Microsoft Energy Core

Special Report

Industry Board Meeting - Q1, 2021

Key Takeaways: *How to Address the Energy Industry's Top Digital Challenges in a Post-Covid-19 World?*

Contents

Disclaimer: The quotes highlighted in this Special Report are not verbatim.

Chapter 1:
Executive Summary

What is the surprise silver lining of the last year, one which has marked the greatest global disruption since World War II? That it has unlocked many and long-stymied opportunities – notably in sustainability and digitalization.

Despite the uncertainty sparked by Covid-19, volatile commodity prices, and the worst economic strain since the 1930s, there has been a clear acceleration in innovation across multiple sectors and technologies in the energy industry. Some were already gaining pace, but many urgently needed a boost in momentum – and the last 12 months have certainly delivered.

The character of the oil and gas industry in the 21st century will be entirely different to that of the previous 100 years – that is one certainty we can all bet on.

Your new identity?
The character of the oil and gas industry in the 21st century will be entirely different to that of the previous 100 years – that is one certainty we can all bet on. Consumers' rising appetite for a lower carbon future, propelled by governments' ever-ambitious policies and regulations, means that adaptability is more important than ever. In no way does this dismiss the value of fossil fuels up to 2050 at least, but it does mean we must craft a more diversified energy basket, a new wave of collaborations,

and a new type of learning. The pressure is undeniably on. Aside from governments and companies' net zero targets – the vast majority of which have emerged in the last year – the likelihood of peak oil by 2030 means fossil fuel companies must rapidly divert their route from a looming cliff edge.

Golden ally?
A large part of this burgeoning appetite and need for increased innovation is being met by the digital tools of the 4th Industrial Revolution (4IR) – a cornerstone in the global energy transition. Without digital tools being able to provide in-depth and real-time reporting and analyses, the vast volume of change needed to hit 2050 climate goals will simply not happen. More and more, this fact is being accepted

and acted upon. More than two thirds (77.3%) of Chief Information Officers recognized digital transformation as their number one budget priority going forward, according to the CIO Outlook for 2021 Survey.

One of the many areas to explore is how digitalization can bolster the growth of common energy platforms and innovation into established and new markets, like oil, gas, green hydrogen, and green fuels. These points, and many more, are explored in this Special Report. Collectively, we must tick three non-negotiable and demanding boxes: energy security, environmental progress, and economic robustness. As the climate clock ticks ever louder and a pandemic-shaken world slowly regains its footing, how best to spur progress in 2021?

What is Microsoft Energy Core?

A global initiative and center dedicated to digital transformation in the energy sector. Building on AI and cloud-based technologies, Microsoft Energy Core supports organizations to develop AI solutions that improve operational efficiencies, enhance sustainability, increase energy innovation, and drive workforce transformation. Based in Dubai, Microsoft Energy Core has global scope.

Source of Special Report

This focuses on the exclusive insights harvested from Microsoft Energy Core's webinar on the 17th March 2021. Its pressing questions on what is next for global trends and challenges reflect the opinions and brainstorming of the 26 high-level executives who dialed in from ten countries on three continents – the Middle East, Europe, and Asia. The Chatham House Rule applies, bar those featured.

Without digital tools being able to provide in-depth and real-time reporting and analyses, the vast volume of change needed to hit 2050 climate goals will simply not happen.

Founding partners

Microsoft Energy Core's Protocol of Engagement

- Microsoft Energy Core's industry board agrees to collaborate and exchange knowledge to accelerate innovation and digital transformation in the energy sector.

- Microsoft Energy Core's industry board members will attend quarterly meetings to establish an industry challenge to solve for using AI (see page 5). The identified challenge will move onto the ideation phase of the Center's integrated strategy where solutions will be brought to life through hackathons.

- Microsoft Energy Core Industry Board Members will be elevated as 'Featured Speakers' on a rotating basis for each quarterly board meeting.

- Microsoft Energy Core's industry board members will deploy at least one representative from their respective institutions to each hackathon to bolster the Center's posture and commitment to advancing digital transformation in the energy sector.

- Microsoft Energy Core's industry board will commit to qualify at least one minimum viable product that emerges from each hackathon and assess its viability to be deployed in a working environment. If the pilot phase of a minimum viable product proves to be successful, Microsoft Energy Core's industry board will strive to support further incubation and establish a strategy towards scaled roll out.

- Each quarter, Microsoft Energy Core's industry board members will deploy one representative from their respective institutions into the AI Academy to conduct a lecture on the practical applications of AI and the digital skills necessary for the future of work in the energy sector.

Accelerate Digital Transformation
31 Partners & 115 AI Solutions

Meeting new targets

Fossil fuels will remain an essential part of the energy mix, and it is on the industry to manage production safety to reduce emissions, discharges, and the ecological impact, while providing energy at a reasonable cost. In addition, companies face complex investment challenges due to the extreme price volatility and cruel operational environment of exploration and production (E&P). Proper detection, reporting and analysis mechanisms are considered key enablers of sustainable development at the oil and gas company level.

GHG emissions from oil and gas operations, especially methane, pose a critical challenge for the industry as it receives more and more scrutiny from investors, government, and the public, all of whom are demanding ambitious reductions. There are several key GHGs, such as CO_2, NO2, SO2, N2O and CH4 (methane) releases, emitted by the oil and gas industry, especially refineries and petrochemical operations. Methane is responsible for 25% of global warming, with over a third of such emissions from oil and gas. All these emissions are calculated as CO_2e (carbon dioxide equivalent). Detecting GHG emissions and leaks has been difficult due to technical, logistical, and cost limitations.

Energy Core Hackathon & Winners

Methane Tracking using **Satellite Imagery** towards containing its Environmental Impact – V2
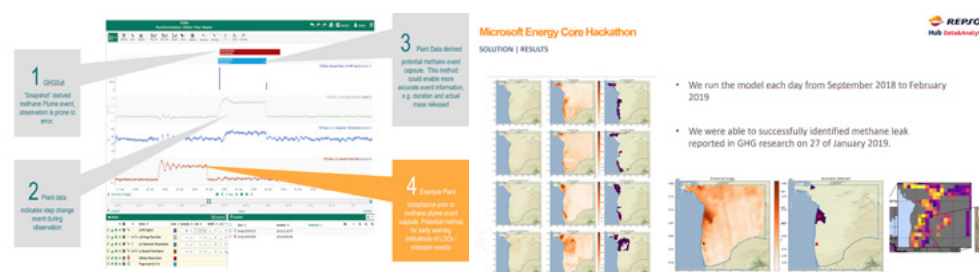
» ■ **21 participants**
■ **4 teams**
■ **2 coaches + 4 SME's**

» **7 days delivery**

## 3 Finalist Teams | Shell, Repsol & team Sayat

Evaluation Criteria

- • *Use of Technology*
- • *Cleansing the data*
- • *Identify leak source asset*
- • *Identify time of leak*
- • *Identify Volume of leak*
- • *Use of Multiple satellites*
- • *Data sources correlation*
- • *Integration of weather data and Process data.*

Hackathon winner – Team Shell

THE TEAM

- • **David Randell,** *Statistician*
- • **Matthew Jones,** *Statistician*
- • **Ross Towe,** *Statistician*
- • **Emma Ross,** *Statistician*
- • **Rutger IJzermans,** *Senior Engineer Co_2 Abatement*
- • **Richard Eyers,** *Principal Scientist Remote Sensing-Methane*
- • **Bas van de Kerkhof,** *Data Scientist*
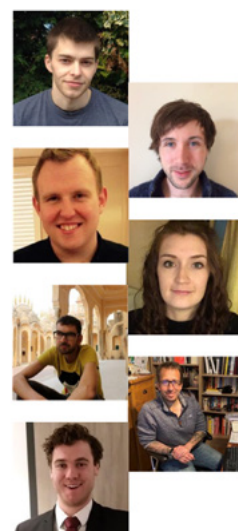
Gamechangers?

However, existing, and upcoming emissions tracking satellites (e.g. GOSAT-2, Tropomi, GHG Sat, Bluefield, EDF methane SAT) offer a breakthrough towards precise, timely, and affordable detection on a large scale. The data these satellites can capture is relatively new and could be enhanced by applying AI and machine learning models.

Precise and scalable methane monitoring via microsatellites is a promising new technology, which will make it possible to monitor methane and other GHG releases. As with any new technology, there are limitations in terms of coverage, visibility to satellites, and front-loaded cost. However, such limitations are likely offset by the potential benefits expected.

The Energy Core: A Global Facility and Initiative

Harnessing the power of AI, cloud technologies and the IoT, organizations can transform their businesses, increase productivity, drive innovation and run more efficient and sustainable operations.

Program anchors on 4 key pillars:

1 Empowering Digital Transformation	**2** Coalitions for Responsible Innovation	**3** Closing the Skills Gap & Enhancing Employability	**4** Sustainability & Societal Impact
Building on AI and cloud-based technologies, Microsoft Energy Core supports organizations to develop AI solutions that improve operational efficiencies, enhance sustainability, increase energy innovation, and drive workforce transformation.	Microsoft Energy Core is an open initiative that incorporates energy operators, leading industry partners and academics to lead responsible innovation across the energy value chain.	Energy Core showcases Microsoft's investments in AI skilling, complemented by contributions from leading universities, educational institutions, and industry partners to deliver AI readiness programs tailored for the energy sector.	Microsoft Energy Core has a mandate to create societal impact. Together with our partners, we are pursuing innovative solutions to solve the energy industry's most pressing issues on worker safety and environmental sustainability.

Energy Core Industry Board

Thought Leadership and Responsible Innovation

The Industry Board convenes quarterly to identify top of mind challenges to solve for using AI.

- ■ **12x Global Energy Operators**
- ■ **3x Academic Institutions**
- ■ **10x Founding Technology Partners**
- ■ **1x Industry Body**

Decarbonization Journey:
What to watch closely in 2021?

By Alex Robart, Energy Industry Strategy Leader, Microsoft

30 years. That is how long we have to transition our entire energy system – one that has been crafted for more than a hundred years. It is understandable why some companies are overwhelmed. There are going to be winners and there will be losers, but there are opportunities for growth – for everyone.

The big question is: how do we achieve the net zero goals that many governments and companies have announced in the last year? Not simply is the first point, because there are many different pathways to decarbonization. The reality is that we must execute most of them in order to hit the deadline, which means overhauling our economic, energy, and environmental norms, so efforts must accelerate immediately.

NET ZERO?
As well as significant progress in Europe, we are seeing a particular wave of net zero commitments from the US over the last couple of years. Approximately 70% of the top 30 utilities have set net zero goals by 2050 in some form. It will be interesting to see how these play out in terms of operational effectiveness. Now we are also starting to see net zero targets emerge from Asia. This is an unfolding story, so many more twists and turns will emerge this year.

THE TWO ES
Within this broader picture of net zero goals and sustainability is the need to address energy. The message is simple: the more you reduce energy consumption, the easier and the cheaper it is to transition to a low carbon future. The good news is that there are already a huge number of efficiency-oriented investments, such as the growth of the renewables market and research and development (R&D) into more environmentally friendly batteries. But this is just one route – there are a whole bunch of other options that still need exploring and leveraging as soon as possible.

WHAT TO WATCH?
The development of the electric vehicle (EV) market is one, with more companies moving into EV charging infrastructure, piggybacking on their existing fuel retail networks. It will also be interesting to see if some big players in the US execute strategies that are similar to what the Europeans have been doing. There is also the much-needed rise of carbon capture and storage (CCS), with this technology attracting more and more investors. Plus, the oil and gas industry must cut the carbon intensity of its current supply base as well as commission their new projects based on carbon intensity – such considerations must be seamlessly woven into the decision-making process. Again, there is good news: these technologies and many others that can facilitate this positive disruption already exist. What does this mean? We are far from starting from scratch.

TOUGH BUT INEVITABLE
Honing in on the 'hard to reach' areas may be difficult, but it is inevitable if the decarbonization goals are to be realized. Huge progress has already been made in the power markets, so the next steps must address cutting coal consumption, for example. How this will play out in Asia remains a question mark right now, but it is paramount that progress is made. Among other areas of focus, progress must also be made in agriculture and in other land uses, as these are significant contributors to CO_2 emissions.

OUR APPROACH?
Microsoft is taking a multi-modal stance when it comes to data acquisition and we see a multi-data source aggregation and reconciliation problem that needs solving. This is an area that we are focusing our energy on, which means building an underlying data layer to help companies integrate different data sources. And then do consistent analysis on top of that. We are also working to enhance the digital grid infrastructure.

WELCOME ALLIES
To truly close the gap between longer-term aspirations and the near-term substantial concrete efforts, we must all partner more deeply within our ecosystem. This includes more meaningful engagement with every part of the value and supply chain, including with all our customers. The cliff we must collectively climb to reach the 2050 goals is incredibly steep; we must help one another to make it to the top safely, sustainably, and profitably. It is time for all hands on deck.

Our CO₂ Journey: Progress Report?

Microsoft's pledge to be carbon negative as a company by 2030 is well underway. Each step is also building the foundation for its 2050 goal to remove from the environment all the carbon that it has emitted directly or through electricity use since the company was founded in 1975.

ONE YEAR IN
In the first year since announcing this pledge, Microsoft's carbon emissions have been reduced by 6% - roughly 730,000 metric tonnes. The company has also purchased the removal of 1.3mn metric tonnes of carbon from 26 projects around the world and it is committing to transparency by subjecting the data in its annual sustainability report to third-party review by the accounting firm Deloitte. Microsoft is also increasing accountability by including progress on sustainability goals as a factor in determining executive pay, starting with the next fiscal year. The company has now published its most comprehensive sustainability report, which not only reviews its commitment to being carbon negative, but also its route to becoming water positive. Plus, it details how to achieve zero waste and how to create a "planetary computer" to gather data to improve the world's biodiversity.

UNITING EFFORTS
Partnerships are a key pillar to achieving Microsoft's 2030 and 2050 goals. These include a three year-old partnership called Northern Lights with the Norwegian government, Equinor, Shell and Total to standardise and scale up CCS in Europe. Microsoft has also signed individual and strategic partnerships with Total and bp to further digital transformation and support progress towards net zero emissions, as well as a five-point plan with professional services company Accenture to help accelerate the UK's net zero goals by 2050.

SURVEYS: What is next?

Intensely disruptive was a fair description of 2020, but it was also a year of undeniable acceleration in innovation across multiple industries and technologies.
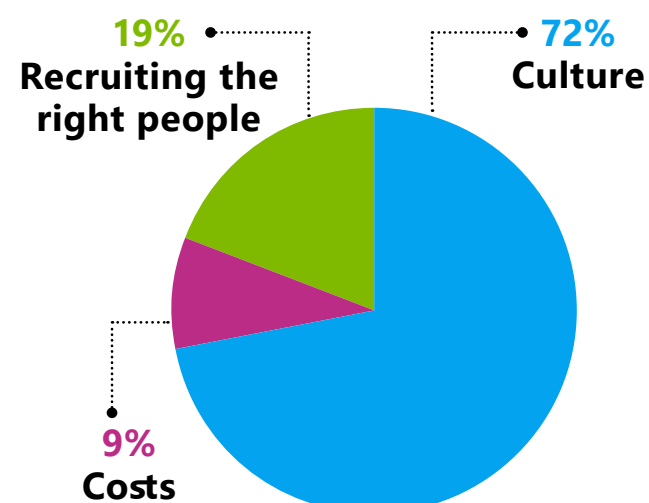
4% Disagree
96% Agree
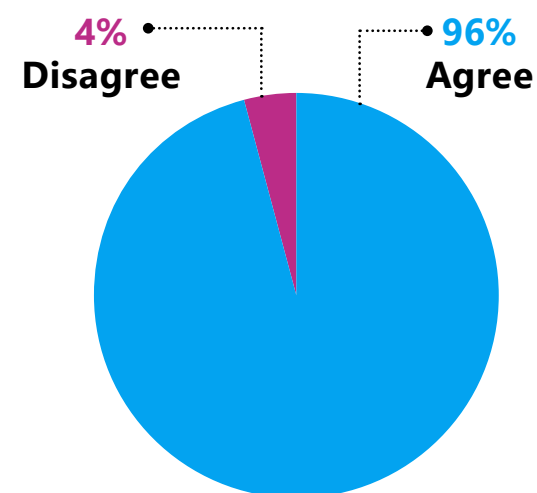
Which of the following digital tools will have the biggest impact in bringing sustainability to scale?

5% Remote sensing and satellite imagery
51% Artificial intelligence
44% Big data analytics
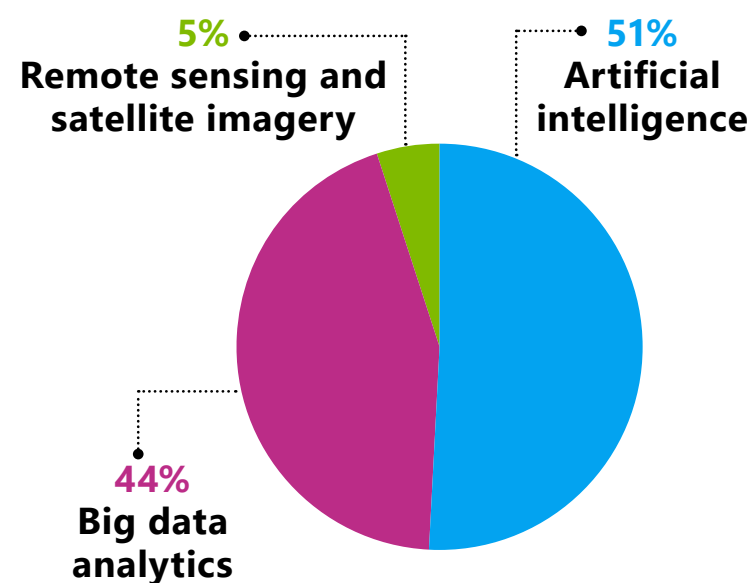
What are the main challenges that energy companies face today in adopting digitalization?

19% Recruiting the right people
72% Culture
9% Costs

Alignment between industry and academia must urgently be improved to deliver an innovative energy ecosystem that fosters a digitally enabled workforce.

6% Disagree
94% Agree
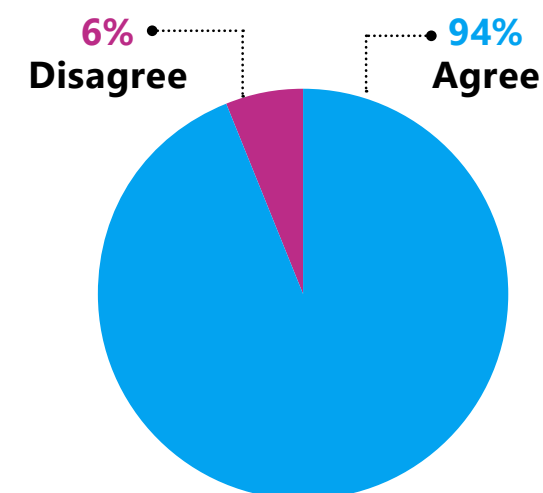
A successful energy transition can only occur if there is full collaboration across the energy value chain, from oil and gas companies to utilities, and renewable energy firms.

0% Disagree
100% Agree
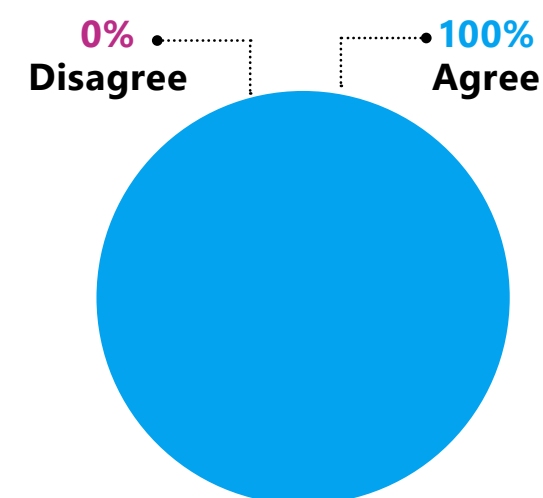
Companies that aspire to build an agile workplace founded on digitalization must first establish a culture of innovation within their organization.

5% Disagree
95% Agree
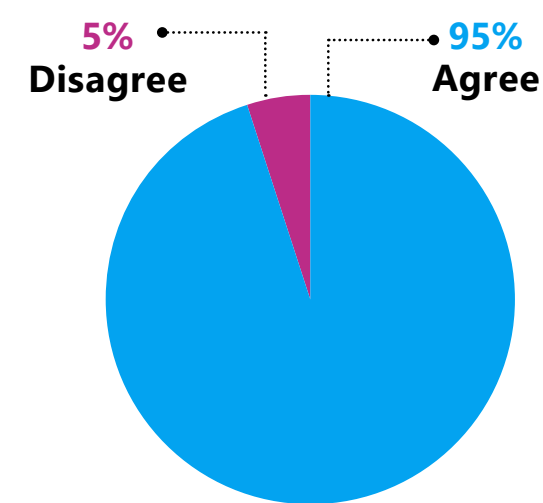
Chapter 2: Climate & Sustainability

Top digital actions to cut industry's carbon footprint in 2021?

- Ahmed Hashmi, Chief Digital Officer and Technology Officer – Upstream, BP
- Enrique Fernandez Puerta, Digitalization and IT Architecture & Strategy, Repsol
- Sebastien Grau, VP Middle East, Turkey & Africa, Rockwell Automation
- Alex Robart, Energy Industry Strategy Leader, Microsoft

Moderator: Sean Evers, Managing Partner, Gulf Intelligence

INSIGHTS

Digital tools are the much-needed grease for the sticking points that oil and gas majors are facing in their decarbonization journeys. Fossil fuel operators aiming for a net zero status – a recently announced and much-lauded goal for many entities – face a complex journey. This means weaving carbon monitoring tools and insight into every part of the supply chain.

This is not a simple process, but digital advances can play a key role by bettering the measurement, tracking, and validation of CO_2 emissions via real-time services, for example. In turn, this dramatically improves overall decision-making processes and helps reduce CO_2 footprints. In short, digital tools can make processes faster, safer, and stronger – a triple win for an industry in a transformative chapter. The economic argument is also increasingly sound. Every US dollar invested in building climate resilience could result in between $2-$10 in net economic benefits, according to the Global Commission on Adaptation (GCA). Especially amid the 'lower for longer' oil prices, such returns will become increasingly coveted. Against this backdrop, investing in digital tools to support sustainability goals is not a choice, but an economic inevitably.

"The dirty secret in net zero commitments is that most companies don't actually know how they will deliver them. They know how to get 20% or 30% of the way there over the next decade, but the 70% that needs to follow over the 20 years after that...that is another question. Engineers must be encouraged to step beyond what they're comfortable with. So, leadership is the most important factor."

Alex Robart, Energy Industry Strategy Leader, Microsoft

"Getting to net zero across our operations will require weaving carbon information and insight into everything we do – that is where digital plays a huge role."

Ahmed Hashmi, Chief Digital Officer and Technology Officer – Upstream, BP

TOP TAKEAWAYS

LESSONS FROM TEXAS?

The ice storm that brought Texas' energy infrastructure to its knees in March this year must serve as a learning moment for all energy stakeholders. Once the political wrangling passes, there should be recognition that all energy infrastructure needs more investment, not just renewables, and that updating digital infrastructure will significantly support real-time engagement and risk mitigation. This is a pressing point, for the acceleration of climate change means the chances of such high consequence weather events could be more regular and more random. Improved management, including the use of digitalization, is essential to avoiding further damage.

THE 'P' WORD

The importance of digital partnerships has been extensively mentioned over the last year, and for good reason: they are critical to achieving sustainable and innovative change for companies of all sizes. For example, BP is partnering with several companies, including Microsoft, to achieve its sustainability goals. Digital tools are essential to building confidence in this new energy norm and successfully quantifying progress, therefore encouraging others to accelerate their progress. It is encouraging to see that the gap between operational technology (OT) and information technology (IT) is increasingly narrowing, and that small and medium-sized enterprises (SMEs) are demonstrating greater and more ambitious transformations. Unfortunately, many still need greater access to financing to truly maximize their digital potential in the energy industry, and in turn, their positive influence on sustainability.

TEST YOUR THEORY

Being able to roll out a practice run of a new energy-saving theory or risk mitigation approach via a digital twin is invaluable. A company with production optimization as a goal – arguably this should apply to every entity – is able to use a digital twin to test both the environmental and operational readiness and applicability of their goals. This essentially means hitting 'two birds with one stone', saving time and money – two critical ingredients to bolstering efficiency in the energy transition. Of course, there is

9% of all human-made greenhouse gas (GHG) emissions are generated by the oil and gas industry. Plus, it produces the fuels that create another 33% of global emissions, according to McKinsey.

3.4 gigaton reduction in CO_2 equivalent a year by 2050 is needed by the oil and gas sector, compared with business as usual, details McKinsey – representing a 90% cut.

$2-$10 is net economic benefit for every US dollar invested in building climate resilience, according to the Global Commission on Adaptation (GCA).

still a long way to go, not just for the scale-up of digital twins, but for all technology-based solutions. Approximately 40% of the cumulative emissions reductions rely on technologies that have not yet been commercially deployed in mass market applications, warned the IEA.

DON'T FORGET THE CUSTOMER

While we focus on finance, technology, and industry's needs, we cannot forget a crucial ingredient in an effective and profitable decarbonization journey: customers. They must become a part of

"One plus one can equal three! The value of merging the expertise of SMEs is one route to making this transformation possible."

Sebastien Grau, VP Middle East, Turkey & Africa, Rockwell Automation

"We must make our customers part of the solution."

Enrique Fernandez Puerta, Digitalization and IT Architecture & Strategy, Repsol

the solution to ensure a holistic digital approach, which is understood by the entire value chain. This lies at the heart of an effective transformation. Part of this also means companies better understanding customers' behaviors and the alternatives they have, instead of adding reams of new services with the hope of hitting the right spot.

WE STILL NEED A PRICE ON CARBON

This old conversation has a new injection of urgency. Putting a price on carbon is essential to enabling and improving investment decisions in energy and every industry and sector. Without price

signals integrated into middle-level business decisions, it is very difficult to reach sustainability and net zero goals. But making this a reality is complex and requires digital tools – AI, big data, IoT, predictive analytics, and more – to make real-time reporting, verification, and trading, to say the least, a reality. As an interim solution to fill a frustrated void, some companies have created their own carbon pricing mechanisms, incorporating them into operational, investment, and compensation schemes. But this is not a long-term solution; there must be consistency across the energy industry at least, if not all industries worldwide. Currently, some 40 countries and more than 20 cities, states, and provinces already use carbon pricing mechanisms, with more planning to implement them, according to the World Bank. Together, the carbon pricing schemes cover about half their emissions, which translates to just 13% of annual global greenhouse gas (GHG) emissions.

Chapter 3: Technology Adoption

Top actions to educate energy stakeholders on scaling up innovation and the adoption of new digital tools in 2021?

- James Wimbury, Resources (Oil, Gas & Petrochemicals) Lead – Saudi Arabia, Accenture
- Dr. Joseph Estep, Senior Business Relationship Management Analyst - Innovation & Commercialization, Chevron
- Trygve Randen, President, Software Integrated Solutions, Schlumberger
- Vladimir Krdzic, Group Chief Digital Officer, Petrofac
- Ali Faramawy, Corporate Vice President, Digital Transformation, Microsoft

Moderator: Sean Evers, Managing Partner, Gulf Intelligence

INSIGHT

There is a difference between knowing something and doing it. Industry has long known that improving assets and reducing expenses are made considerably easier with the help of digital tools, leveraging the ability to quickly analyze years of data across systems and equipment types. It has long been common knowledge that digital solutions give energy stakeholders the power to predict and prevent operational issues, reduce downtime, and boost overall asset performance and life. And yet, many still have not done it. Why? Because such a transition needs guidance and support. It is not a 'flick-of-a-switch' operational change, but a deep-rooted overhaul of a company's status-quo. Covid-19, however, has accelerated parts of companies' journey. For many, it has triggered a surprise cultural and operational shift that has, in turn, made many companies that were previously fearful, complacent, or reluctant embrace digital technologies far more eagerly. And so, the industry-digitalization relationship is entering a dynamic chapter. But industry is a long way off the finish line; there is much more to do to ensure economic, environmental, and energy security.

"What's in it for me? And how do I use it? These and other key questions around innovation and tech adoption will need answering."

**James Wimbury,
Resources (Oil, Gas & Petrochemicals)
Lead – Saudi Arabia, Accenture**

"Data and people: these are key to unlocking and empowering your workforce and your data. The best route is to remove barriers and close knowledge gaps."

Dr. Joseph Estep, Senior Business Relationship Management Analyst - Innovation & Commercialization, Chevron

TOP TAKEAWAYS

4 STEPS TO ADOPTION?

Firstly, keep awareness in mind – what is changing, why, and what this big change will mean for people.
Secondly, you must answer this question for stakeholders and users will ask this question: what is in it for me? The answer is going to be different for every person. The third step is around adoption: how do I use it? One delegate referenced how his father looked at a mobile phone for the first time as if it were "alien hardware". And finally, the importance of commitment. Asking what keeps people motivated to continue with change, and to continue to innovate in order to push forward.

IDENTIFY INTERNAL ALLIES

As leaders, you are often not the closest person to the most pressing problems. So, it is critical to provide grassroot contributors with the capabilities and a common set of tools to both create innovative solutions for challenges, as well as to communicate the issue effectively up the chain. With skilled staff established in different segments of a business, they must be able to work together in a compatible manner, both horizontally and vertically.

TALK EQUALS ACTION

Industry-to-industry collaboration is at a peak and there is a common understanding that not a single company, university, nor government can achieve digitalization alone. It is important to leverage a combination of subject matter experts in their fields, be they technologists, data scientists, or cloud solution architects, for example, from major corporates or SMEs. Curating this ecosystem is essential for knowledge-sharing, which in turn forms the crux of effective collaborations. And effectiveness is critical to commercializing a product or service. One delegate referenced public data from the Norwegian government saying that just 30% of AI projects are at a pilot stage, whereas less than 10% have been deployed. Getting the 'right brains in front of the right projects'

"Companies and organizations who're going to be able to bridge the knowledge gap together will proceed much faster. Good partnerships are a bit like AI modules in that the more data you have, the smarter you are, and the better your algorithm, which then accelerates your progress further."

**Ali Faramawy,
Corporate Vice President,
Digital Transformation, Microsoft**

$900bn

could be wiped off the value of big oil and gas companies if governments more aggressively attempted to restrict the rise in temperatures to 1.5°C above pre-industrial levels for the rest of this century. That equates to one third of value, according to the FT's Lex. Technology adaption and adoption are critical to remaining relevant.

62%

compound annual growth rate (CAGR) is projected in the global digital twin market, seeing it climb from $2.66bn to $29.57bn in 2020-2025, according to Researchandmarkets.com.

57%

of respondents to a Deloitte survey who demonstrated a higher digital maturity said that data analytics is a "very high" investment priority over the next 12 months. Just 27% with lower digital maturity agreed.

"We've come to a level now in the digital evolution of our industry that just giving an example of a one-off experiment is no longer good enough."

Trygve Randen, President, Software Integrated Solutions, Schlumberger

is also paramount, as many of the decision makers signing off technology and digital projects do not have the right knowledge to truly access the project's value. Essentially, the hand that holds the check book is not aligned with those developing the tools or engaging directly with customers – a burgeoning chasm in understanding that slows progress.

COVID-19 BOOST?

The advanced level of digital connectivity due to remote living and working during Covid-19 has bolstered the level of openness to socialize and partner across different organizations. Increasingly, partnerships that focus on innovation and technology adoption that perhaps would not have happened are now flourishing. This brings much-welcomed diversity as digitalization and the energy transition combined (not to mention the impact of Covid-19) is still relatively unexplored territory.

USE. YOUR. DATA.

Frustration at the poor utilization rate of data continues, with one participant saying he sees an average of just 5% leveraged. Increasingly sophisticated digital tools, such as the IoT and predictive analytics, to name just two, should actually see utilization rapidly rise. Another route to increasing data utilization – coveted gold nuggets of information that are critical for competitive edges, as well as financial and environmental goals – is to improve visibility across the chain and partnerships. Silos still very much exist, each one hindering the

speed of progress and therefore, companies' competitive edge.

BUMP IN THE ROAD

Not all players in the oil and gas market are at the same or similar level of maturity, which is a gap that needs addressing when designing partnerships. Signing up to a digital joint venture (JV) with a partner whose digital know-how is up to a decade behind yours will not help propel your progress. If this occurs, consider whether the dynamic just needs adjusting, rather than abandoning the project altogether. For example, with such a big difference for a digital JV, perhaps seek other areas of expertise in the company, or adopt a training posture. While all companies are on the same global journey of technological and digital evolution, many have yet to cross the starting line while others are surging towards the first pit stop. Accepting this divergence and adapting to it, instead of fighting it, will hasten users' digital fluency overall.

"We had engineers who have worked for 20 years in an office, pretty much tied to their desks. Now, they are fully open to remote work, which would've been unimaginable 18 months ago. The pandemic has pushed the entire digital transformation onto users – and they are accepting it very well."

Vladimir Krdzic, Group Chief Digital Officer, Petrofac

Chapter 4: Energy Innovation Ecosystem

Top actions by Industry-Academia to create an innovative energy ecosystem?

• Dr. Steve Griffiths, Senior Vice President, Research and Development, Khalifa University
• Craig Hayman, Chief Executive Officer, AVEVA
• Sebastian Geiger, Energi Simulation Chair and Director of Research, Heriot-Watt University
• Dr. Vikas Goel, Computational Modeling & Data Sciences Manager, ExxonMobil
• Stasa Podgorsek, Data & AI MEA Business Lead, Microsoft
Moderator: Sean Evers, Managing Partner, Gulf Intelligence

INSIGHTS

Is technology alone enough? Not at all. A supporting ecosystem must be established between industry and academia to help make it effective. This includes collaboratively understanding and crafting business and learning strategies, skilling up and retraining across the board, and driving positive disruption amid management to spur cultural change among students and employees. These, and many more steps, are all supporting pillars to an overarching and innovative energy ecosystem.

It is undoubtedly a tall order, but the historical norms of industry-academia engagement – which have already started to change over the last decade – need a revamp. Communication channels between the two camps are still not seamless, each side finding difficulties when it comes to expectations over the speed and depth of work.

"The skills needed for power generation, distribution, chemical engineering, and petrochemicals are non-trivial skills. Let's not forget those plastic syringes that are doing the job of getting millions of people vaccinated against Covid-19. That alone is a petrochemical process that's been many years in the making!"

Craig Hayman, Chief Executive Officer, AVEVA

"Define a clear challenge that will clearly move industry forward and then there is the opportunity for industry-academia collaboration, which is really the core of robust innovation."

Dr. Steve Griffiths, Senior Vice President, Research and Development, Khalifa University

As the saying goes, you will never learn anything if you do not ask. The good news is that this is exactly what ramped up in 2021: the rate of questions between industry and academia. Each question got industry and academia closer to being able to pin down synergies. This is a large part of the reason that there has been a surge in programs that aim to marry the strengths of both sides. The new possibilities for industry academia digital partnerships also extend beyond knowledge and research collaborations to more commercial partnerships. Traditional education services could be blended with service creation opportunities throughout the energy sector. So, now perhaps the most important question of all in this journey: how to unite these efforts to enact real change over the long-term, permanently changing the identity of industry-academia partnerships?

TOP TAKEAWAYS

CRAFT YOUR TIMELINE
The deep skills that are needed around power generation, distribution, chemical engineering, and petrochemicals, for example, are more time-consuming to obtain. For one, the fundamental processes that come with petrochemicals require engineering at a large scale with varying degrees of heat, raw materials, feedstock and then distribution, to give a simplified snapshot of the process. These are not generic skills, nor are they created quickly. So, industry and academia must work out the timeline of skills needed versus the time it takes to train new talent in order to establish realistic goals.

IS IT INTERESTING ENOUGH?
The brightest minds of tomorrow must be interested in something in order to truly innovate and push the barriers. So, a point for industry and academia to tackle is how to make a challenge in the energy ecosystem engaging and potentially impactful enough to capture the interest of skilled people? This also feeds into innovative endeavors having a positive

and world-enhancing outcome, as many 'thinkers of tomorrow' are increasingly focused on their work addressing goals linked to the UN Sustainable Development Goals (SDGs). There are many embryonic and exciting areas in the energy market to explore, such as green chemistry and the advancement of green hydrogen. Making these newer avenues clearer to future talent via advertising and increased industry-academia engagement is vital.

"A high percentage of young graduates want to be in an agile and exciting environment, often not deeming some larger companies as attractive enough. So, it's on us, the larger companies and academia, to collectively nurture more of a more start-up environment – one that promotes agility, innovation, and sustainability."

Stasa Podgorsek, Data & AI MEA Business Lead, Microsoft

GETTING HANDS ON
Give industry-orientated research and testing laboratories to academia to ensure that students are not learning only from books, but real-life scenarios. Being able to apply theory and data directly to a challenge is not only a deeply valuable learning opportunity, but it also possibly solves industry's challenge. One example is a program called 'Go Green' by Schneider and AVEVA, which involves looking for

"There's not a single university or single company that's big enough to tackle this massive challenge on its own. We must have a network to unite interested parties in industry and academia. It must be a two-way street."

Sebastian Geiger, Energi Simulation Chair and Director of Research, Heriot-Watt University

game-changers worldwide who dare to disrupt and put their skills to the test in the digital transformation in energy management. So far, 24,000 people are registered on the program, with 1,200 ideas captured.

NON-NEGOTIABLE DIGITAL SKILLS
Students must have digital skills. This is a simple and oft repeated statement, yet following through tends to be tricker. Regardless of the program a student is studying, their learning must be underpinned by digital skills. Not everyone need be a data scientist, or an AI expert. But they must understand the basics of computational systems: the cloud, network architectures, and cyber security, for example. These areas, and others, must be instilled into learning both in the workplace and the classroom so there is consistency across the board, regardless of generation.

MYOPIC VIEWS WILL FAIL
This must be a collaborate effort; it simply cannot succeed otherwise. Being able to use state-of-the-art technological and digital tools, while being supported by sound theory, within industry and academia means students and employees gain a holistic and modern overview of

what is required. Technology companies must also be more engaged so that the latest tools are integrated into the learning progress and directly applied to problems – helping find solutions 'here and now' and not in ten years' time.

LOWER YOUR WALLS
The sense of protectionism of core ideas is understandable due to historical norms. Some entities are being asked to share information they may have built up and protected over decades. But it cannot continue. All parties – companies, academia, students, workers, and others – must be willing to go outside of their comfort zones together.

MERGING TECHS?
The development and application of a technology must be consistent whether it is in industry or academia. Currently, technologies do not always naturally translate from the workplace to the classroom. Brand value, for example, is a key point which must transfer through to industry from academia. Greater engagement with the schools to make graduates more aware of what industry is working on, and how it affects their competitiveness, would be very beneficial to streamlining talent's transition from academia to industry.

"How do we make our industry a preferred employer for our region for upcoming graduates? And how do we influence some of the core engineering programs to inculcate the right digital skills so that graduates can be digital innovators in the workplace?"

Dr. Vikas Goel, Computational Modeling & Data Sciences Manager, ExxonMobil

Chapter 5: Energy Transition

Actions to foster deeper collaboration between oil, gas, and utility companies to streamline transformation?

• Daniel Jeavons, General Manager, Data Science, Shell
• Sami Sokker, Digital Transformation Lead, Saudi Electricity Company
• Ronan O'Sullivan, Vice President – Energy Industries, India, Middle East, and Africa, ABB
• Darryl Willis, Vice President of Energy, Microsoft
Moderator: Sean Evers, Managing Partner, Gulf Intelligence

INSIGHTS

Which company type are you: one that embraces change and seeks allies, or one that sticks its head in the sand and hopes the energy transition is just a trend? These are the two dominant types emerging in the energy transition, with one set far more successful than the other. It is possible that some companies are paralyzed into inaction by the sheer breadth and depth of change being presented by the energy transition – the biggest change ever to the global energy ecosystem? One participant referred to a CEO of an energy company who commented that he did not know what market his business would specialize in by 2025, such is the speed of change and the demands on entities to diversify beyond their 'lane'.

Understandably, the value of collaboration is higher than ever. The accelerated roll-out of 5G and the development of cutting-edge computing among some oil, gas, and utility companies is also stimulating change, throwing down a gauntlet to competitors to 'act now, or not have a reason to later' as they fade from relevance. In many ways, industry players are becoming increasingly proactive. A recent example is the launch of the Open AI Energy Initiative by Shell, Baker

"It's about speed, it's about common platforms, and it's about creating agility to value exchange."

Daniel Jeavons, VP, Digital Innovation and Computer Science, Shell

Hughes, C3 AI, and Microsoft. This open ecosystem of AI-based solutions for the energy and process industry provides a framework for energy operators, service providers, equipment providers, and independent software vendors. Such an effort is needed multifold to deal with the disruption that lies ahead, much of it positive disruption for those taking initiative to safeguard economic, environmental, and energy security. Overall, Covid-19 has highlighted how global instability comes with a very high financial and social bill – something companies do not want to experience again.

TOP TAKEAWAYS

DO YOU WANT TO JOIN?
Establish common platforms and, from there, a community. This is one of the best routes for organizations to boost their agility so they can innovate quickly, remain relevant, and profitable while hitting climate targets. Historically,

there have not been many examples of international oil companies (IOCs) and utilities, for example, exchanging applications on top-level platforms. But it does happen a lot in other industries, such as tech. This is a breakthrough the energy industry must embrace. The value of this route is already clear with the success of start-ups in the energy transition and their ability to quickly leverage and roll out ideas when the financing is available. So, industry must look at how it can start to work on common platforms to leverage collective technologies, exchange best practice, and intellectual property (IP) between different companies, so that it is a fair value exchange.

AGILE METHODOLOGIES?
Governments and regulators must adopt some sort of agreement between all parties to spur agile methodologies that speed up the execution of digital transformation plans. For example, installing smart meters for more than 2mn customers would be a big win on all fronts; a government's reputation and customers' service being two. The same goes for standardizing the inspection of electricity transmission lines using AI and drones, for example. Building solid agreements will help establish 'new norms' that are both economically and environmentally sound.

"The needle is increasingly being moved towards autonomous operations. Entire oil and gas facilities can be started by a single click of a button."

Ronan O'Sullivan, Vice President – Energy Industries, India, Middle East, and Africa, ABB

90%+
of oil and gas respondents said their company has, or is developing, a long-term strategy for a sustainable and low carbon future, according to Deloitte in late-2020.

50%
of oil and gas respondents said their company is already investing in energy efficiency and cleaner fuels to power field operations, Deloitte's results showed. Plus, they are acquiring businesses outside their core focus.

$7.4bn
is the annual spend on low carbon solutions by the Oil and Gas Climate Initiative (OGCI), which accounts for 28% of global oil and gas production.

"The pandemic continues to be a big exercise to test the readiness and efficiency of the power sector."

Sami Sokker, Digital Transformation Lead, Saudi Electricity Company

THE BIG T?
Smart leaders collaborate and the best collaborations are transparent – it is a simple equation that some companies still need to master. For example, it is beneficial to share best practices in oil, gas and among utilities, and then collectively look at the strengths and weaknesses of that project's methodologies or operational philosophies? Add to this the allocation of subject matter experts who help reaffirm the best route forward and suddenly, all parties have improved operations and stronger alliances. This also means building an environment where ideas can be shared openly, such as via cloud engineering and data immigration (transparency being key to resolving challenges over data sovereignty, for example).

ZOOM INTO MICRO
Companies across the energy industry must hone into the micro details of big data, AI, and other digital tools in order to harvest the 'hard-to-get' intelligence. And they must ensure they have the human resources to do so. Industry has done an impressive job so far at being able to mitigate risk, but as energy demand and environmental targets intensify, the stakes will become higher and risk management must become more sophisticated.

PACE MATTERS
It will be survival of the fastest, not survival of the biggest. Historically, it was good enough to be big – but this is no longer enough. Companies must be fast and agile, and that is a very real pressure point for fossil fuel operators who are also facing stringent safety and

environmental goals. The chokepoint lies is in the ability to figure out how to leverage the intersection between people, capability, and data – and fast.

HOW MANY LANES ARE YOU IN?
Energy companies are increasingly expected to do more than one thing. It is no longer enough to be the most efficient producer of oil and gas; you must also be a world-leader in reducing carbon footprints, for example. And companies that were historically oil majors are now energy majors. Plus, more and more companies are talking about diversifying into support supply chains for EVs, batteries, and utility platforms. The lines are being blurred and those opting to stick to one market may find themselves lost as the decades progress. Collaborations will prove key to helping firms keep pace.

"The pace of positive disruption really matters. Doing things safely and slowly is not sufficient. It'll no longer be the survival of the biggest – but the fastest."

Darryl Willis, Vice President of Energy, Microsoft

Chapter 6: Future of Work

Top actions to foster an agile and efficient workplace post Covid-19?

- Khaled Al Blooshi, Vice President, Digital Projects & Innovation, ADNOC
- Rainer Ludwig, Global Director of Business Development Digital Solutions, Sensia
- Babur Ozden, Founder & CEO, MAANA
- Pattabhiraman Ganesh, Vice President, Digital Transformation & Lifecycle Services, Middle East & Africa, Emerson
- Mohamed Mikou, Chief Operating Officer & CMO, Microsoft MEA

Moderator: Sean Evers, Managing Partner, Gulf Intelligence

INSIGHTS

Creating agility is not a quick route; it must be deeply embedded in a company's culture. Of course, Covid-19 and the economic squeeze have truly tested companies' agility-o-meter, with just a week's notice for many to reorganize their thousands of staff into remote working programs and operations. However, this behemoth logistical challenge has its upsides. For one, it has demonstrated how rapidly a willing company can increase its rate of operational agility (albeit sustainable agility takes longer than the lower hanging fruit of doing remote working) and it has inspired staff who desire a more flexible work-life balance. It has also significantly expanded the job market; the hiring portal is increasingly global. All these factors can be leveraged by companies to boost their competitiveness, strengthening their post Covid-19 recovery.

But Covid-19 has not been the only major factor over the last year affecting employees' career paths; digitalization is also dramatically reshaping the job market. For example, automation is replacing the must-have human talent for welding. Instead, oil workers need

"Agility is really a cultural point in any organization. We were one of the lucky companies in that we gained a lot from this situation due to our early investments in Panorama, which leverages AI, big data, and other advanced technologies."

Khaled Al Blooshi, Vice President, Digital Projects & Innovation, ADNOC

actionable knowledge of smart data, AI, and predictive analytics. And this is just the tip of the digital iceberg. More than half (58%) of digital leading organizations in the Middle East saw investment in digital skills as the most important driver of profit growth, detailed SAP and Oxford Economics Digital Transformation Executive. Amid such change, one thing has not changed: people truly lie at the core of creating an agile workplace. Investing time and money in this space is non-negotiable for firms wanting to sharpen their relevance in the 21st century workplace.

TOP TAKEAWAYS

PROACTIVITY PAYS – SERIOUSLY
ADNOC is one of the companies that can truly attest to this. The value of its significant investments – time, human resources, and funds – into building its AI

capability have truly paid off, especially during the pandemic. For example, the company built up its AI capability with its own data science team. At the start of the pandemic, when top management asked whether the team were able to predict the spread of the virus to the firm's core sites, the answer was 'yes' – a near real-time answer to an operationally critical question. And when there was a large spread of Covid-19 at one of its sites, and isolation measures needed to be taken, the team already had customers' requirements and contracts ready to avoid any disruption. ADNOC – and other companies like it – would not have been in this beneficial position during what the International Monetary Fund (IMF) called the worst recession since the 1930s had it not made proactive digital investments. It would be smart for others to follow suit.

INVEST, INVEST, INVEST
Employees will not automatically become digital quizzes, and the vast majority will not naturally be innovative, especially without a supporting ecosystem. Companies must ensure that training programs are available, as well as a 'safe-to-fail' culture, in order to push boundaries. There is an opportunity to create a new normal around employee

"There must be a strong correlation between what a company is doing and what it stands for when it comes to its digital transformation. The concept of needing to 'walk the talk' is stronger than ever."

Rainer Ludwig, Global Director of Business Development Digital Solutions, Sensia

25% more workers than previously estimated may need to switch occupations after the Covid-19 pandemic accelerated existing trends in remote work, e-commerce, and automation, according to McKinsey.

60-100% of the working week by workers in advanced economies could be completed from home, without impacting productivity. This is the result of McKinsey's survey of 2,000-plus tasks used in some 800 occupations in eight focus countries.

75% of people using digital channels for the first time during the pandemic say they will continue using them when things return to "normal", revealed McKinsey.

(and student) engagement and experience by connecting the dots around the way they learn, engage, and collaborate. Instilling troubleshooting skills – including those that leverage the tools of the 4IR – is also paramount. Disturbances in the energy industry are not uncommon, so employees must be able to find solutions once they hit the inevitable chokepoints. They must continue delivering against targets to sustain sustainability, competitiveness, and energy security.

"If you look at people's calendars, the number of meetings they have is mindboggling. Most people have no time left in their workday once the meetings are done."

Babur Ozden, Founder & CEO, MAANA

GET EXCITED!
An agile workplace means an inspired and diverse workplace, with employees breathing new ideas and energy into the business strategy. Achieving this means making the industry more attractive to talent, moving away from the historical reputation as bloated and dirty. For example, hydrogen has been coined the

"Covid-19 really exposed the limitations of what are very long-standing norms when it comes to inflexible work arrangements."

Mohamed Mikou, Chief Operating Officer & CMO, Microsoft MEA

'new oil of the 21st century' and is still at a very early stage of development when compared to other energy markets. This market, and others like CCS and green fuels, present an opening for the energy industry to attract and retain the crème de la crème of talent.

KEEPING BUSY...
Deploying more technologies and automation means some employees are going to have more free time, so they must be allocated to more strategic programs to keep them occupied and engaged. This is key to sustaining positive morale within the workforce, as well as retaining quality staff as energy companies transition into a new, greener, and more diverse chapter. Universities have a very big role to play in working with industry to ensure that the curriculum reflects industries' needs.

RETIREES' REVIVAL!
Historically, the industry has focused on hiring staff from well-known universities,

competitors, or leading companies in other fields, such as technology. But the rise in remote-working over the last year due to Covid-19 has unlocked an entirely new pool of talent. For example, there are experienced professionals no longer wishing to commute or experience the office lifestyle who still have exceptional expertise and now, without geographic restrictions, can work anywhere. Often, they are keen on three to five-year projects, offering a relatively short but intense amount of energy.

DATA LINGO?
Companies often look at data from a 10,000-foot viewpoint while promising to deliver accurate results. This is a risky mismatch. Huge volumes of data are still being lost or underutilized, with rates sometimes as high as 80%. Having the right talent in-house to maximize the data processes and the subsequent lessons learned is key in creating an agile environment, both intellectually and operationally.

"During Covid-19, there has been an acceleration in the deployment of technologies – solutions starting from subsurface to production to distribution, from sensors to the analytics of big data..."

Pattabhiraman Ganesh, Vice President, Digital Transformation & Lifecycle Services, Middle East & Africa, Emerson

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Brad Davis, Innovation and Commercialization Manager, Chevron

Daniel Jeavons, VP - Digital Innovation and Computer Science, Shell

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Energy Core Board Meeting (Q1, 2021)
Speakers

*(*Alphabetical order)*

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Ahmed Hashmi, Chief Digital Officer and Technology Officer – Upstream, BP

Alex Robart, Energy Industry Strategy Leader, Microsoft

Ali Faramawy, Corporate Vice President, Digital Transformation, Microsoft

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