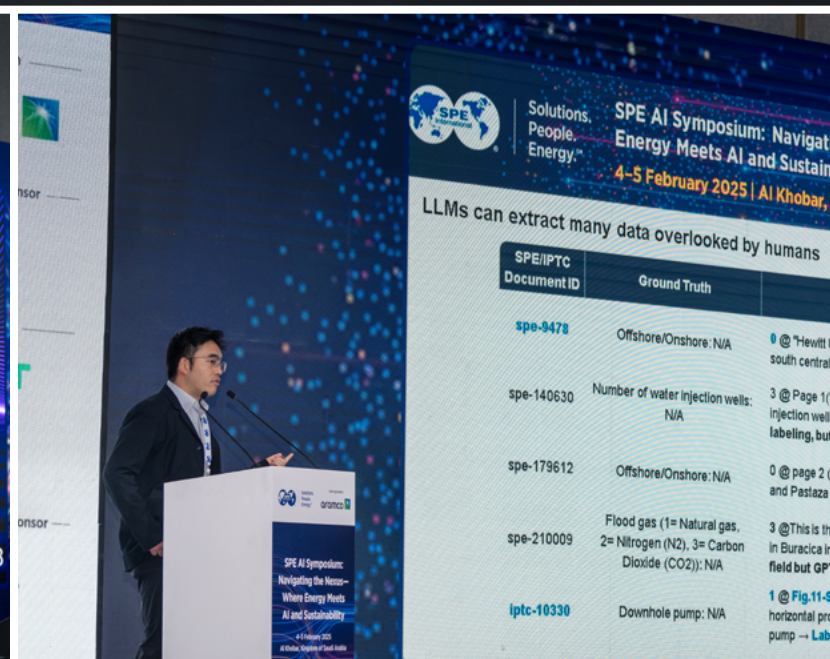
"Aramco values AI not just as a tool but as a paradigm shift, a catalyst that can improve efficiency, enhance sustainability, and potentially unlock opportunities for innovation."

The SPE AI Symposium

Several panel sessions on AI, energy, and sustainability were held, as well as technical sessions on topics such as Generative AI and Big Data Analytics.

Participating Aramco management included Ashraf M. Al Tahini, vice president of Upstream Digital Center; Omar Y. Al Thukair, vice president and chief digital officer (A); Ghaithan A. Al Muntasheri, director of EXPEC Advanced Research Center; and Umar A. Al Nahdi, director of the Petroleum Engineering Applications Services Department. One of the main attractions at the event, led by Halah A. Alasmri, was an exhibition where organizations showcased groundbreaking innovations. Aramco's booth displayed advanced technology solutions already being utilized, including an interactive display on the Intelligent Near Surface Platform.

There was also a virtual reality display on RockLAB, which is designed to simplify the interpretation of complex subsurface geological data. By integrating AI and mixed-reality technologies, a headset is used to overlay geological data onto physical core samples, allowing the user to transition between mixed-reality and real-world views. Another feature of the symposium was the AI hackathon organized by SPE-KSA and Amazon Web Services, which offered industry professionals, academics, and enthusiasts the chance to collaborate on complex challenges in the sector. They were encouraged to develop AI-focused solutions to industry problems, share knowledge, and facilitate the exchange of ideas, techniques and best practices.



Volunteers Spotlight

The volunteers of the Society of Petroleum Engineers - Kingdom of Saudi Arabia (SPE-KSA) play a vital role in the local community by organizing events, sharing knowledge, and supporting the professional development of members. This segment highlights the passion, dedication, and valuable contributions of the SPE-KSA volunteer base.



Mohammed Alessa,

*Reservoir Petroleum Engineer,
Saudi Aramco, Gas Development Department*

"My volunteering journey with SPE-KSA has been an incredibly rewarding experience, allowing me to contribute meaningfully while growing both personally and professionally. As a dedicated member of the Technical & Professional Programs and Treasury committees, I have had the privilege of playing an active role in advancing SPE-KSA's mission. One of the highlights of my time with the Technical & Professional Programs committee has been organizing and supporting the NMO program. This unique initiative brings together speakers from diverse backgrounds to engage in roundtable discussions on a single topic, fostering a lively exchange of ideas and perspectives. Witnessing these sessions' positive impact on attendees—who often express their gratitude for the knowledge shared and the connections made—has been a truly fulfilling experience. Through volunteering, I gained valuable leadership experience, enhanced my organizational skills, and forged meaningful connections with industry professionals and peers. The opportunity to work alongside such a passionate and talented team has been inspiring and has strengthened my commitment to driving positive change within the SPE community. Volunteering with SPE-KSA has not only broadened my professional horizons but also deepened my appreciation for the power of collaboration and knowledge-sharing. I look forward to continuing this journey and contributing further to the success of SPE-KSA's impactful initiatives."



Abdullah Bubshait

*Petroleum Engineer
Saudi Aramco, Reservoir Description & Simulation Department*

"As soon as I started my professional career, SPE became a cornerstone of my personal and professional development, fostering creativity and leadership opportunities that shaped who I am today. With the unwavering support and encouragement of SPE-KSA's executive board, I was able to explore my potential and take on impactful volunteering activities. One of the most memorable experiences was establishing multiple SPE student chapters and maintaining active communication chapters with other universities by serving on the Student Outreach committee. This journey required me to navigate complex challenges, such as negotiating with university leadership, including deans, department chairs, and professors, to align the chapters with SPE's global mission and vision. Through these interactions, I evolved my leadership, communication, and negotiation skills, learning to tailor discussions to meet diverse stakeholders' academic and professional goals. Engaging with students was equally transformative. Mentoring them in structuring and leading their chapter plans taught me the importance of inspiring others to realize their potential. Organizing workshops and field trips further developed my ability to manage logistics and curate impactful learning experiences, bridging academic knowledge with industry practices. These experiences not only deepened my connection to the energy industry but also inspired a sense of purpose and resilience. They reinforced the value of adaptability and collaboration, skills that have been invaluable in my career. SPE allowed me to become a more confident, versatile, and community-oriented professional, demonstrating the organization's unparalleled role in fostering development and leadership."



Dana Alismail

*Geologist
Saudi Aramco, Exploration Business Support Division*

"Contributing to the continued success of SPE-KSA has been an incredibly rewarding journey over the past months. Through my role with the Public Relations committee, I have honed essential skills while handling the content and design role, contributing to several SPE conferences, and coordinating and leading the SPE-KSA podcast Journey. This podcast has become one of my most memorable experiences, expanding my perspective and providing invaluable lessons and exposure from inspiring leaders in the field of sustainability and energy. It is truly an honor to support SPE-KSA's mission and vision, as it has offered me countless opportunities to give back to our community and build meaningful connections with professionals and further leaders across our industry."



Mohammed Almannai

Production Engineer
Saudi Aramco, Southern Area Oil Production Engineering Department

"I still remember the day I first volunteered with SPE-KSA, as if it were yesterday. Little did I know that moment would mark the beginning of a life-changing journey. As an active volunteer, I have been part of a community that shares my passion for the oil and gas industry. Through SPE-KSA, I have not only expanded my technical knowledge but also discovered a sense of purpose and belonging. Volunteering with SPE-KSA has been a transformative experience that has helped me grow both professionally and personally. It allowed me to connect with like-minded individuals, learn from renowned experts, and contribute to meaningful projects shaping our industry's future. Beyond skills and expertise, the people and camaraderie have impacted me most. Every moment, whether during engaging discussions or lively networking events, has been inspiring and fulfilling. Through SPE-KSA, I have developed valuable skills and formed lasting connections, gaining a deeper understanding of the industry. Volunteering has taught me that giving back is not just about time but about investing in oneself and others. Joining our community can lead to unexpected journeys. For me, it means growth, discovery, and connection. Thank you, SPE-KSA, for being my catalyst for change and helping me become a better version of myself."



Yara Alkhaldi

Petroleum Engineer
Saudi Aramco, EXPEC Advanced Research Center

"My journey with SPE-KSA began when a friend invited me to lend a hand as a volunteer at one of their events. What started as a simple help opportunity quickly became a purposeful pursuit. Fast forward two years, and I am now an active member of one of SPE-KSA's committees, proudly co-leading the Special Programs division within the Human Capital committee. One of our most significant accomplishments, and one I am particularly proud of, is ROSHD—a mentoring program designed to equip both mentors and mentees with essential skills for growth. It has shown how mentorship fosters personal and professional development, helping individuals unlock their full potential. Witnessing the program evolve from initial drafts to its official launch has been thrilling and deeply rewarding. The team's unwavering support and dedication have been a constant source of inspiration, and it has been an honor to work alongside such talented individuals. I am especially grateful to Afnan Alnahdi and Re'am Alsinan for their guidance and for making my experience within the committee so memorable. While my journey may have started by chance, becoming a part of the SPE-KSA family was a deliberate choice—and one that has been immensely fulfilling."



Alwaleed Alturaif

Petroleum Engineer
Saudi Aramco, Upstream Development Strategy and Reserves Department

"Imagine being part of a dynamic movement revolutionizing the energy landscape—a movement where innovators, thought leaders, and passionate individuals unite to shape the future. For me, that movement is SPE-KSA, and I feel privileged to be an integral part of it. From the moment I joined, I knew I was in for an extraordinary ride. The organization's infectious energy and unwavering commitment to excellence have sparked a fire within me—a flame that burns brighter with each passing day. Through SPE-KSA, I have had the privilege of collaborating with fellow professionals, attending exclusive events, and participating in projects that push the boundaries of what is possible. One of the highlights of my journey has been serving on the Event Management committee, where I have had the opportunity to sharpen my project management skills, think creatively, and work closely with cross-functional teams to deliver high-quality events that exceed expectations. Specifically, I have gained hands-on experience in event planning, marketing, and execution, which has not only refined my attention to detail but also taught me the importance of adaptability and effective communication in fast-paced environments. Together, we're redefining the energy sector, driving innovation, and creating a better tomorrow. I am thrilled to say that this is just the beginning. With SPE-KSA, the possibilities are endless, and I am excited to see what the future holds."



Faris Alghamdi

Planning & Performance Analyst
Saudi Aramco, Producing Planning & Performance Management Department

"During my tenure with SPE-KSA Treasury committee, I contributed to financial oversight and strategic decision-making. I played a pivotal role in collaborating with other committees and providing them with the financial insights and resources necessary to execute their initiatives effectively. I also led the enhancement of three different committees with financial support by recommending improvements to funding strategies and cost management practices. I helped bridge the gap between financial planning and execution, ensuring alignment and fostering a culture of accountability. This role allowed me to collaborate passionately to encourage knowledge-sharing and build meaningful time. Also, coming from Aramco's upstream finance, this new exposure brought me closer to the business. My experience with SPE-KSA reinforced my commitment and opened a continuous window for improvement. Though my time with the society began briefly, I am deeply grateful for the opportunity to collaborate with such groups of Incredibly bright Individuals."



Ranyah Albeesh

Petroleum Engineer

Saudi Aramco, Reservoir Description & Simulation Department

“Volunteering with SPE has been a fulfilling experience that has enriched both my professional and personal journey. Organizing events within the Technical & Professional Programs has given me the privilege of curating dynamic spaces where industry leaders and professionals gather to delve into topics such as leadership, career growth, and financial acumen. These roundtable discussions have extended my experiences beyond our industry, fostering a platform for meaningful connections and collaborations. Furthermore, my work with SandRose Magazine has given me a unique opportunity to engage with exceptional individuals from diverse backgrounds, spotlighting their inspiring stories and expert insights. Every issue has been meticulously crafted from conceptualization to publication with passion, precision, and dedication, reflecting the highest editorial excellence and creativity standards. Through these experiences, I have acquired invaluable skills in event management, content creation, and teamwork while developing a deeper appreciation for the intricacies of the energy industry. Moreover, being part of the SPE-SKA community has allowed me to work alongside talented individuals and contribute to initiatives that positively impact our community. It is an honor to contribute to SPE- KSA’s mission and be part of its continued success and legacy.”

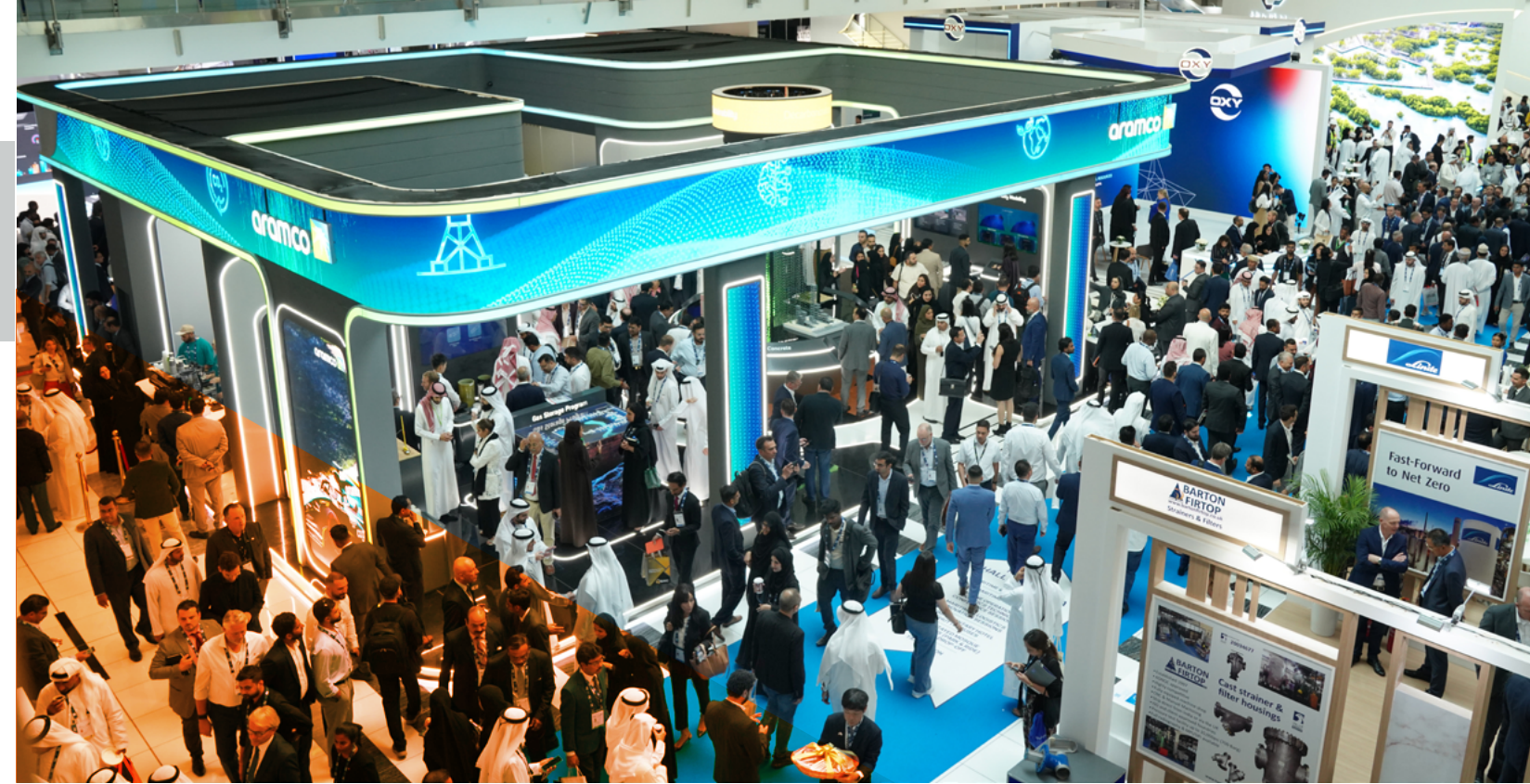


Abdulelah Bukhari

Petroleum Engineer

Saudi Aramco, Reservoir Description & Simulation Department

“My journey with SPE- KSA has been filled with memorable moments. As a member of the Admin Coordination and Public Relations committees, I was fortunate to go through some unique experiences. First of all, by leading the SPE- KSA Surveys team, as we went through hundreds of responses after every SPE- KSA event, I was able to garner a comprehensive overview of the attendee’s preferences and learn more about the section’s activities, helping improve SPE- KSA to more incredible successes and enhancing my data analysis skills. In addition to that, my experience with the Public Relations committee has given me a unique outlook on SPE- KSA from the perspective of the public, as gauging audience reaction and seeing how they respond to social media posts has developed my communication and critical thinking skills and has given me a different viewpoint on the perception of SPE- KSA, with Public Relations committee I also worked on the SPE- KSA podcast, Journey, which was a fascinating adventure to go through, as being a part of this platform was instrumental to my professional growth with the podcast tackling the pillars of sustainability and volunteerism among others and hosting industry professionals as guests, allowing me to have a first-hand experience with them and learn from their expertise, which contributed greatly to my career development.”



EXCELLENCE IN ENERGY: ARAMCO’S INNOVATIONS ON DISPLAY AT ADIPEC 2024

Tens of thousands visit booth at high-level conference

Aramco’s presence at the 2024 Abu Dhabi International Petroleum Exhibition and Conference (ADIPEC) was a resounding success, attracting more than 23,000 visitors to its booth. This year’s exhibition showcased the company’s dedication to innovation and sustainability within the energy sector, with a particular emphasis on decarbonization and advanced digital solutions.

The Aramco booth served as a hub for industry leaders, including ministers, government officials, and key members of Aramco’s management.

Noteworthy attendees included Sultan Al-Jaber, CEO of ADNOC; H.E. Suhail Al Mazroui, Minister of Energy and Infrastructure, United Arab Emirates; and H.E. Mohamed Bin Daina, Minister of Oil and Environment, Bahrain. Their participation highlighted the exhibit’s significance, reflecting the strategic impact of Aramco’s initiatives on the future of energy.

Pioneering excellence, sustainability and digital innovation

The booth prominently featured cutting-edge technologies that addressed crucial themes of decarbonization and energy transition. Aramco is actively pursuing a sustainable energy mix, integrating new energy sources into its portfolio.

Notably, the company’s ongoing hydrogen development efforts are vital as it navigates toward a more sustainable energy future.

Under the exhibit’s central theme, Aramco highlighted its initiatives in several key areas:

Operational Excellence: Demonstrating strategies that enhance efficiency in robotics and gas expansion operations.

Digital Innovation: Showcasing solutions from corrosion management to hydrogen simulation the Upstream value chain.

Leading Sustainability: Presenting advancements in carbon emission reduction and CCS technologies.

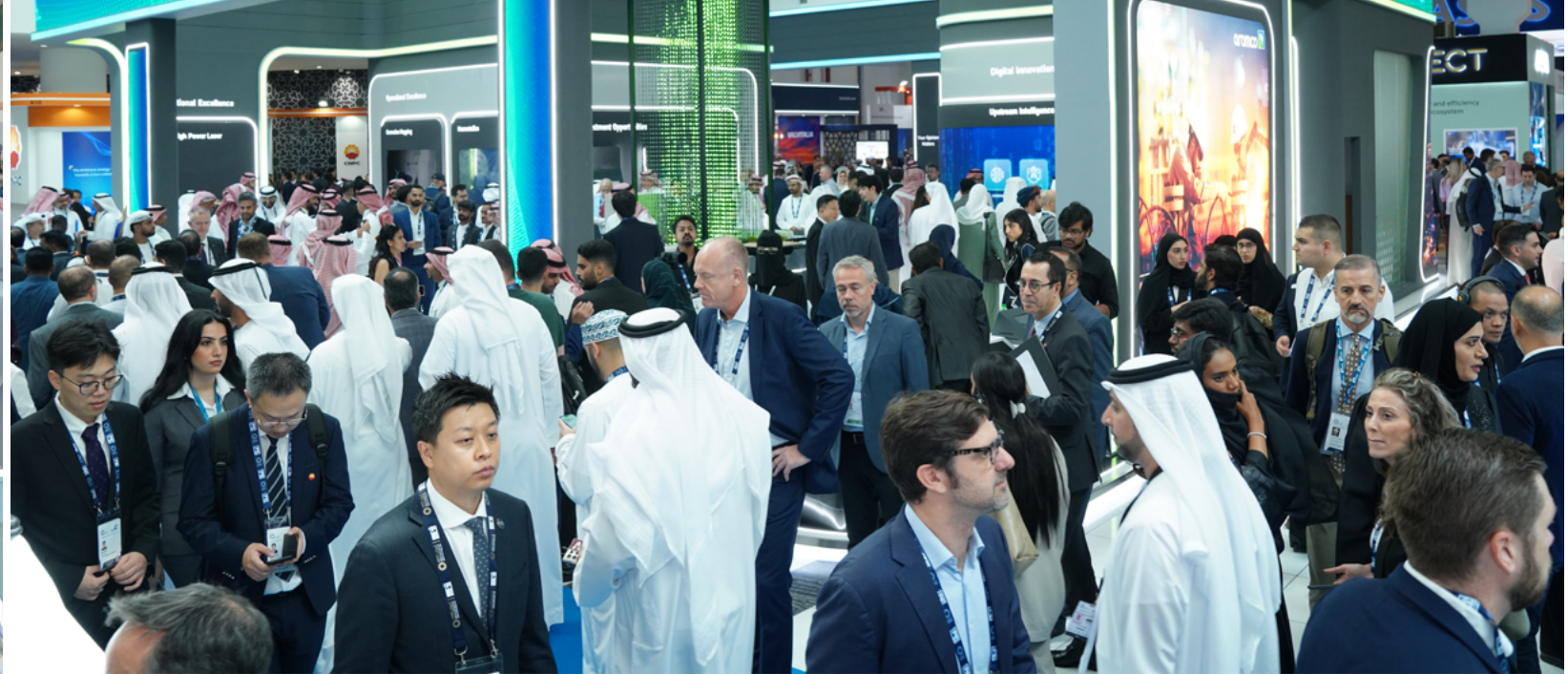
Resounding Success

Aramco's Upstream management was instrumental in roundtable discussions, featuring high-profile discussions with Ashraf M. Al Tahini, vice president of Aramco's Upstream Digital Center, and Ghaithan A. Al Muntasheri, EXPEC Advanced Research Center director. It underscored the necessity of a clear strategy for lower-carbon solutions and the importance of financing technological advancements, including the role of artificial intelligence and data centers.

This further emphasized Aramco's initiatives, such as the CCS Jubail Hub, which align with its sustainability goals. Aramco is committed to leading this transition through innovative solutions and collaborative partnerships.

Aramco's booth at ADIPEC 2024 highlighted its operational excellence and commitment to addressing the challenges of the energy sector. With a focus on innovation, sustainability, and strategic leadership, Aramco continues to assert its position as a leader in the global energy landscape.

Aramco's initiatives in the gas program, hydrogen development and decarbonization reinforce its dedication to a sustainable future, ensuring it is at the forefront of the energy transition.



CALLING ALL WRITERS & CREATIVES

SandRose Magazine cordially invites you to submit your work for a chance to be featured.

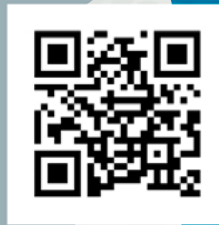
We are seeking submissions from talented individuals, encompassing a range of genres including technical articles, general interest pieces, and captivating artwork.

To share your work with us, please contact us at:

SANDROSE@SPE-KSA.ORG

We look forward to receiving your submissions and sharing your work to our community of 30,000+ readers.

**Sincerely,
Yazeed Aldughaither
Editor-in-Chief of SandRose Magazine**



SCAN THIS CODE TO VISIT
THE SANDROSE WEBSITE

Bridging Sustainability and Economics: Circular Practices in Event Management

By Nazhoon AlNashea, Echo/EM Team member

In a world where environmental consciousness is no longer optional but essential, the event management industry holds a significant responsibility. Events, by their very nature, are resource-intensive, often generating considerable waste and consuming substantial energy. Recognizing this, SPE-KSA's Event Management team has embarked on a journey to transform its event management practices to be more sustainable, aligning with the Kingdom's broader vision of achieving net-zero emissions.

Our strategy, Echo, is not just about reducing our environmental footprint; it's about creating a ripple effect that amplifies our impact. By integrating sustainable practices into every aspect of event logistics, marketing, and beyond, we aim to raise awareness and set a new standard for eco-friendly events within SPE-KSA and the wider community.

As part of this transformation, economic circularity plays a pivotal role. By embracing circular principles, we seek to minimize waste, maximize resource efficiency, and ensure that every element of an event can be reused, recycled, or repurposed. This approach not only supports our environmental goals but also drives innovation and economic efficiency, demonstrating that sustainability and success can go hand in hand. Through this commitment, we are not just planning events—we are designing a future where sustainability is at the core of everything we do.

Economic Circularity: Creating a Sustainable Model

Economic circularity is a concept that redefines our traditional "take-make-dispose" linear approach to resources. By rethinking how we design and reuse

materials, economic circularity aims to reduce waste, conserve natural resources, and create systems that benefit both the environment and the economy. In simple terms, it's about closing the loop on waste, ensuring that what we produce can be continuously utilized, leading to a more sustainable future.

Implementing such systematic and sustainable processes across all SPE-KSA events reduces energy costs and consumption, making our operations more efficient and cost-effective. For example, by standardizing and storing reusable branding materials, we have reduced the need for new production, which in turn lowers our energy expenditure. Additionally, our vendor contracts for recurring events ensure that materials are reused rather than disposed of, further reducing our environmental impact and contributing to cost savings.

Echo's Three Pillars of Sustainable Event Management

At the heart of Echo are three fundamental pillars: Reuse, Recycle, and Reshape. These pillars guide our efforts to make every SPE-KSA event not just memorable but also environmentally responsible.



Reuse

One of the most effective ways to reduce waste is to reuse materials and assets across multiple events. At Echo, we have standardized our branding items, ensuring they can be used repeatedly without compromising on quality or appearance. This approach is supported by our dedicated storage facilities, which allow us to efficiently store and retrieve materials for recurring events. One notable example was during the Growth Quest workshop held in January this year with McKinsey & Co., where we invested in customized branding materials that were stored and later used multiple times throughout this term. By storing reusable branding items, we saved significant costs as well as reduced the need for repeated manufacturing, thereby supporting a more sustainable ecosystem.

Recycle

At Echo, we are committed to contributing to a circular economy by ensuring that all giveaways at our events are eco-friendly. Currently, we are running 100% sustainable consumables across our events, with all giveaways being fully recyclable or made from recycled resources. This practice reinforces our dedication to sustainability and ensures that every item we distribute leaves a minimal environmental footprint. Whether it's a branded tote bag or a reusable water bottle, we are making sure that our giveaways echo our commitment to a sustainable future.

Reshape

Through strategic partnerships with vendors, we have introduced the concept of reshaping and rebranding used materials. Instead of discarding items like trophies, podiums, and stages after a single use, we extend their lifecycle by repurposing them for future events. For instance, by developing contracts with vendors for recurring events, we have secured high-quality materials at a lower cost, while also minimizing waste.

This initiative exemplifies how reshaping materials contributes to both environmental sustainability and economic efficiency.

Echo's sustainability efforts are deeply intertwined with the principles of economic circularity. By reusing, recycling, and reshaping materials, we are creating a closed-loop system that minimizes waste and maximizes resource efficiency. This demonstrates the financial benefits of adopting a sustainable economic model that meets our shared goal of achieving net-zero emissions.

The Future of Sustainable Event Management

The impact of our efforts has already been significant, with a 45% decrease in raw materials used, a 35% reduction in waste, and about 0.5 million Riyals in cost savings. As we continue to integrate sustainability into every aspect of our operations, the future of SPE-KSA's events will shine with hope and commitment.

Echo is more than just a strategy; it's a movement toward a sustainable tomorrow. By promoting and implementing eco-friendly practices across all SPE-KSA events, we are driving our collective ambition toward a sustainable future. We invite you to join us in spreading awareness about the importance of sustainable practices within and beyond SPE-KSA. Through social media and our online interactive page, we aim to extend our reach and amplify our impact. Together, we can create a more sustainable and better-shared future for all.



Inauguration of the Resonate Program with Mr. Ibrahim Moussa under the ROSHD Mentorship Initiative

On November 3, 2024, the SPE-KSA Human Capital Committee successfully launched the inaugural session of the Resonate program as part of the ROSHD mentorship initiative. Held at ILFigio Italian Restaurant, this exclusive networking event brought together 18 selected SPE-KSA volunteers and industry professionals for a memorable evening of connection and learning. The session featured Mr. Ibrahim Moussa, Managing Director of SLB KSA and Bahrain and an SPE-KSA Board Member, who generously shared his life and career experiences in a relaxed yet professional setting. His reflections offered valuable perspectives on leadership, adaptability, and growth, resonating deeply with the attendees.

Resonate is an Exclusive Networking Program crafted to connect young professionals with seasoned industry leaders in a supportive, professional environment. Through engaging sessions, Resonate encourages open dialogue and facilitates connections that nurture both personal and professional development. The inaugural session embodied this mission, as participants had the special opportunity to engage directly with Mr. Moussa, whose candid responses sparked meaningful discussions and reflections on his career journey.

Mr. Moussa's openness about his achievements and challenges inspired participants to consider how they, too, can build resilience and ambition in their own careers. This successful launch of the Resonate program has laid a strong foundation for future sessions, and the SPE-KSA Human Capital Committee is excited to continue expanding this initiative to bring more valuable opportunities to SPE-KSA members.



ROSHD Workshop: Effective Communications by MISK

On August 4, 2024, SPE-KSA Human Capital Committee, in collaboration with MISK, hosted an engaging workshop on "Effective Communication". The event aimed to enhance participants' abilities to communicate persuasively and become effective leaders.

The workshop featured Murtadha Al-Yousef as the speaker, who provided insights into effective communication techniques. His talk emphasized the importance of effective communication and how it is an essential factor towards the path of great success. Over 100 attendees participated in person, while more than 700 attendees joined online, reflecting the topic's widespread significance.

The session included interactive activities and real-life examples to illustrate key concepts. One of the highlights was the Johari Window exercise, the Johari Window is a psychological tool designed to boost communication and self-awareness. Participants select adjectives that describe themselves and compare them with those chosen by others. This process highlights differences between self-perception and how others perceive them, helping participants gain insights into their communication styles and identify areas for improvement. Additionally, a custom-designed card game created by the ROSHD team was introduced, allowing participants to practice and enhance their communication skills in a fun and interactive manner.

Understanding varied communication styles and knowing how to adjust to different audiences for more productive interactions were among the workshop's main takeaways. Murtadha Al-Yousef highlighted the value of persuasive communication to become a more compelling communicator, including active listening and empathy. Participants also learned how improved team dynamics and decision-making are

fostered by good communication skills, which is a crucial prerequisite for effective leadership.

One of the workshop's special aspects was the collaboration between ROSHD and MISK, which provided a combination of innovative approaches for communication training. The learning process was entertaining and educational thanks to the utilization of interactive sessions and games.



Digital Wellbeing: Creativity & Reactivity, Productivity & Distraction

On May 23, 2024, the SPE-KSA Information and Technology Committee, in collaboration with the Sync program, hosted a significant workshop titled "Digital Wellbeing: Creativity and Reactivity, Productivity and Distraction." The event, which took place at the Ithra Knowledge Tower - Floor 15, aimed to emphasize strategies for achieving a healthy digital balance.

Mohammed Alotaibi served as the Master of Ceremonies for the event, ensuring a smooth flow of activities and engaging the diverse group of participants. The workshop attracted professionals from the oil and gas industry, technology enthusiasts, and individuals interested in enhancing their digital wellbeing and work-life balance. Approximately 30 participants attended the event, highlighting its broad appeal and the community's interest in the subject matter.

The workshop was a collaborative effort between SPE-KSA and the Sync program, reflecting the commitment of both organizations to explore the intersections of technology and human wellbeing. The event featured two prominent speakers who provided valuable insights into different aspects of digital wellbeing.

The first speaker, Dr. Justin Thomas, a distinguished professor of psychology and an expert in cognitive therapy, delivered an insightful presentation on the impact of technology on our lives. Dr. Thomas covered historical perspectives, internet-related disorders, and strategies for achieving digital balance. His extensive research on the evolution of human-technology interactions provided the participants with a comprehensive understanding of the challenges and opportunities presented by our increasingly digital world.

Following Dr. Thomas's presentation, the workshop continued with an interactive session on Yoga and mindfulness in the workplace, led by Sara Al-Budair, a yoga therapist and instructor. Sara guided the participants

through practical techniques to incorporate mindfulness and yoga into their daily work routines, promoting mental clarity and overall health. This hands-on session added a unique and highly appreciated component to the workshop, allowing attendees to experience the benefits of mindfulness practices firsthand.

The workshop emphasized the importance of balancing digital transformation with personal wellbeing, ensuring that technological advancements contribute positively to our lives rather than causing harm. This key takeaway resonated with many participants, who appreciated the focus on practical strategies to manage their digital lives effectively.

The event's success was made possible by the efforts of various support committees within SPE-KSA. The Event Management Committee coordinated the logistics, ensuring smooth operation throughout the workshop. The Public Relations Committee managed announcements and communication with participants, ensuring that everyone was well-informed and engaged.

As the event concluded, Dr. Justin Thomas and Sara Al-Budair were invited back to the stage to receive their trophies as tokens of appreciation for their valuable contributions. Their presentations left a lasting impact on the attendees, who departed with practical knowledge and techniques to enhance their digital wellbeing.

In summary, the "Digital Wellbeing: Creativity and Reactivity, Productivity and Distraction" workshop was a resounding success. It provided participants with valuable insights into the importance of digital balance and equipped them with practical tools to improve their work-life balance. The collaborative efforts of SPE-KSA and the Sync program, along with the dedication of the support committees, ensured the event's success and left a positive impression on all who attended.

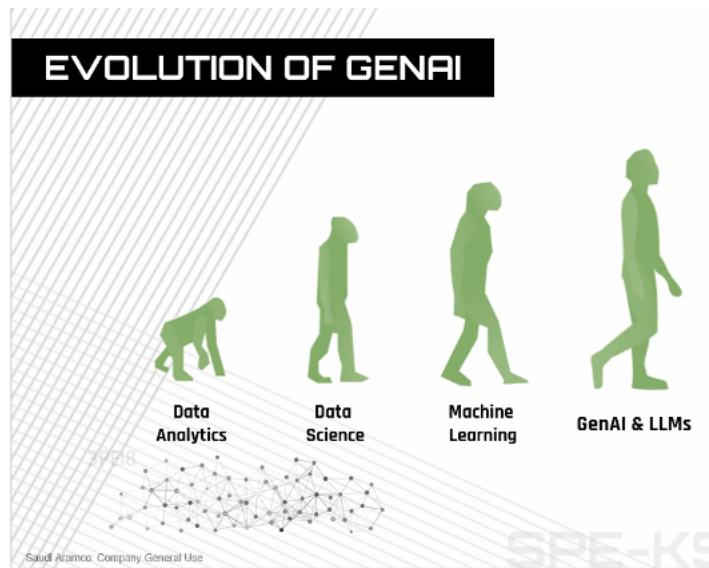
Retrofitting GenAI for Secure Energy Applications

SPE-KSA's Information Technology Committee has successfully conducted a session on November 12, 2024 titled Retrofitting GenAI for Secure Energy Applications. Hafiz Farooq from Aramco's Upstream Information Security Division delivered an insightful talk highlighting the critical aspects of Generative AI, covering key areas including the evolution of GenAI spectrum, which highlights the rapidly changing landscape; the threat landscape with emerging GenAI, where he examined the increasing risks and vulnerabilities associated with GenAI; detection & protection against GenAI threats, outlining effective strategies for mitigating these threats; and finally, recommendations for navigating the complex world of GenAI.

Throughout this journey, Hafiz Farooq, shed light on the evolution of GenAI, starting from being a Data Analytics until it reaches a mature stage to develop GenAI & LLMs. What made this talk particularly captivating was the insightful sharing of 2024 GenAI trends and their profound impact on various industries. This added layer of depth provided valuable context for understanding the significance within the broader landscape of technological advancements. By exploring these emerging trends, participants gained a deeper appreciation for the transformative potential of generative AI in shaping the future of multiple sectors.

Based on F5's 10th Annual Survey for AI research, "Nearly one-third of decision makers fear AI-powered attacks." Another interesting statistic based on the cyber-attack statistics from the blog is "Global spending on cybersecurity products and services is predicted to exceed \$3 trillion cumulatively over the five-year period from 2019 to 2023."

Moreover, Farooq examined the increasing risks and vulnerabilities associated with GenAI. Such as Samsung Data Leak, Microsoft Tay matter, and the lawsuit against



GM. Additionally, he emphasized on understanding what our consistent privacy policies in Gemini and OpenAI do and how they are using our data to provide, improve, and develop products and services and machine-learning technologies.

In the detection & protection against GenAI threats, he outlined the effective strategies for mitigating these threats. One aspect is, Zero-Retention of LLM Chat Histories, where minimize places where sensitive data can be found by turning off any retention of logs for prompts and responses unless in a dedicated and secure system.

Interesting final key takeaways that was concluded by Hafiz talk, were 1. Pay heed to Enterprise Policies and Regulatory Laws, Perform Red Teaming on GenAI based Applications, Adopt RAG to avoid hallucinations, but ensure data security, prefer local LLMs if financially viable and finally, Deploy GenAI gateways before it is too late. The workshop was moderated by Shahad Alkaltham and led by Razan Boodai. It was attended by 35 participants with professionals from different companies and disciplines.

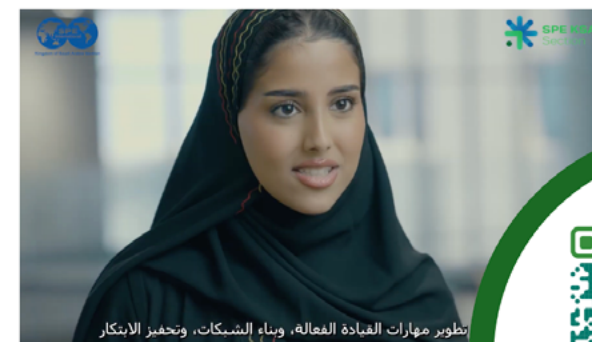
SPE-KSA National Day Video | Decades of Excellence

In celebration of Saudi Arabia's National Day, the SPE-KSA PR Committee launched a series of videos capturing decades of excellence across pivotal areas that shape the Kingdom's future. Recognizing the critical importance of developing the next generation, the Committee collaborated with Yamamah University, led by Sara Al Shehri, to inspire students to take the reins in shaping the future of energy.

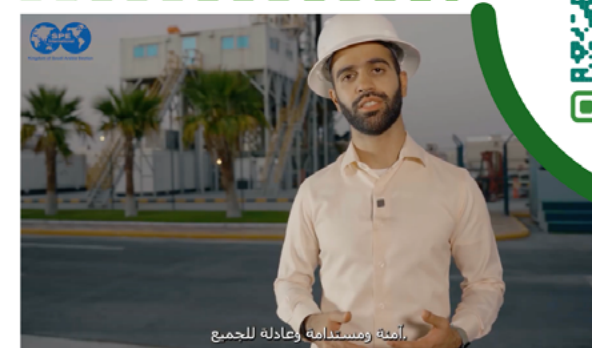
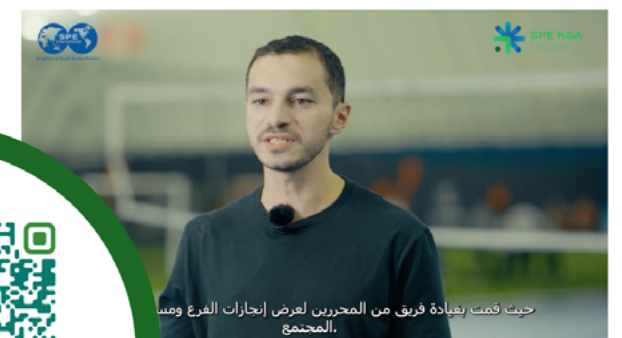
Equally important is their dedication to building a strong and cohesive society, demonstrated through charitable initiatives, with the video filmed at Ithra and directed by Reem Al Hugail, reflecting the values of compassion and prosperity.

The videos also highlighted the value of athletic achievement, with Mohammed Kurdi emphasizing the discipline and teamwork that drive success in both sports and the energy sector. Additionally, Yazeed Aldughaiter represented petroleum engineers in showcasing the ongoing pursuit of technical innovation, a cornerstone in addressing the evolving challenges of tomorrow's energy landscape. Through these key pillars, the Public Relations Committee highlighted its role in advancing the Kingdom's vision for a brighter and more prosperous future.

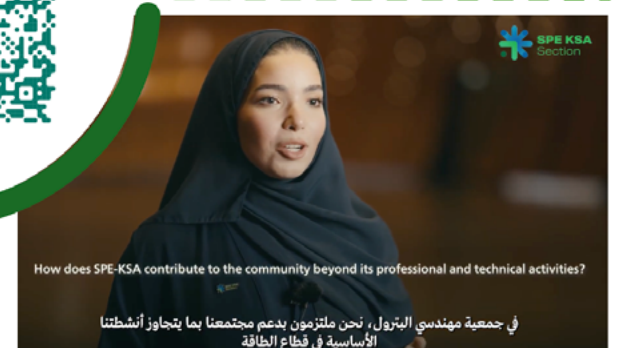
Student Empowerment



Sports Advancement



Professional Growth



Flourishing Community



A Dialogue on Energy and Sustainability in the Gulf highlight of historic SPE dinner meeting

Hundreds attend first-ever joint dinner meeting of SPE-KSA and SPE-Bahrain

On Nov. 25, a landmark event in the Society of Petroleum Engineers (SPE) history occurred with the first-ever dinner meeting jointly organized by SPE-KSA and SPE-Bahrain sections.

Held in Manama and attended by about 500 participants, this inaugural gathering marked a significant milestone, fostering cross-border dialogue on the future of energy and sustainability in the region. The event served as a platform to explore the evolving energy landscape in the Gulf and address pressing global challenges.

The evening featured H.E. Mohamed bin Mubarak Bin Daina, Bahrain's Minister of Oil and Environment and Special Envoy for Climate Affairs, as the keynote speaker. The compelling dialogue, titled "Fueling the Future: A Dialogue on Energy and Sustainability in the Gulf," was moderated by Yousef Al Tahan, Aramco's head of Unconventional Resources Completion Operations and included insights into the region's energy dynamics. Also explored was the balance between hydrocarbon reliance and sustainability ambitions.

Prominent figures in attendance included H.E. Faihan M. Al Faihani, Acting Under Secretary of Bahrain's Ministry of Oil and Environment; Nasir K. Al-Naimi, Aramco Upstream president; as well as other members of Aramco executive management and the SPE-KSA Board of Directors.

Phase 1 of the CCS hub will have the capacity to capture 9 million metric tons of CO₂ from three Aramco gas plants and other industrial sources. The captured CO₂ will be transported through a pipeline network and stored below ground in a saline aquifer sink, leveraging the Kingdom's significant geological potential for CO₂ storage.

Charting a course toward sustainability

Bin Daina's remarks highlighted the Gulf's current reliance on hydrocarbons while charting a course toward renewable sources such as solar and wind energy. He underscored Bahrain's commitment to sustainability, which includes ambitious net-zero targets and greenhouse gas emission reductions. These efforts are part of Bahrain's National Energy Strategy, which incorporates energy efficiency measures and advanced technologies such as carbon capture and storage (CCUS). The Gulf Cooperation Council (GCC)'s hydrocarbon resources are vital for meeting global energy demands.



The dialogue addressed the broader regional energy transition.

Bin Daina explained how Bahrain maximizes hydrocarbon efficiency through initiatives such as the Bahrain Petroleum Company (Bapco) Modernization Program, which enhances refining capacity and reduces carbon intensity.

Achieving sustainability through collaboration

Attendees were presented with the critical importance of collaboration in driving innovation and sustainability. Bin Daina emphasized the necessity of unity among governments and energy companies to foster innovation, implement green technologies, and reduce emissions. He highlighted the role of organizations such as SPE in promoting dialogue, sharing knowledge, and building capacity to manage the evolving energy landscape. Stakeholders were urged to prioritize sustainable practices, emphasizing the importance of technology and innovation in addressing global energy challenges. Advancing energy affordability and inspiring the next generation

Bin Daina also emphasized the Gulf's opportunity to address the approximately 800 million people lacking access to energy and the region's vital role in exporting resources and advancing energy efficiency technologies. By balancing innovation, policy alignment, and knowledge sharing, Bahrain and the broader Gulf region can emerge as global leaders in sustainable energy development while ensuring economic resilience and environmental stewardship.

Bin Daina also noted that young professionals are crucial in shaping a sustainable future. Their contributions and proactive measures from GCC governments are essential for building a cleaner and more resilient energy landscape.

This unique gathering reinforced the Gulf region's role as a leader in sustainable energy innovation, bridging the gap between traditional energy systems and a greener future through a collective commitment to promoting sustainable practices.



SPE-KSA June Dinner Meeting with Dr. Abdulrahman Al-Jadhai, CEO of Elm

SPE-KSA's Technical & Professional Programs inaugurated the Dinner Meeting series of the 2023-25 term with the theme of Digital Transformation and the remarkable milestone of SPE-KSA's 65th anniversary. This commemorative evening was attended by over 500 professionals, including key leaders from the oil and gas industry, celebrating SPE-KSA's enduring legacy, while standing ready to embrace the future.

Under the title of "Navigating the Digital Frontier: Enabling the Kingdom's Growth," the evening featured the esteemed Dr. Abdulrahman Al-Jadhai, CEO of Elm, as the keynote speaker, with Laila Al Hmoud, Lead Upstream

Digital and Computing Strategist, moderating the discussion. Dr. Al-Jadhai highlighted Elm's innovative journey and leadership in digital transformation, sharing insights on their creative culture, success stories, tailored solutions and collaborative partnerships. These initiatives align with the Kingdom's Vision 2030, emphasizing the role of generative AI and cutting-edge technologies in advancing diverse industries and achieving widespread impact.

We extend our heartfelt gratitude to all participants whose remarkable contributions made this event a resounding success.





SPE-KSA September Dinner Meeting - Celebrating Saudi Ambition: A Closer Look at the Kingdom's Vision 2030

In a pivotal moment of global transformation, Saudi Arabia's Vision 2030 stands out as a beacon of ambitious reform and visionary progress. This ambitious blueprint represents a profound reimagining of the Kingdom's economic, social, and cultural landscape, aiming not only to enhance its global standing but to catalyze a transformative renaissance. Central to this monumental journey is the National Transformation Program (NTP), a dynamic engine driving this evolution under the leadership of Mr. Thamer Alsadoun, the CEO of the NTP.

Organized by the Technical and Professional Programs Committee, the second dinner meeting of SPE-KSA 2023-2025 term, which attracted more than 400 attendees, took place on September 2nd titled "Celebrating Saudi Ambition: A Closer Look at the Kingdom's Vision 2030" and a celebration of the up and coming 94th national day of the Kingdom. During the event, Alsadoun highlighted the Kingdom's progress and future aspirations, showcasing the significant advancements achieved under Vision 2030. This gathering served as a platform to underscore the unwavering commitment to a future marked by innovation, efficiency, and sustainability. Vision 2030 is not merely a plan; it is a declaration of intent. It embodies Saudi Arabia's resolve to transition from a historically oil-based economy to a diversified powerhouse with global influence. As Alsadoun highlighted, NTP, which was the first Vision 2030 program launched in 2016 and the operational arm of this vision, has been instrumental in translating these lofty goals into tangible achievements. In fact, the NTP is in charge of 34 of the 96 strategic operations laid out by the Vision's goals. The program has become a catalyst for change, driving initiatives that span across economic diversification, digital transformation, and social development. He highlights that the program's overall goal is to enrich each other's lives, cultivate a sense of purpose, and foster an impact in the kingdom and our communities.



Caption: With Thamer Alsadoun, CEO of the National Transformation Program



The impact on various industries under Vision 2030 is transformative. These impacts fall under specific themes highlighted by the Vision which include government operational excellence, sustaining vital resources while looking after the environment, labor market accessibility, digital transformation, and economic partnership. In the energy sector, the Kingdom's focus has shifted towards sustainability and diversification, with a marked increase in the development of renewable energy sources. This strategic move not only enhances the Kingdom's energy security but also contributes to global efforts to combat climate change, positioning Saudi Arabia as a key player in the global energy transition. An example of this highlighted by Alsadoun during his talk would be the Kingdom's ranking of 1st internationally in water desalination. In the realm of digital transformation, the expansion of broadband coverage to 99% of the Kingdom represents a leap towards a more connected and technologically advanced society. The digitization of public services with the development of over 6,000 E-government services, representing 97% of total government services has been revolutionary in the Kingdom under the Vision and the guidance of NTP. The justice sector, where huge percentage of services are now digital, has streamlined processes, reduced case durations by 79%, and made transactions more efficient. This technological leap paves the way for innovation and growth across various sectors, facilitating a more vibrant and dynamic economy.

The real estate sector has undergone a significant transformation, revolutionizing the industry by making property dealings more transparent and efficient. By simplifying processes, the sector has attracted increased investment and supports the broader economic diversification goals of Vision 2030. This focus on diversification is evident in the issuance of over 8,500 foreign investment licenses in 2023 alone, highlighting the Kingdom's success in creating a favorable investment climate and stimulating economic activity. Parallel to this, the business landscape has expanded significantly with a notable rise in new enterprises and a streamlined registration process. As Alsadoun highlighted, these changes foster an entrepreneurial spirit, drive job

creation, and bolster the economy by supporting mid-tier firms. Labour market reforms have also played a crucial role in reducing unemployment and improving conditions for expatriates, while advancing inclusivity and empowerment through increased female workforce participation and more women in managerial roles. Some specifics include reducing the Saudi unemployment rate from 12.8% in 2017 to 7.6% in Q1 of 2024, and increasing the percentage of women in the labor force to 35.5%. These reforms not only enhance the Kingdom's human capital but also contribute to a more dynamic and equitable labor market. Concurrently, the surge in nonprofit organizations, which saw a 173.4% growth since the launch of Vision 2030, and volunteering, with a staggering number of over 834,000 volunteers across the kingdom in 2023 alone, underscores a strong commitment to civic engagement and community development, reflecting a deeper dedication to fostering social cohesion and encouraging active participation in shaping a vibrant and inclusive society.

Alsadoun's presentation at this event was not just an update but a testament to the Kingdom's unwavering commitment to Vision 2030. Through meticulous planning and visionary leadership, Saudi Arabia is not merely envisioning a transformative future but actively shaping it, establishing itself as a global leader in progress and development. This multifaceted approach ensures that Vision 2030 delivers significant benefits across diverse sectors, elevating the Kingdom's global prominence while markedly advancing the living standards for its citizens.



SPE-KSA T&PP'S Distinguished Lecturer Program Hosts Dr. Pallav Sarma

The SPE-KSA Technical & Professional Programs successfully hosted its second event of the Distinguished Lecturer Program (DLP) series titled "Physics Embedded Machine Learning for Modeling and Optimization of Mature Fields." Held on May 19th, 2024, the insightful lecture was delivered by Dr. Pallav Sarma, Co-founder and Chief Scientist at Tachyus.

The event highlighted a novel approach known as Data Physics, which combines the strengths of physics-based modeling and machine learning to expedite predictive modeling processes. Dr. Sarma introduced Data Physics as an innovative method that enhances the accuracy and speed of modeling and optimization tasks. This approach is particularly beneficial for mature fields, where extensive historical data is available, allowing for more precise and quicker predictions. During his presentation, Dr. Sarma showcased a range of machine learning models, offering a comprehensive view of how artificial intelligence (AI) and machine learning (ML) can revolutionize reservoir simulation. He emphasized the future potential of AI and ML applications in the energy sector, illustrating how these technologies can optimize production and improve decision-making processes.

Among the modeling techniques discussed were Fast Forward Modeling and Closed Loop Optimization Modeling. Both of which proved to be successful when employed in predicting the optimal injection rates for reservoirs. Notably, Dr. Sarma demonstrated an application of the Data Physics approach to a complex waterflood, where a 15% increase in cumulative production was achieved since implementation. This was followed by addressing the limitations of the Data Physics approach. While it is highly effective under the right conditions, its success depends on the availability of high-quality historical data. Despite these limitations, he argued that Data Physics and conventional methods can complement each other effectively, providing a more robust framework for advancing reservoir modeling and optimization.

The event underscored the importance of integrating reservoir physics, modeling, and simulation with cutting-edge AI and ML techniques. By combining these disciplines, the industry can achieve significant advancements in the management and optimization of mature fields. Dr. Sarma's lecture was a testament to the progress being made in this field, demonstrating the potential of Data Physics to transform traditional modeling practices.

The DLP session saw excellent attendance, with participants actively engaging in discussions, asking insightful questions, and contributing enriching thoughts and additions. This made the event a great success, highlighting the community's interest and commitment to leveraging advanced technologies in reservoir management. Overall, the DLP event provided valuable insights into the future of reservoir simulation, showcasing how the integration of physics and machine learning can drive innovation and efficiency in the energy sector.

Technical & Professional Programs Committee Hosts Dr. Paul Lyford in Distinguished Lecturer Program

The Technical & Professional Programs committee successfully completed its 3rd SPE-KSA Distinguished Lecturer Program, titled "CO2 Storage Resource Management System". The session took place on Tuesday, 1st of October in Baker Hughes Dhahran Techno Valley. Where we welcomed distinguished lecturer, Dr. Paul Lyford, General Manager Planning Portfolio and Resource Management at Santos Ltd, who gave a fruitful and engaging lecture on the standardization approaches and the future of Storage Resources Management System. The event was signified by an exceptional turnout of over 80 attendees with diverse technical backgrounds and expertise, marking our highest DLP session attendance yet.

SPE-KSA Technical & Professional Program NMO Roundtable Discussion: Insights on Career Growth

By Safiyah Alghamdi

Career growth is a multifaceted journey, uniquely defined by individuals based on their distinctive aspirations and life stages. This was the key theme explored during the third NMO session titled “Career Growth,” where industry experts gathered to discuss the nuances of professional development. Organized by the NMO team as part of the Technical & Professional Programs and held on the evening of August 14th, the event welcomed 100 attendees to an engaging roundtable discussion moderated by Dr. Abdullah Almuhaideb, Petroleum Engineering Specialist at Saudi Aramco. The panel featured esteemed professionals from diverse backgrounds including Mai Aldossary, Corporate Communications Manager at TAQA, Mishari Alghamdi, Training and Development Manager at ASMO, and Mohammed Alabbad, Management Development Advisor at Saudi Aramco. The panelists engaged in a thought-provoking discussion, highlighting principal themes and points of consideration in the journey of career growth.

Defining Career Growth

The discussion opened with a complex yet fundamental question: What is career growth? Ms. Aldossary highlighted



that the definition of career growth is often subjective. For some, it might mean earning a promotion, while for others, it could encompass any form of personal or professional development. Mr. Alghamdi echoed this sentiment, emphasizing that career growth is deeply personal and shaped by individual experiences and goals. Mr. Alabbad added that career growth is an ongoing process of self-improvement, evolving over time as one's motivations and life circumstances change and develop.

Stages of Career Growth & Accompanying Challenges

Addressing the stages of career growth, Mr. Alghamdi pointed out that these stages are intrinsically linked to a person's values at different phases of life. He referenced Reid Hoffman's Tour of Duty concept from the book “The Alliance,” noting that early career stages often focus on excellence and skill acquisition, sometimes at the expense of work-life balance. As careers progress, the focus might shift towards leadership and creating

impact, with new challenges and expectations emerging at each stage.

The panelists then delved into the challenges associated with career growth. Mr. Alabbad remarked that the difficulties often lie in meeting the evolving demands of each career stage. For instance, in more advanced roles, the challenge could be managing the responsibilities of leadership, which requires balancing team dynamics and organizational goals. Adding to that, Ms. Aldossary shared personal anecdotes from working in oil and gas fields, underscoring the importance of building a strong technical foundation early on in one's career to ensure success in future roles.

Another challenge discussed was overcoming one's self-imposed stereotypes and how others perceive them in the workplace. Ms. Aldossary discussed how personal traits, such as being an introvert or extrovert, can influence workplace perceptions. She also mentioned the pressure of maintaining a reputation of excellence, noting that career changes can provide a fresh perspective and alleviate this burden. Mr. Alabbad emphasized the importance of self-awareness in understanding how others perceive you, which is crucial for planning effective career transitions and achieving success.

Early Career Misjudgments & Role of Mentorship

One significant pitfall in the early stages of a career, according to Mr. Alghamdi, is the lack of understanding of the job's nature and its alignment with personal goals. Many young professionals struggle with the transition from being high-performing students to junior employees, often finding the realities of work life starkly different from their expectations.

Mentorship emerged as a critical theme in this discussion. Mr. Alabbad eloquently stated, “A mentor downloads the genius in you while a coach uploads this genius.” He emphasized that while a mentor provides guidance, a coach helps individuals capitalize on their skills. Ms. Aldossary added that the most effective mentors are those who guide without micromanaging and have relevant



experiences to their mentees. Mr. Alghamdi further elaborated on the importance of alignment between a mentor and a mentee's goals, stressing that mentors should not impose their perspectives, but rather share their experiences to help mentees carve their own paths.

Navigating Career Transitions

Career transitions present their own set of challenges. Mr. Alghamdi identified three key difficulties: incomplete experiences, maintaining focus on current roles while planning transitions, and adapting to new work environments. Multiple career shifts in a short period can create a series of unfinished experiences that may not contribute to skill development and can be challenging to evaluate later. Ms. Aldossary added that while transitions can offer a more holistic view of one's field, they often require significant personal adaptation to fit into a new corporate culture, demanding extensive efforts and social skills.

When it comes to selecting a workplace, the panelists agreed on the importance of the alignment between one's personal goals and the organization's values. Mr. Alghamdi highlighted the significance of choosing an organization that prioritizes employee development. He recommended tools such as the 360-degree feedback to understand both self-perception and how others view you, aiding in making more informed career decisions. Ms. Aldossary emphasized the importance of the work environment, noting that different workplaces offer varying levels of competition and stress, which must align with an individual's preferences and expectations.

On a related note, the panelists shared insights on self-promotion and seizing opportunities. Mr. Alghamdi advocated for the power of networking, both in-person and online through platforms such as LinkedIn. Ms. Aldossary added that involvement in professional communities, such as SPE, can significantly enhance visibility and access to opportunities across various job roles.

Achieving Work-Life Balance

Achieving a work-life balance is critical for both career success and personal well-being. Ms. Aldossary emphasized the importance of time management, noting that balancing work and personal life is crucial for long-term productivity and satisfaction. She advised professionals to take regular breaks and not to postpone vacations, as these periods of rest are essential for recharging and maintaining high performance. Mr. Alghamdi pointed out that work-life balance can vary depending on the stage of one's career and life. For example, early in a career, professionals may prioritize skill acquisition and career advancement, often leading to longer hours and more intense work periods. As careers progress, however, the focus might shift towards achieving a balance that allows for more personal time, family commitments, or pursuing hobbies. Mr. Alabbad highlighted the role of hobbies and personal interests in achieving work-life balance, noting that they can provide a mental break, help prevent burnout and promote a more fulfilling life.

This NMO roundtable offered a wealth of insights into the complex journey of career growth, providing valuable guidance for professionals at every stage of their careers. The discussion not only highlighted the challenges and opportunities professionals encounter at various stages of their careers, but also provided actionable guidance for navigating these complexities, empowering individuals to take informed steps toward achieving their professional aspirations.



SPE-KSA Technical & Professional Programs:

Growth Quest: Path to CFA Workshop in Collaboration with Kaplan Professional ME

The SPE-KSA Technical & Professional Programs, in collaboration with Kaplan Professional Middle East, recently hosted a highly successful Growth Quest workshop titled "Finance Essentials: Path to CFA." Attended by 100 mid-career professionals, this two-day event was designed to provide a comprehensive overview of the Chartered Financial Analyst (CFA) program, equipping participants with essential financial knowledge and skills.

The workshop was led by Nicola Pasquali, a seasoned accounting and finance trainer with Kaplan Professional Middle East. Pasquali is a CFA and FRM holder with over 10 years of experience in Europe, where he successfully sealed M&A deals with high-profile entities such as Brazil's state-owned energy company Petrobras and the global conglomerate Reliance Industries. He also holds an Executive MBA from the London Business School and has a strong background in the oil and gas sector. Additionally, Pasquali has served as the Chief Investment Officer (CIO) of the Central Asian Investment Fund and is the CEO of Step99 Investment Consulting Boutique. His expertise in equity research analysis and mergers & acquisitions provided participants with a wealth of knowledge and practical insights into the complexities of the finance industry.

Pasquali's sessions covered a broad range of topics critical to understanding the CFA curriculum. On the first day, participants delved into 'Financial Statement Analysis (FSA),' learning how to enhance the quality of financial information to make more informed decisions. The workshop also explored 'Alternative Investments,' comparing traditional and alternative strategies, investment methods, and the fair value hierarchy, which emphasizes transparency, objectivity, and comparability in investments.



Day two of the workshop focused on key financial concepts such as 'Fixed Income,' where participants learned about the significance of debt capital, the intricacies of bond pricing, and the dynamics of yield. Additionally, 'Equity Investments' were examined, with discussions on the definition and value of equity, historical examples of Initial Public Offerings (IPOs) and privatizations, and an eight-step process for corporate valuation.

A highlight of the event was the inspiring segment featuring Fatimah Aldawood, an MBA holder with a robust background in Data Analytics and Finance, previously working with Upstream Joint Ventures Management

in Aramco. Aldawood shared her personal journey to achieving the prestigious CFA accreditation, discussing the challenges she overcame and the significant impact the credential has had on her career. Her story resonated deeply with the audience, as she offered practical advice and motivation to the attending professionals aspiring to expand their expertise in finance and advance their careers.

The workshop proved to be a resounding success, making for an enriching experience for all attendees and leaving them better equipped to pursue their CFA credentials and excel in the finance industry.



SPE-KSA Fun Day at DYNO Climbing Center

SPE-KSA Trips and Social Activities (T&SA) Team in collaboration with the House Social Nursery Dammam and the Charitable Society for the Care of Orphans (Benea) successfully held and organized "SPE-KSA Fun Day at DYNO Climbing Center" on July 6th, 2024. This event aims to emphasize on the role of SPE-KSA in adhering to social responsibility through prompting for inclusion amongst the society while celebrating the new Hijri Year.

In perseverance to the sincere passion and collective efforts adhering to the social responsibility and the welfare of the community, SPE-KSA Trips and Social Activities (T&SA) Team in collaboration with the House Social Nursery Dammam and the Charitable Society for the Care of Orphans (Benea) successfully held and organized "SPE-KSA Fun Day at DYNO Climbing Center" on July 6th, 2024. A group of 33 children from both the House Social Nursery and Benea Association joined with SPE-KSA members and their families to celebrate the new Hijri Year.

The House Social Nursery Dammam is a children care institution under the Ministry of Human Resources and Social Development, while the Charitable Society for the Care of Orphans (Benea) is a stand-alone organization that devotes its services to support orphans all across the Eastern Province. The SPE-KSA Fun Day event incorporated various activities such as Wall Climbing, Face Painting Booth, and a variety of Board Games.

The event commenced with participants registration and warm welcome followed by safety induction on climbing safety and general etiquettes of the center. After which, the participants enjoyed the different wall climbing activities such as the automatic belay, the top rope and bouldering.

The SPE-KSA Fun day had over 102 participants, 17 organizers and volunteers, and 7 DYNO Staff members. SPE-KSA T&SA Team would like to extend their gratitude and deep thanks to the House Social Nursery Dammam, the Charitable Society for the Care of Orphans (Benea), DYNO Climbing Center and everyone involved in the success of this event.



Financial Acumen for Engineers by YP & Aramco Business School

On December 22nd, the SPE-KSA Young Professionals Committee hosted a workshop on Financial Acumen for Engineers in collaboration with the Aramco Business School. The session aimed to bridge the gap between engineering and finance, empowering 29 young professionals with essential financial knowledge to enhance their decision-making and strategic thinking.

Participants explored key financial concepts tailored for engineering professionals, gaining insights into linking technical projects with financial performance and driving value in their roles. This impactful workshop demonstrated the importance of cross-disciplinary collaboration, providing attendees with tools to broaden their expertise and contribute more effectively to their organizations.



Insights with Abdullah Alrashid, CEO of Ithra

On September 16, 2024, the SPE-KSA Young Professionals Committee hosted Abdullah Alrashid, director of Ithra, for an inspiring moderated session attended by over 90 young professionals. The speaker shared his personal journey from being a young professional to his inspirational leadership role, highlighting key lessons learned along the way.

Additionally, he provided an overview of Ithra's transformative impact on the community, detailing various initiatives aimed at fostering creativity and knowledge. Abdullah also shared the inspiration insights behind Ithra, underscoring its mission to empower individuals and enrich volunteerism.



Insights Session with Naif Al Hadrami, Executive Director of NESR

The SPE-KSA Young Professionals Committee, hosted its third flagship event "Insights" in which they had the pleasure of hosting the Executive Director of NESR, Naif Alhadrami. During the session, Mr. Alhadrami shared insights from his career, discussed the importance of sustainability within the oil and gas industry, and emphasized the value of getting involved in professional organizations such as SPE-KSA. The session took place on the 29th of May and was attended by well over 40 participants and young professionals.



Inspiring Youth: Shaping a Sustainable Future

SPE-KSA Young Professional Committee hosted a sustainability workshop titled 'Inspiring Youth: Shaping a Sustainable Future' on May 7. The event, facilitated by Aramco's exceptional Upstream Development Strategy & Reserves team, provided an enriching experience. During the workshop, we delved into crucial topics such as sustainability models, the history of energy, global commitments, and innovative practices like carbon capture and utilization.



Young Professionals Visit to an Offshore Rig at IMI's Shipyard in Ras Alkhair

The SPE-KSA Young Professionals Committee, in collaboration with Saudi Aramco Drilling and Workover (D&WO) and IMI, recently organized its first offshore rig visit at IMI's shipyard in Ras Al-Khair. The visit featured a COSL offshore rig, offering 20 young professionals from three different Admin Areas within Saudi Aramco and two service companies a unique opportunity to gain hands-on exposure to offshore operations.

Participants explored the technical and operational aspects of the COSL rig and interacted with the crew, bridging the gap between theoretical knowledge and real-world application. This experience provided valuable insights into offshore drilling operations, equipping participants with practical skills and a deeper understanding of industry challenges.



Student Chapter

Billal Aslam,

King Abdullah University of Science and Technology

*Ph.D. Student, Energy Resources and Petroleum Engineering
President, SPE KAUST Student Chapter*



WHAT DOES SPE MEAN TO YOU?

SPE is important to me for several reasons. Firstly, it's a place where professionals from the energy industry can meet and exchange ideas that transcend geographical boundaries. These interactions with visionary individuals help shape the industry as we see it today.

Additionally, engagement with SPE has instilled in me a sense of responsibility and pride in my profession. SPE's mission has always been to advocate for the advancement of technology while promoting an understanding of the oil and gas industry's role in the energy transition and global economy. Through SPE, I found a supporting community that strives to achieve this important mission through innovation and collaboration.

In essence, SPE is not merely about personal or professional growth but about contributing to an industry vital to global development and sustainability.

HOW HAS SPE INFLUENCED YOUR JOURNEY AS A STUDENT AND IMPACTED THE BROADER UNIVERSITY COMMUNITY?

My involvement with SPE as an undergraduate has profoundly shaped both my personal development and my contributions to the university community. My engagement began when I helped organize the student paper contest for the Asia Pacific regional qualifier. This role was my first real leadership experience, where I

learned to lead and collaborate with others effectively, and it was here that I first connected with many inspiring individuals.

Attending various SPE conferences further has also enriched my professional journey. These events provided invaluable exposure to industry leaders and offered a platform to showcase my research, enhancing my professional network and boosting my confidence.

Beyond personal growth, SPE has significantly impacted the broader university community by bridging industry and academia. Through guest lectures, workshops, and collaborative projects facilitated by SPE, our students have gained direct access to practical industry knowledge. This integration of real-world challenges and solutions into our academic curriculum has enhanced our educational experience and prepared a more informed and skilled generation of future engineers. These initiatives have brought a more engaged university community, reading to make meaningful contributions to the energy sector.



جامعة الملك عبد الله
للعلوم والتقنية
King Abdullah University of
Science and Technology

WHAT ARE YOU LOOKING FORWARD TO IN THE FUTURE?

Looking forward, I am excited about the opportunities to further enhance collaboration between the SPE KAUST Student Chapter and SPE-KSA, aiming to make a significant impact on the evolving petroleum industry. Our industry is at a crucial juncture, facing challenges and opportunities as it moves towards more sustainable energy solutions. I plan to leverage the extensive network of expertise and resources available through SPE to drive innovation and address these grand challenges.

Additionally, I aim to continue facilitating our student members' career aspirations and promote a more diverse and inclusive industry through the events we organize at the SPE KAUST Student Chapter. We plan to enhance our impact by hosting technical workshops, inviting industry-leading speakers, and organizing field trips for practical industry exposure. These initiatives will provide valuable insights and experiences, enriching our members' educational journey and professional growth.

SPE will continue to play a crucial role in shaping the future of our energy industry and its professionals, and our student chapter is committed to actively supporting this mission.

Quotes from students:

"Joining SPE KAUST Student Chapter has profoundly enriched my academic and career journey within the Oil and Gas industry. Through seminars, workshops, networking events, and social activities, SPE has not only expanded my knowledge in Energy Resources Engineering but also connected me with a diverse community. I am grateful for the growth opportunities that SPE provides and eagerly anticipate contributing further!"



DEA VALLERIE OEMAIYA

PUBLIC RELATIONS CHAIRPERSON, SPE KAUST STUDENT CHAPTER,
PH.D. STUDENT, ENERGY RESOURCES AND PETROLEUM ENGINEERING

"SPE-KSA's technical seminars and distinguished lectures, featuring world-leading experts from industry and academia, serve as a remarkable source of inspiration for my research and early career. Moreover, the field trips organized by SPE-KSA provide invaluable hands-on experiences and practical insights directly from the field, enriching my academic and professional journey. Finally, being an active member of SPE-KSA has afforded me unique networking opportunities and personal exposure, further enhancing my growth and development in the field of petroleum engineering."



MARTIN HOECHERL

TREASURER, SPE KAUST STUDENT CHAPTER
M.S. STUDENT, ENERGY RESOURCES AND PETROLEUM ENGINEERING

"Being a part of the SPE KAUST Student Chapter has been instrumental in shaping my university experience, providing me with a sense of belonging and purpose. From organizing impactful events to participating in leadership development workshops, every interaction within the society has contributed to my holistic development, equipping me with the skills and resilience needed to navigate the complexities of both academic pursuits and professional endeavors, empowering me for the journey ahead."



REENAL FAYSAL

EVENT PLANNING CHAIRPERSON, SPE KAUST STUDENT CHAPTER
PH.D. STUDENT, ENERGY RESOURCES AND PETROLEUM ENGINEERING



KFUPM Success at the 100th SPE Annual Technical Conference and Exhibition

The College of Petroleum Engineering and Geosciences at King Fahd University of Petroleum and Minerals (KFUPM) showcased its excellence at the SPE International Student Paper Contest during the 100th SPE Annual Technical Conference and Exhibition in New Orleans, LA, from September 22-25, 2024.

OUTSTANDING ACHIEVEMENTS

The event gathered top talent from around the world, with KFUPM participants winning 2nd Place internationally and being recognized for 1st Place in the MENA Region in both the Master’s (MS) and Bachelor’s (BS) divisions.

MASTER’S DIVISION

Abdelaziz Elyasa
Master’s student at KFUPM

Presentation Title: “Thermochemical Fluids Dual Benefit: Enhancing Hydrocarbon Productivity on Organic-Rich Shale and Liquid Loading Removal from Gas Wells.”

BACHELOR’S DIVISION

Mohammed Alyousef
Production Engineer at Saudi Aramco’s Northern Area Production Engineering Department

Presentation Title: “Development of Stabilized SiO2 Nanoparticles-Based Formulation for Robust Hybrid Enhanced Oil Recovery.”

PARTICIPATING UNIVERSITIES

The conference featured a diverse range of participating institutions, including:

MS Division: University of Texas at Austin (USA), Stanford University (USA), University of Tulsa (USA), Danish Technical University (Denmark), Nazarbayev University (Kazakhstan), Santa Catarina State University (Brazil).

BS Division: Texas A&M University (USA), Indian Institute of Technology (India), Sukhoi State Technical University (Belarus), University of Ibadan (Nigeria), Institut Teknologi Bandung (Indonesia), Montanuniversität Leoben (Austria), North Fluminense State University (Brazil).

Through these achievements, KFUPM continues to demonstrate its leadership and commitment to innovation in the field of petroleum engineering and geosciences.



SandRose Reviews

In this issue of SandRose Reviews, we delve into the dynamic theme of resilience. This force shapes extraordinary moments and journeys, from the high-speed world of Formula One to the strategic maneuvers of corporate acquisitions. Whether you prefer reading a book, watching a documentary, or listening to a podcast, we hope you gain a new perspective on the power of tenacity and perseverance. Check out our top picks below!

For future editions, we will be taking 'Recs from our Readers,' if you'd like to submit your reviews, send them to SandRose (sandrose@spe-ksa.org) for a chance to be featured.

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



FAISAL ALDUGHAITHER The Intelligent Investor

The Intelligent Investor by Benjamin Graham is a foundational read in value investing, renowned for its timeless wisdom on investment principles. Graham advocates a disciplined approach, focusing on a stock's true value over market trends, and emphasizes patience and resilience for long-term success. He distinguishes between investing and speculation, guiding readers through financial markets with clarity. His concept of a "margin of safety" provides a protective buffer against unforeseen risks, relevant even in today's volatile market. Accessible to both beginners and experienced investors, the book includes practical tips for personal investment journeys. The success of Graham's followers, like Warren Buffett, highlights the book's lasting influence on modern investment philosophy, making it essential for anyone seeking to build a solid financial foundation.

Film



MONEERA ALSHARIF The Bucket List

The Bucket List is a film that balances humor with themes of friendship, mortality, and the pursuit of dreams. Starring Jack Nicholson and Morgan Freeman, it follows two men facing terminal illness who decide to break out of the hospital and fulfill items on their bucket list. The chemistry between Nicholson and Freeman is beautiful, blending charm and grounded presence that makes their journey relatable. The cinematography beautifully showcases stunning locations, while the film's poignant moments prompt reflections on life and what truly matters. Although the plot is familiar, the emotional journey inspires viewers to cherish their own lives and dreams, reminding us to live life to the fullest.

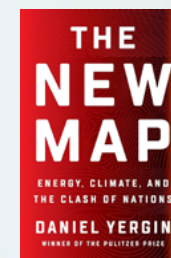
Podcast



SHAIKHAH ALTHUWAIQEB On Purpose

On Purpose is a podcast hosted by Jay Shetty that delves into the human experience, focusing on mindfulness, relationships, and personal growth. Jay's calming voice and storytelling create an engaging atmosphere, making listeners feel like they are having tea with a wise friend. Each episode features interviews with thought leaders, celebrities, and everyday people, drawing out authentic conversations that resonate personally. His emphasis on purpose and intentional living inspires listeners to reflect on their journeys. With relatable insights and practical tips, On Purpose serves as a source of motivation and a reminder to live with intention. If you're seeking inspiration and practical advice, it's definitely worth a listen!

Books



The New Map by Dan Yergin

The New Map is a compelling read that reshaped our understanding of the evolving energy landscape. Daniel Yergin unpacks the geopolitical, technological, and economic shifts redefining the world's energy future. What stood out most was how the book connects historical energy trends to today's challenges, showing how nations and industries must navigate a rapidly changing environment. One key message is that energy is not just a resource—it's a driving force behind global power struggles, economic policies, and climate strategies. Yergin challenges the idea of a single, clear-cut energy transition, instead presenting a nuanced view of a fragmented and competitive race toward a new energy order. He explores U.S. shale production, China's energy dominance, Russia's geopolitical influence, and the push for renewables, showing how these forces shape global markets. What I appreciated most is how The New Map avoids extremes, offering a balanced perspective on the complexity of the energy transition. It's not just about replacing one source with another but understanding how policies, markets, and innovation intersect. If you want a book that blends history, politics, and economics into an engaging narrative, this is a must-read. It's an excellent resource for understanding the challenges and opportunities shaping the future of energy and finance.

Documentary



Switch On: Power the People

Switch On is an eye-opening documentary that explores the global energy divide and the urgent need for sustainable, accessible power. Featuring Dr. Scott Tinker, the film shifts focus from broad energy policy discussions to real-world communities, highlighting how energy access transforms lives in ways we often take for granted. One of the documentary's key messages is that billions of people still live without reliable electricity, impacting not just comfort but also critical areas like healthcare, education, and economic growth. Switch On takes viewers across rural villages, urban centers, and off-grid communities worldwide, showcasing innovative solutions—solar microgrids, hydro projects, and clean cookstoves—that are helping to close the energy gap. The documentary underscores that energy poverty is one of the most pressing yet overlooked humanitarian challenges, directly affecting economic mobility and quality of life. What stood out to us most was how the film balances technology, policy, and human stories, offering a nuanced perspective on energy poverty. It avoids oversimplified narratives, instead emphasizing the importance of localized approaches, investment, and energy education in driving real change. If you're looking for a documentary that connects global energy challenges with human impact, Switch On is a must-watch. It's an inspiring, informative film that sheds light on the real stakes of energy accessibility and why sustainable solutions matter—not just for the environment, but for people's daily lives and futures.

Podcasts



Odd Lots

Odd Lots is a stimulating podcast for anyone interested in global markets, finance, and economic trends. Hosted by Bloomberg's Joe Weisenthal and Tracy Alloway, the show dives deep into the forces shaping the global economy, from central bank policies to commodity markets and emerging financial innovations. What sets Odd Lots apart is its unpredictability and breadth—one episode might explore the intricacies of U.S. monetary policy, while the next delves into the future of energy markets or the economics of lithium mining. The hosts bring in top-tier experts, investors, and policymakers, creating a mix of high-level analysis and accessible storytelling. One of the podcast's biggest strengths is its ability to connect complex economic concepts to real-world implications. Whether discussing inflation, supply chain disruptions, or the role of oil in global finance, Odd Lots makes macroeconomic trends engaging and relevant. It also doesn't shy away from contrarian takes and deep historical context, which adds depth to discussions often dominated by surface-level financial news. If you're looking for a podcast that blends sharp analysis with engaging conversations, Odd Lots is a fantastic choice. It's an insightful listen for professionals and casual economic observers alike, helping to make sense of the ever-evolving financial and energy landscape.



Sandrose Readers' Lens



IN THIS SECTION, WE PROUDLY SHARE PHOTO SUBMISSIONS FROM OUR VIBRANT COMMUNITY, BEAUTIFULLY ENCAPSULATING THEIR REMARKABLE TALENT FOR CAPTURING MOMENTS THAT RESONATE WITH THEM

"Gliding through the heart of Riyadh, the KAFD station stands as a symbol of modernity and movement."

– Yasser Alomari, Photographer

Follow Yasser on Instagram @yys.ibra

ISO 200

AUTO

ISO 50

ISO 100

ISO 200

ISO 400

ISO 800

ISO 1600

ISO 3200

DIAMOND



PLATINUM



GOLD

HALLIBURTON



