

FLOW



PETRONAS

45th Anniversary Issue

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#6GREATNESS is a title that's not given, but earned. As title partner to Mercedes-AMG PETRONAS Motorsport, we are proud to be named FIA Formula One™ World Constructors' Champion for the sixth consecutive time. This victory reflects our commitment to consistently deliver the best for you. Our Fluid Technology Solutions™ undergoes extreme testing and with proven results on track, you too can experience #6GREATNESS on the road.

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Editor's Note

We are beyond pleased to present to you a special issue of FLOW where we share PETRONAS' journey moving forward as it embraces the changing energy landscape. As the saying goes, "There can be no progress without change." In this issue, we explore the ways PETRONAS and the industry are evolving to meet the needs of the changing times as we seek to make progress hand-in-hand.

Our cover story explores PETRONAS' transition this year as it expands its core business into renewables. In its 45th year, PETRONAS has articulated its move in evolving alongside industry landscape and customer demand. To clearly define our headways going forward, PETRONAS has introduced its Statement of Purpose as a compass and a clear affirmation of its business goals to its stakeholders. It also revealed its new brand positioning as a visual representation of this significant new beginning for the company. The transition has made our anniversary celebrations that much more meaningful as we took it to the road to mark the occasion with Malaysians who were with us every step of the way.

Continuing our forward-looking theme of progressing into the future, we take a closer look at PETRONAS' Facilities of the Future programme where a team of innovators and inventors work to translate ideas and concepts from paper into functioning products that could be deployed to our assets. The team from our Group Research and Technology (GR&T) looks at how to improve upon and subsequently apply existing technology to our operations and maintenance to improve efficiency, reduce cost, and promote sustainability. In this story, we also delve into some barriers to technological progress

that exist, including old school mentalities and fear of being displaced, as we explore methods of curbing the aversion through upskilling and communication.

A bright future for Malaysia cannot exist in a society rife with diseases. Optimistic that we can work towards a cancer-free future for Malaysia, Yayasan PETRONAS has been a long-time supporter of Cancer Research Malaysia (CRM), a team of researchers that are doing ground-breaking work in cancer research based on the genetics of Asians. While 50 per cent of the population of the world is Asian, we make up only 10 per cent of the genetic studies worldwide. CRM aims to change that. Through its cancer research, CRM is working to bring better understanding, diagnosis, and treatment mechanisms to Malaysians. Through its support of CRM, Yayasan PETRONAS aims to increase health awareness and improve the livelihood of communities in Malaysia.

This year has been an illustrious one for PETRONAS Motorsports as the Mercedes-AMG PETRONAS Motorsport team had another victorious run in the 2019 Formula One season, clinching its sixth consecutive double title – a feat previously unachieved. For two-wheels, the PETRONAS Yamaha Sepang Racing Team has done the team proud in its maiden season in MotoGP™, winning the coveted Best Independent Team Award, while Fabio Quartararo was recognised as Rookie of the Year. It is also the first time an ASEAN team has representation in all three tiers of Grand Prix motor racing. Our product, PETRONAS Tutela (transmission fluids) and PETRONAS Sprinta (engine oil), also made headway as they were used on the

MotoGP™ tracks this year. It was an all-in-all outstanding year for us on the tracks.

FLOW also had the privilege to have an up-close and personal session with Emeliana Rice-Oxley, PETRONAS' Vice President of Exploration who leads the PETRONAS Leading Women Network (PLWN), a platform created for women to grow and support each other, as well as to nurture the development of strong female leadership. As women make up only 20 per cent of the workforce in oil and gas, we sought Emeliana's thoughts on attaining a more gender-balanced workplace while learning more about her own experience as a woman in a male-dominated industry.

Our future is built upon a past that we learn from and improve on. To wrap up this issue, we are 'Looking Back at 2019', as we remember the highlights and significant milestones we have achieved in this year that we are bidding goodbye to. It has been an exciting year here at PETRONAS. May the New Year invoke in all of us great passion for progress.

We would like to hear from you as we continue to look for ways to improve the magazine. Please do not hesitate to share with us your feedback or submit your queries at flow@petronas.com.

Thank you and happy reading!

Editor-in-Chief
Zahariah (Liza) Abdul Rahman

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A Time for Change

By **Chai Li Tiing**



Throng of Malaysians came out to Konsert Bersama Merentas Zaman to celebrate PETRONAS' 45th anniversary.

At 45, PETRONAS finds itself at the brink of yet another change.

Through the years, the national oil and gas company has gone through recessions and transformations, adapted to them and not only survived but has thrived through all the challenges. While no stranger to change, this year's milestone is a significant one for the company as it expands its business into new frontiers – renewables.

The call for clean energy has grown louder in recent years. The rise of a new generation of energy consumers, represented by the likes of Greta Thunberg, has brought to the world stage their demand for immediate action to find sustainable ways of delivering energy. Governments around the world have come together to sign the Paris Agreement, pledging their commitment to mitigate greenhouse gas emissions in their countries. According to the International Renewable Energy Agency (IRENA) in the 'Renewable Power Generation Costs in 2018' report, the global weighted-average levelised cost of

electricity has plummeted significantly, and by 2020, it is estimated that onshore wind and solar photovoltaic will consistently offer less expensive electricity than the least-cost fossil fuel alternative.

The world of energy is changing and PETRONAS is evolving alongside.

In March this year, PETRONAS has unveiled its new Statement of Purpose to replace its Vision and Mission statements.

The new statement reads, "A progressive energy and solutions partner enriching lives for a sustainable future."

This single statement embodies PETRONAS' aspirations in a succinct and resolute manner. It is a unified rallying call to drive action towards a higher purpose, which includes the company's future business focus and the impact it wants to have in the world.



It reflects the meeting of growth, innovation, and collaboration that it aims to achieve as it ventures beyond its traditional bread and butter.

The first part of the statement, 'A progressive energy and solutions partner,' signifies PETRONAS' move to future-proof the company beyond oil and gas. PETRONAS has expanded its core business to include renewable energy and specialty chemicals with the acquisition of Amplus Energy Solutions Pte Ltd headquartered in India and the establishment of a Gas and New Energy division to oversee its clean energy efforts. Through this new setup, PETRONAS will continue to push boundaries and provide innovative solutions to its stakeholders, as not just a provider of goods and services, but as a reliable and valuable partner.

The second part of the statement, 'enriching lives,' highlights PETRONAS' commitment to sustainability and our holistic approach to progress – which includes improving the quality of life of its partners and stakeholders – both internal and external – so that they can collectively reach their fullest potential.

The third and final part, 'sustainable future,' – indicates its commitment to ensure that the benefits and the value created by the organisation are sustainable over the longer term, measured through stakeholder value creation, societal progress, and environmental sustainability.

To complement this change and to reflect its new aspirations in a tangible form, PETRONAS has undergone a thorough rebranding exercise, shedding its old skin for a new persona. The company envisions this new image to not only demonstrate to the public the new direction of the company but also to have a rejuvenating effect on its employees and stakeholders – heralding a new dawn for the company just a handful of years before its half century mark.



The new persona is a reflection of the company's eagerness to make bold efforts to ensure continuous progress – be it through small everyday progress or fundamental and transformative ones.

Through the years, PETRONAS has continuously made new innovations, ventured into new businesses, penetrated new markets, and collaborated with new partners to break new grounds. The Statement of Purpose is more than aspirational – it is the company announcing to the world its direction moving forward as well as the way it will be conducting its business.

This milestone has breathed a significant meaning into its 45th anniversary celebrations. At 45 years old, PETRONAS finds itself reborn, rejuvenated, and ready to take on new challenges in this new business direction.

On that note, PETRONAS took to the road, celebrating the momentous occasion with Malaysians from all walks of life who have been with PETRONAS every step of the way.

The 45-day celebration included a 'Time Travel Truck' – which allowed Malaysians to experience PETRONAS through an immersive digital experience, a free 'Bersama Merentas Zaman' concert

featuring 45 Malaysian artistes from all generations and a digital showcase featuring our story. It was a celebration across Malaysia.

The celebration was also a thank you to Malaysia and Malaysians, expressing PETRONAS' appreciation and affection to the nation and its people whose support had been indispensable for it to grow from an office of 15 employees nestled at the Prime Minister's Department in 1974 to the 48,000-strong multinational that it is today, with presence in over 90 countries. The support remains indispensable as PETRONAS aspires to continue to grow, to be passionate about progress, and to enrich lives.

Our guests of honour, led by the Prime Minister of Malaysia, Tun Mahathir Mohamad, give the thumbs up at the celebrations that took place right in front of the emblematic PETRONAS Twin Towers.



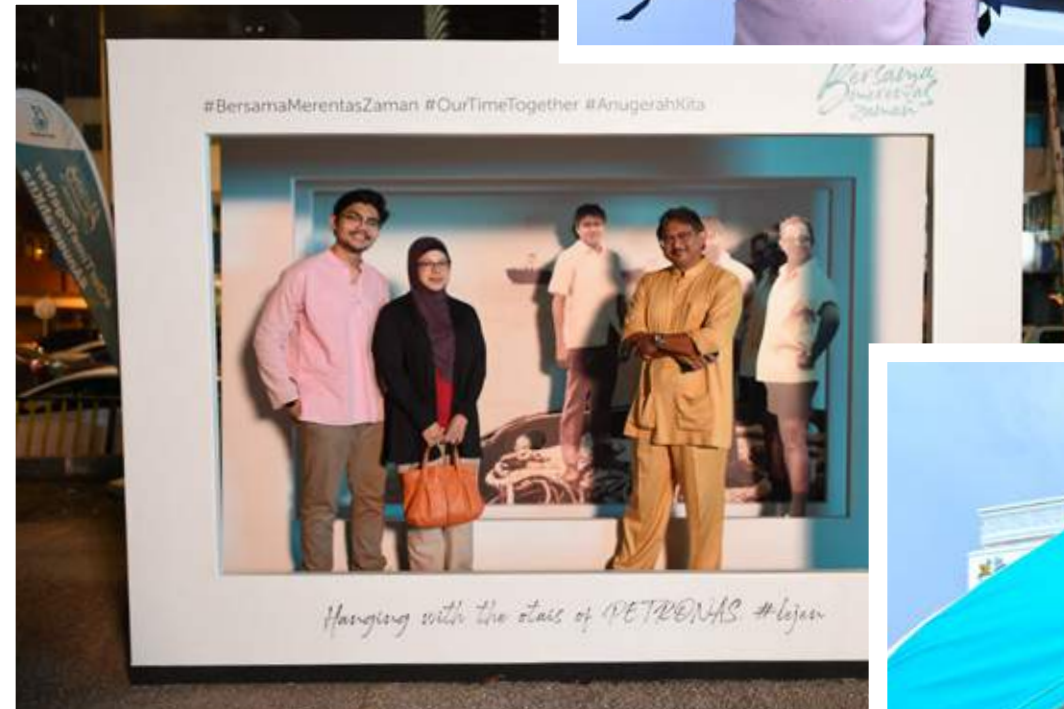
'Bersama Merentas Zaman' Concert



Malaysians came out in droves to the 'Bersama Merentas Zaman' Concert at the PETRONAS Twin Towers, while even more watched live at home as, for the first time ever, 45 local musical legends from different eras serenaded the public with well-known anthems and sing-alongs on the occasion of PETRONAS' 45th Anniversary. The event was also graced by the presence of the Honourable Prime Minister of Malaysia, Tun Dr Mahathir Mohamad, his wife, Tun Dr Siti Hasmah Mohamad Ali, and Youth and Sports Minister, Syed Saddiq Syed Abdul Rahman.



Nationwide Celebrations



At locations across Malaysia, thousands joined in on the celebration, visiting the PETRONAS 'Time Travel Truck', a 45-day travelling roadshow that took the audience back in time in an immersing experience, allowing them to reminisce upon the memories that they have shared with PETRONAS over the past 45 years. The truck made 22 stops nationwide where visitors could enjoy interactive games and get a sneak preview of the upcoming PETRONAS 'UNI' webfilm, produced in conjunction with the then-upcoming Independence and Malaysia Day celebrations.

The celebrations were also taken across the South China Sea, to Sabah and Sarawak, where on top of the webfilm showing, Petrosains brought along fun learning activities to cater for the children, and exciting photobooths where they were able to take family photos to commemorate the occasion.

Celebratory Enamel Pins



Close to 50,000 sought-after enamel pins were distributed at each celebration location throughout Malaysia as keepsakes. Each of the nine different designs bears a special PETRONAS memory that it shares with the people of Malaysia. A crude oil barrel to commemorate PETRONAS' first shipment of 385,000 barrels to Japan, a Formula One™ car to memorialise its achievements on the tracks, the PETRONAS Twin Towers, its emblematic headquarters that stands tall overlooking the city – all iconic images that represent the years that PETRONAS and Malaysia have been through together. The collectibles received great response from the participants and staff alike, all of whom tried to collect all nine designs from the different locations by participating in the exciting activities that PETRONAS had in store.



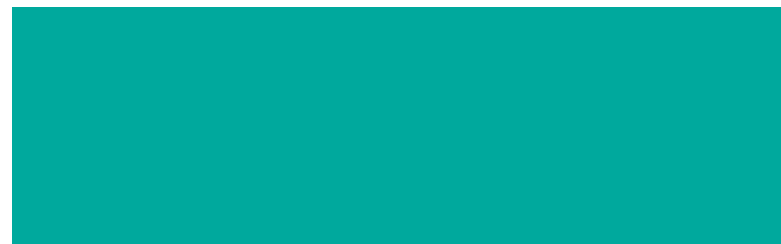


UNI Webfilm

The birthday bash also included the unveiling of PETRONAS' new Merdeka and Malaysia Day webfilm entitled 'UNI', which the crowd received with open arms and loud cheers. The webfilm tells the tale of university students from different parts of the country discovering that they are not so different after all. It is a story of youth and unity set in Universiti Teknologi PETRONAS with drama, comedy, and an unmistakable Malaysian touch – a PETRONAS webfilm signature over the years that Malaysians look forward to when the festive seasons roll around.



Scan the QR code to watch the webfilm.



An Ode to the Unsung Heroes

By **Brigitte Rozario**

An organisation is the sum of its parts – each one as important as the other, like puzzles that fit together to form the big picture. From those at the helm charting the course to those at the deck manning the oars and raising the sails. In PETRONAS, tens of thousands of people are working together every day like a well-oiled machine to realise their common goal of making the organisation “a progressive energy and solutions partner enriching lives for a sustainable future.”

While the C-Suites and the highflyers often take the spotlight, there are countless unsung heroes whose dedication to their

work often goes beyond the normal call of duty. On the occasion of PETRONAS’ 45th anniversary, FLOW brings you the stories of three of our unsung heroes, whose jobs take them from deep within the quiet inlands of Sarawak to the faraway bustling concrete jungle of Tokyo.

These are the stories of the men and women behind PETRONAS who are building bridges with our customers, safeguarding our plant operations, and making connections with important stakeholders so that PETRONAS can continue to grow.



John standing in front of a barricade in Sarawak. As the Operational Support Executive, John is the bridge between PETRONAS and the community.

In the jungle, building bridges can help people move from one river bank to the other, making it easier to gather resources, work, and go to school. John Fery Jame, an executive with the Operational Support Unit (Miri), Sabah-Sarawak Gas Pipeline, spent his childhood roaming the jungle with his family. He knows that building bridges means building the path to a brighter future.

“I am a Penan so I know how they live. They may live in homes now but they still go to the jungle to get food. Whenever I have the time, I tell them about how I roamed around in the jungle with my family when I was younger, just like they do now. I am also a jungle boy and I know the names of the herbs, roots, and traditional medicines,” he says proudly.

Whenever he meets communities, including the Penan, he makes it clear that he works for PETRONAS. “More importantly, I also make it known that I am also here to help them understand how PETRONAS works and how we can help you. That’s how I explain it to them. So, when they ask for CSR assistance, such as help to build a house or for a donation in kind, I would advise them to make sure it is reasonable and something that we can help them with.”

The Operational Support executives are the frontliners who meet the communities and handle stakeholder management before the technical team comes in to construct pipelines. They visit the *kampung* folks and spend many hours explaining what PETRONAS needs to do and how it can work with the community to necessitate this. There are always negotiations because the *kampung* folks will ask for compensation in one form or another. Besides cash, they normally ask for assistance such as to build a longhouse for them, materials to construct a new house, educational support or jobs.

John explains that blockades have traditionally been used as a means to get the authorities to come to the village for negotiations. This was the way that communities demanded to be heard especially in the past when there were no other forms of communication. Today, it is still used but often as a last resort.

“We try to prevent blockades and people asking for unnecessary things. Sometimes their demands are overvalued such as RM60,000 for each durian tree as compensation for clearing the area in their village. Sometimes the value they place on the *kebun* or the trees is based

John Fery Jame
Operational Support Executive
(2013 - present)

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2



1. John holds a dialogue at a Penan village.

2. Visiting the kampung folk in person is the way Operational Support executives like John work with the community to build rapport and resolve issues.

3. John believes that communication is the key to resolve misunderstandings between parties.

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on their needs and not based on fair compensation. So, when we meet the people, we try to negotiate a reasonable compensation fee," he adds, explaining that he uses logic to explain how PETRONAS arrives at the compensation value.

Naturally, negotiations can sometimes get heated. John has had to face aggressive *kampung* leaders who slam their fists on the table and scold him. Mindful that he represents PETRONAS, John always ensures he is calm and responds professionally.

"For me, it's not about the compensation amount; it's about how we put it on the table, whether we can have a dialogue with a result. For me, that is successful," he says.

Usually, it takes between a month and three months to complete the negotiations. But, even after that, John and his colleagues still visit the community because their job is all about building relationships.

"We have to understand people, their nature and lifestyle, only then we can

understand why they react the way they do. From a psychological viewpoint, we have to learn their needs, backgrounds, and customs. Then, we can understand their point of view. Sometimes, we may have good intentions but in their eyes, we have taken the wrong approach. For example, in the city, we look into people's eyes when we talk to them. But for some communities, that is deemed as challenging them.

"Misunderstandings are bound to happen. We might tell them to submit their plans for our management to consider. They might misunderstand the word 'consider' and think that it means 'confirm'. Then, later they might question us, asking why the value is less when we had agreed to their terms. We have to be careful about the words we use. We need to make sure they understand. Sometimes, we repeat it a few times until we are sure they understand," explains John.

He knows that rural communities need to be treated with respect. Sometimes, what is a small matter to PETRONAS may be a big issue for the *kampung* folks. John believes that negotiations should always result in a win-win situation so that both sides are satisfied with the outcome.



Dr Nafisa Khodjaeva

Pengerang Integrated Petroleum Complex
Head of Safety
(2018 - 2019)



A petite woman entered the meeting room, looking impeccably dressed in slacks and blouse. She leaned in for a handshake and her face broke into a warm smile, small lines appearing at the outer edges of her eyes. She is nothing like the conservative image one might have of a Head of Safety at an oil and gas project. Dr Nafisa Khodjaeva was in charge of safety at the Pengerang Integrated Petroleum Complex in Johor for a year and is now Head of Exploration HSE.

She used to be a medical doctor and worked with Doctors Without Borders, Mercy Corps International, and International Federation of Red Cross. Saving lives and limbs is not just part of her job; it has become second nature to her.

At Pengerang, her role has been to drive HSE excellence, whether it is through advocacy, implementing Standard Operating Procedures (SOPs) or inspecting the site. According to Dr Nafisa, Pengerang had

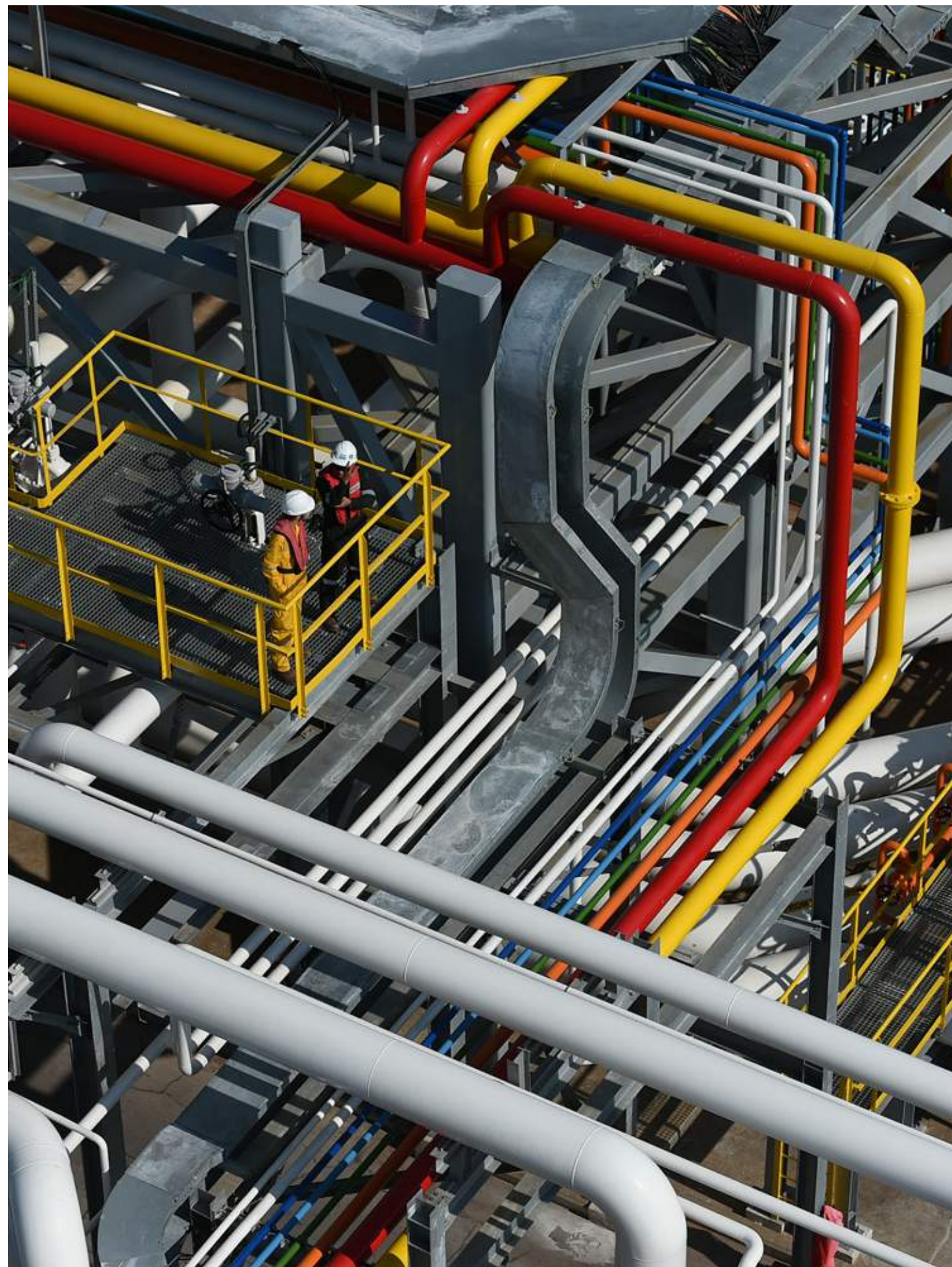


a population of 65,000 at the peak of mobilisation and a majority of them were contractors and workers that were being exposed to such a mega-scale project for the first time in their lives.

"It is quite challenging to make everyone value HSE, understand the requirements and comply with what we expect to save their lives and those of their colleagues. For example, at the project, contractors may not understand why they need to wear gloves because they may have done the work many times without gloves in the past and nothing happened. It is if and when they cut their hand or lose a finger, that they start to value wearing gloves and realise that it can protect them. I think it goes back to hazard awareness. That's why we try to explain to them the importance of the practice so that they understand and comply with the HSE requirements," she explains.

Her job also required her to be on-site at Pengerang for engagement inspections. This is where checks and balances were done. While it was very good to come up with requirements while sitting in an office, nothing beats being on-site to confirm the feasibility of SOPs.





1. Dr Nafisa, decked in personal protective equipment, during a site visit.

2. As a medical doctor, saving lives has become second nature to Dr Nafisa.

3. Dr Nafisa's task in Pengerang Integrated Complex was to drive HSE excellence to the entire population there - a number that reached 65,000 at the peak of mobilisation.

On-site, one would have to wear coveralls during scorching hot weather, strap on a seven kilogramme harness and climb 70 metres high to inspect columns. No easy task, indeed. She ended up requesting a lighter harness. Thankfully, someone found one with lighter aluminium hooks. "After that, whenever I was on-site, colleagues would tell me, 'Doctor, the lighter one for you and the heaviest for us.' That is how you balance perception and reality," she adds, smiling.

She didn't just have to break the barriers because of her gender but also because she is a foreigner and a former doctor. "People always think that with my medical background, I might not have the capability to do this work. I used to tell them doctors can even become Prime Ministers. So, doctors can do anything."

There is a sadness in her voice when she talks about the April explosion in Pengerang. She rushed over to the site as soon as she got a call in the early hours of the morning informing her of the incident. "It was something that disappointed us a lot. At the same time, we worked as a team to find out causes and actions to be put in place to prevent it from happening again," she adds.

If the largely male population at Pengerang were wary of this beautiful doctor initially, they warmed up after seeing her work just as hard as them to ensure their safety. "I'm proud that I am still saving lives. I liked my job in Pengerang because when we went to the site and made a difference, people appreciated what we did."

One of the things that made her proud was hearing that Canada Operations that she used to look after a few years back, and where she was one of the pioneers that established the HSE Management System, had been Loss Time Injury (LTI) -free for the past two years. For her, that meant she had sown the seeds of HSE culture. It is no longer about changing the rules but how you follow the rules.

"To be in HSE, you need to be courageous. Sometimes our leaders, project schedules and time might be more important, but we need to have the courage to speak up if we see something hazardous as it may save lives. You also need to be honest in whatever you do. If you have integrity, you may earn the trust and respect of the people."



Awadh joins his Japanese stakeholders at a year end dinner engagement.

Awadh Asyraf Supri

Deputy Chief Representative and Market Analyst, PETRONAS Representative Office, Japan (2017 - 2019)

The Japanese bow when they meet strangers, while good male buddies might get a slap on the back. This represents two sides of Japanese culture. It takes a lot of effort and time to go from bowing acquaintances to back-slapping buddies, says Awadh Asyraf Supri.

Awadh is Deputy Chief Representative and market analyst at the PETRONAS Representative Office in Yokohama. As the company liaison with Japanese counterparts, it is part of his job to understand the culture and maintain good relationships with them. In Japan, establishing a good relationship with mutual respect is a key success factor.

"The Japanese don't outwardly say no. They may say, 'we will look into it but it may be difficult' or 'we'll try'. That's actually a no," explains the former PETRONAS scholar.



1. Awadh believes that understanding, respect, and the practice of the Japanese culture are key to being accepted into the inner business circle.

2. A family trip up to Hakone during his time in Japan.

3. Representing PETRONAS during an exhibition, Awadh presents crucial information on current and future projects to the top management of Daihatsu Motor Co Ltd.

4. Awadh and his Japanese stakeholders and counterparts pose for a photo at an ENEOS services station in Saitama.



I usually go back to one keyword – *amanah* (upholding trust). *Amanah* towards my company, religion, the people back home, my family, and myself. I have been sticking to this since I was a PETRONAS scholar and student leader. I struggled a bit when I was at university but I kept going because of this *amanah*.



He went to Japan in 2006, where he did his pre-university programme and then pursued his degree in Chemical Engineering. He spent about five years in Kuala Lumpur at PETRONAS LNG Sdn Bhd, where he was part of the LNG marketing team for Japan and also the business analyst to the CEO. Just two years ago, he was transferred to Japan, where he was instrumental in setting up PETRONAS' Representative Office.

"In emerging markets where infrastructure and business know-how are lacking, we can cultivate new markets, create new demand by leveraging on the good business relationships with the Japanese organisations. And because we do it together, we complement each other's strengths and weaknesses, subsequently reducing our exposure to risks.

"The game with Japan is not straightforward anymore. In other words,

while Japan may not be the end-user market, their key players are doing business in other parts of the world, and we should work together with them if we see fit. Having said that, we must remember that most, if not all of the decision-makers remain in Japan, so having a physical presence in Japan to influence them here is also key. Japan may be technologically advanced, but their methods are very traditional. They still appreciate and value face-to-face meetings, constant engagements, to keep the relationship warm."

Finding and creating synergies between PETRONAS group-wide business portfolios is also a key role of the Japan office.

In fact, by the end of this year, one of PETRONAS' service providers, which provides LNG-related services, will be PETRONAS Lubricants International's (PLI) first customer of industrial lubricants in

Japan. According to Awadh, this is one of the biggest highlights for the Japan office.

Daito Corporation is a service provider (LNG tugboat) in PETRONAS' LNG business. In terms of business scale, it is quite modest. However, Daito is also the terminal operator of Yokohama and Tokyo ports and has a sizeable demand for industrial lubricant products.

"We were briefed that PLI, which has been focusing on automotive lubricants in Japan through a local distributor, intends to grow its market share in the industrial lubricants sector. We leveraged on our good business relationship from the LNG segment, did a lot of work in establishing the relationship and promoting our lubricant brand and track record, and slowly we opened the door for PLI and PETRONAS to mark a milestone in Japan. The volume and value may not be enormous but we need to understand

that in Japan, displacing others is not an easy feat because the Japanese value long-term business relationships," Awadh explains.

In Japan, it all comes down to building good relationships. Speaking the language helps, but beyond that, there needs to be an understanding, respect and practice of their culture to be accepted and welcomed into their inner business circle. Awadh reveals that making the Japanese understand PETRONAS' principles, without forcing it on them, will help them understand and appreciate PETRONAS more.

It's no easy task building relationships but Awadh is dedicated to his role, which he sees as his calling. "I usually go back to one keyword – *amanah* (upholding trust). *Amanah* towards my company, religion, the people back home, my family, and myself. I have been sticking to this since I was a PETRONAS scholar and president

of the students' association. I struggled a bit when I was at university but I kept going because of this *amanah*," says Awadh.

While Deputy Chief Representative sounds like a big title, to him, he's just another PETRONAS executive. In Japan, that comes with a heavy responsibility – one which he doesn't for a minute take lightly. Wherever he goes, Awadh always carries the PETRONAS brand and logo with him. Even when he's not working, he can be seen wearing the PETRONAS MotoGP™ shirts. When he plays golf, he wears the PETRONAS badge on his shirt or cap.

"PETRONAS has set this stage for me since the beginning, as a PETRONAS scholar in Japan. This is the time to contribute in the best way I can, with whatever tools and skills I have. It goes back to *amanah*," says Awadh.



Ideas for Collaboration

Shah Rizal Dahlan

The growing complexity of the industry calls for collaboration among players, and the way we collaborate can set a new tone for the industry.

We also need to expand our scope of collaboration to include government, suppliers, technology providers, certification bodies, academic institutions, start-ups, or anybody who could disrupt or influence the industry. We need to both collaborate and co-create to reduce costs and risks, and at the same time, facilitate the shift in our mindset to be more creative and innovative in coming up with solutions. It's time we combine forces with our suppliers and competitors in order to not only survive but thrive. And as the industry is heavily regulated with new laws and policies being implemented, collaboration is also a way for us to have influence over these changes. If we are not part of the influencing party, we will have no say in what shapes our future and in the end, we may be disrupted.



Ideas for a Cleaner Sea

Mohd Rafe Mohd Ramli

The maritime industry is huge and the environmental impact of shipping includes air, water, acoustic, and oil pollution. Ships are responsible for more than 18 per cent of air pollutants, including greenhouse gas emissions. When it comes to emissions, we have a ready solution and it is LNG. It is the fuel of the future.

For PETRONAS, Malaysia's proximity to the Straits of Malacca puts us in the position to push the shift to LNG, a much cleaner fuel for the maritime industry. The Straits of Malacca, to Singapore, is one of the world's busiest shipping lanes. According to Seatrade Maritime, in 2017, a record 83,740 ships transited through it. We have an abundance of supply that provides security of supply for at least the next 200 years and this strategically positions us to meet the world's demands. I believe that cost should not be the only consideration at the expense of sustainability. And for the future, we need to invest in technologies that pave the way for the shift to zero carbon.

The New Age of Oil and Gas



Translating technology into business viability: reducing costs, improving productivity, and increasing efficiency.

By **Jacqueline Pereira**

Fauzy believes that technology will unlock new opportunities beyond the realm of oil and gas industry.



It is dark and damp. The space is narrow, bleak and restrictive. Yet, as soon as the lights flash on, guiding the way, the task begins. Creeping through the gloomy space, it meticulously and methodically assesses the structural integrity of a gas pipeline. It is a robotic crawler, on inspection mode.

Remotely operated, the crawlers' inherent systems transmit the necessary data instantaneously. These digital solutions, through innovation and new technologies, bring reduced cost, increased efficiency, and fewer safety concerns.

According to a recent Accenture survey, 97 per cent of upstream and 91 per cent of downstream oil and gas executives report that emerging technologies have sped up the pace of innovation in their organisations over the past three years.

Similarly, as volatility in the sector continues, PETRONAS confronts growing disruption and transitioning challenges through technology. Its Facilities of the Future (FoF) programme, under the purview of Group Research & Technology (GR&T), aims to seek methods to deploy

technology - digital, data analytics, automation, and robotic solutions - to its assets.

Transforming the Industry

"To be relevant in the future we need to have a lower base cost, meaning how to do things very efficiently and productively," states Fauzy Omar Basheer Othman, Head of FoF. With these new methods, he adds, technology will unlock new opportunities beyond the realm of the oil and gas industry. "Maybe that business does not exist today, but it could exist tomorrow. That's what we do here."

In June this year, the opening speech at the Future Oil & Gas Conference in Aberdeen reiterated the gravity of digitalisation. The new wave of technologies will change the way businesses and operations run. Significantly, this includes workforce skills.

Indeed, much of the Conference conversation focused on skills issues: retraining the existing workforce, attracting young people into the industry, and preparing the future workforce for jobs that do not yet exist.

Investing in agility through digital innovation is one of the four essential strategies to focus on in this transition period. So claims The Oil and Gas Trends 2019 report, *Building growth strategies on shifting sands*, part of PwC's 22nd Annual Global CEO Survey trends series. The report notes that, oil and gas companies are expected to use new technology to increase efficiency in the areas of project management, operations, and the supply chain in the next seven years. Companies with a head start on their competition through digital innovation will have a distinct advantage.

The digital strategies include using drones, robotics, artificial intelligence (AI), and virtual reality to make drilling and exploration projects more efficient, speed up resource recovery, and lower labour costs. Since company digitalisation templates will vary, the report calls for firms to make bold technology decisions, in part to lead to additional innovation.

For Fauzy, an aeronautical engineer, in this business machines will take up repetitive, low-analytical and hazardous work. Currently, in substituting humans to address brownfield assets, the FoF



Testing underway to ensure the drones can carry out its function outside the laboratory.



systems automate data capture through Internet of Things (IoT), communicate via high-capacity, low-latency 5G networks and safe remote control and operations from shore. Fauzy stresses that the brownfield benefits are immediate: automated data collection, wireless transmissions, and instantaneous transfer. He declares, "We are changing how people work and the roles they play at work."

Facilities of the Future

Since 2017, when the FoF programme was initiated, the intention was to bring this visionary platform, "a plant that only exists in our imagination, into reality, bringing the future to today." Fauzy clarifies that - to translate ideas and concepts that exist on paper and presentation decks into real, functioning products - they rigorously test, pilot, install, and validate the new technologies.

These technologies are not created specifically for the oil and gas business, but originate from others such as computer, automation or electronic

industries. In leading his team of almost 50 staff, Fauzy, as always, revels in innovation and technology. He is appreciative of his work scope that allows his inventor streak to thrive, allowing him the opportunity to look out for innovative technologies and improve them to benefit the industry. He takes this as a sign of progress, elevating the company's aims beyond perception and optics. "Belief is as important. This is an opportunity for us to believe in ourselves first, before reaching out to our customers and partners."

The key FoF focus is to de-risk new technologies through rigorous physical, virtual development and validation. Before deploying robots on their assets on a large scale, the FoF teams ensure that they first learn how to use the robots and improve on them. And, crucially, to capture all the lessons learnt. Well-controlled pilot programmes are put in place to observe results and measure the value and efficiency of replacing, for example, a human inspector with a robotic version.

"Robots definitely operate better than human beings because they have no emotions and are consistent in repeatability," affirms Fauzy. Humans come with plenty of factors that affect their job-performing effectiveness, although they excel in perception and analysis. "I don't think robots will replace humans in their entirety. There are spaces where humans perform the job better, and others where robots do. Our job is to find which one is which."

As of this year, some FoF creations have been stationed in real situations in operating assets, in some cases reducing costs by about 70 per cent, saving almost RM55,000 per vessel. Magnetic robotic crawlers have replaced human inspectors in confined spaces to eliminate scaffolding costs and human safety risks. Drones, fitted with probes, execute metal thickness inspection at height. Drones also capture thermal images through autonomous surveillance, for perimeter security purposes especially at night.

Value for Creation

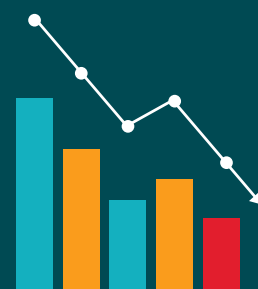
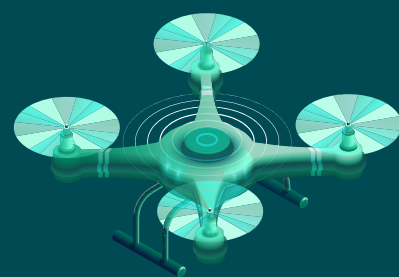
Apart from robotic operations, FoF automates subsea equipment, placing production and processing devices under water instead of on platforms. To reduce costs, instead of building vessels on which to place the apparatus, they chose the sea bed. As the equipment is unmanned and self-contained, thus no emissions are released into the 70-metre shallow seas. While some seabed-living marine life may be displaced, he says, in proportion to the space that the equipment requires the damage is very minimal.

Also in the works are self-healing materials and - at end of field life - low-cost decompression methods. FoF does not focus solely on blue sky innovations, but instead collaborate with partners and research teams from Universiti Teknologi PETRONAS (UTP) at the beginning of the concept, and then customise according to their needs for the industry. Their applied research and applied technology, when used, become the end product of added benefit.



The projects are usually put through a rigorous testing and piloting process to reduce or remove any possible risk of application.

Bytes on Tech



1. Piloting Process

Each innovation takes about a year of rigorous testing, depending on the technology. And before that, a year to engineer and plan the rigorous due processes. Plus another year or two to iron out all challenges.

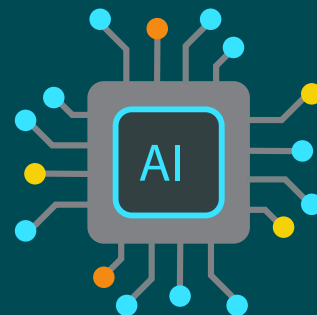
Not for all technologies. As for the drones and robotic crawlers, it takes less than six months from pilot programme to being deployed on assets.

2. Technology Pitfall

The technology disadvantages include breeding a lack of human interaction and the inability to contextualise situations when operating remotely.

“Sometimes technology disconnects humans from each other, and changes their behaviour,” admits Fauzy Omar Basheer Othman.

Also, engineers who oversee operations remotely may not have a physical space to contextualise what is going on as they are too far away from the real situation.



3. Higher Productivity

Digitalisation ultimately creates higher productivity. That translates into a higher-skilled workforce. They become more marketable, not trapped in manual low-skilled work, and this leads to higher salaries. The added benefit is more time and money to enjoy your life!

4. ‘Out-Innovating’ Start-ups

According to Geoffrey Cann, author of Bits, Bytes and Barrels: The Digital Transformation of Oil and Gas, as many as 10 distinct technologies are likely to disrupt the oil and gas sector:

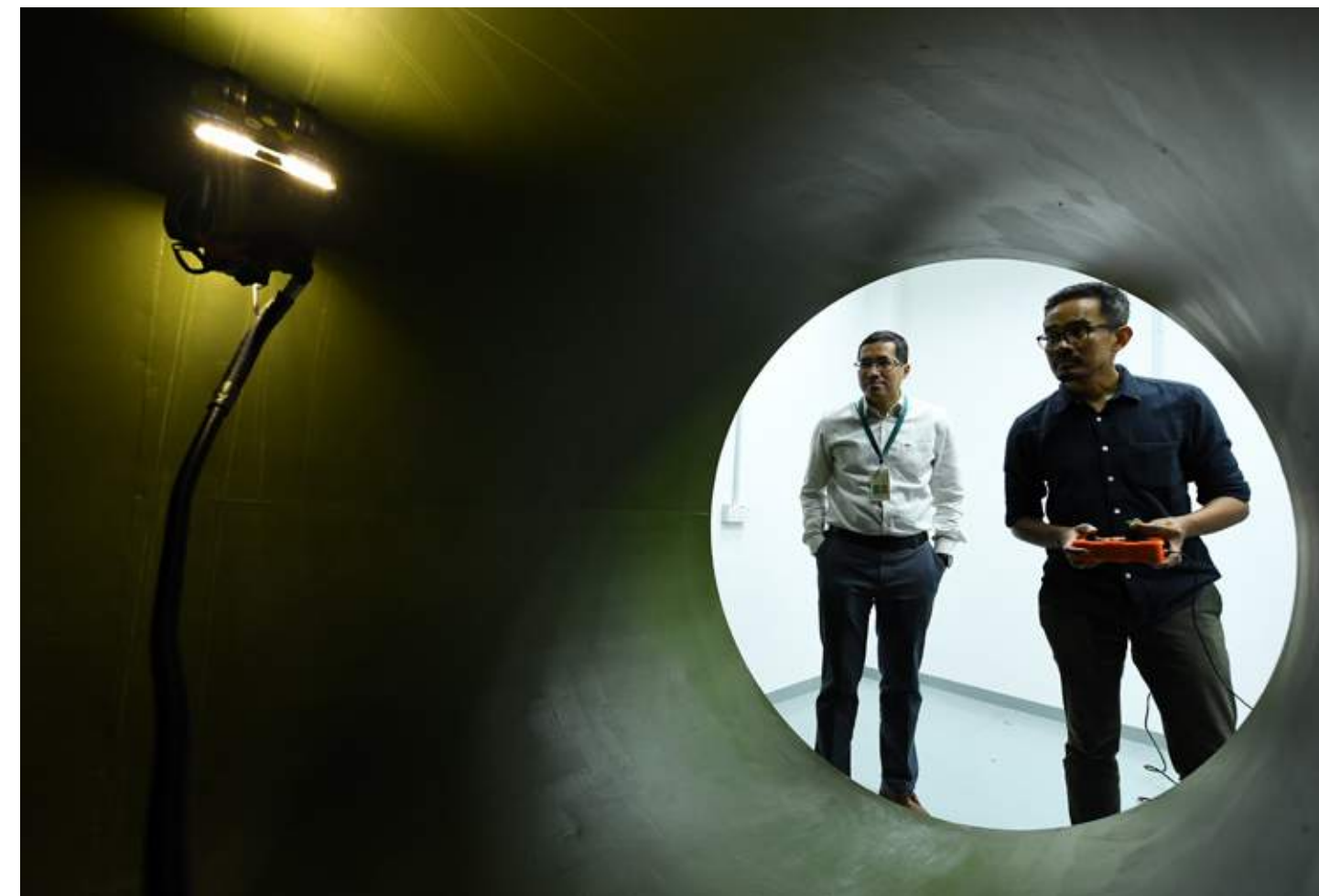
- Analytics
- Artificial Intelligence (AI)
- Augmented/Virtual Reality
- Mobility
- Robotics
- Cloud Computing
- Internet of Things (IoT)
- Advanced Computer Modelling
- 3D printing
- Blockchain

5. Facilities of the Future

The transformational possibilities from hyperconnected enterprises have spawned exciting, groundbreaking initiatives throughout many organisations, including, but not limited to:

- Hyper-connectivity
- Digital Automation
- Robotics
- Autonomous Repair Drones
- Remotely Operated Vessels (ROVs)
- AI
- Machine Learning (ML)

PETRONAS Activity Outlook
2019 - 2021



Fauzy and a colleague look on as the magnetic robotic crawler is being tested in the laboratory.

Improving on external innovations, FoF validates functionality. However, there have been times when the outcomes were not as expected. While the reasons could be many, Fauzy states, “We don’t know what we don’t know. That’s the main reason.” He admits there are always limitations to our imagination and knowledge. “It’s only in the trials there is proof of performance.”

Similarly, resistance to digitalisation goes beyond vested interests. “The majority of people are not resistant to technology or changes, they are concerned about what value it creates. And they want it validated that it works all the time.” While that is a fair prerequisite, Fauzy believes there is no democracy in technology. “In other words, with technology you have to be deterministic. It works. Use it and wean off the current way of doing things.”

Challenging the Mentality

Fauzy recognises that embracing technology and digitalisation at work is not his biggest challenge. In his experience, company culture and individual mentality are his biggest

obstacles. Rather than these barriers starting at the implementation stages, they begin as early as the ideation stages. “Anywhere in the world in this industry, people are afraid of being displaced by technology. Even me. I could be automated one day.”

While he understands the underlying aversion, he is certain that technology is meant to simplify tasks. In the course of this process, inadvertently, some job functions become displaced. “It’s not the intention, but it’s the consequence of technology. Jobs don’t need to be protected, but we need to protect our workers.”

Up-skilling is needed, especially in developing skills to operate robots. Fauzy fears that those who do not embrace this change will be left out. He finds the best way to mitigate the impact of displacement is to provide workers with the right skill sets so that they perform higher analytical functions which robots and machines are not designed for or are incapable of doing yet.

Being passionate about technology, he says, also creates new business opportunities. “Business cases do not come from the inventors, but from innovative advocates within the business. Since new technologies do not pop out of the box in perfect condition, he asserts, effort is required to refine the technology and create robust work processes. “This application takes time, money, and grit which will, in return, require the support of the majority, if not all, in organisations.”

As for innovators or inventors, Fauzy declares they are naturally risk-takers who do not over-analyse value creation. “We simplify it so that we can prove it, unlike the sceptics who over-emphasise and over-analyse value, against innovation.” He adds that innovation takes courage, a little risk-taking and money that you can live without in order to risk innovating.

The perception also exists that inventors must come up with a business case. Fauzy begs to differ: “The inventor invents. You need leaders to advocate the risks, to take a leap of faith and to prove that it works.”



Datin Dr Norsayani M Yaakob

We recognise fatigue as an issue among employees and contractors and we have standards to manage it at work. For certain groups of people working for turnaround, projects, offshore and working in shifts, there is a certain number of days and hours they are allowed to work.

Such is why we have the PETRONAS Technical Standards on Fatigue Management at Workplace that stipulates how long a person can work and have to rest after work. But how do we know if people are complying with these standards? We put in place PETRONAS Fatigue Management System as a tool to track and monitor their work hours and when they are reaching the extended work hour, they will receive an alert from the system. And if people are found breaching their allowable extended work hours, the system will actually block them from entering the premise the next day. We have this system implemented at our onshore assets and soon to be deployed to cover more high fatigue risk work groups such as offshore, land transport, and projects. We also know one size can't fit all, hence for other methods to manage fatigue, wearable technology is on its way to track the employees fatigue risk via monitoring the quality and quantity of sleep. With all these proactive interventions in place, we really hope that fatigue issue can be managed effectively, and incident at work related to fatigue can be prevented fully.

Ideas for Beating Fatigue and Increasing Productivity

Ideas for Inculcating Energy Efficiency

Nursyaqila Samsuldin

I believe that energy efficiency is a knowledge that must be taught early in life. At Petrosains, we have an Energy Efficiency Programme - a project-based learning that uses coding to teach students about energy efficiency.

School kids are given micro-bits that act as micro-controllers and taught how to code and use them to come up with ideations on how to make their schools more energy efficient. And to do this, the students need to embark on a design cycle and later on pitch their ideas to industry professionals and mentors who would advise on how to improve them in order to proceed to prototyping. In an effort to spread awareness about gas and energy efficiency to school kids, Petrosains in collaboration with Malaysian Gas Association brought this programme to six underserved schools where 240 participating students come from B40 and M40 families. When measured, results of the two-day learning showed positive outcomes.





LEADING the Way in CANCER Research

By **BRIGITTE ROZARIO**



Professor Teo giving a talk on her cancer research work.

Cancer strikes fear in the hearts of many and is given intimidating names like the Big C. The truth is, great progress has been made over the years in the study of the disease, and, if detected early, it can be treated.

Although the number of deaths caused by cancer is increasing, contributing factors for better survival rates are research, advances in treatment, growing awareness, and earlier detection.

Cancer Research Malaysia (CRM) Chief Executive Officer Datin Paduka Professor Dr Teo Soo-Hwang believes that more can be done to improve this ratio. She is optimistic about a future where cancer can be controlled, but to arrive at that juncture, more needs to be done today to compile the necessary data to improve early detection, provide the best treatment options and even find cures, where possible.

"If we stop all research today, we will find that because of the ageing population and the different lifestyles, we would have more cancers in the future but no response to that increasing incidence. We need to do something to control cancers more effectively," she says.

She explains that cancer is now one of the most common causes of premature deaths in the world. In 2018, the World Health Organisation reported that 18 million people were diagnosed with cancer and 9.6 million people died because of it. Of that, about 47 per cent of the cancer incidences was among Asians, and about 57 per cent of deaths was in the Asian population. Asians have a lower risk of cancer but a higher risk of dying of the disease partly because we have the cancers that are hard to treat and with low survival rates.

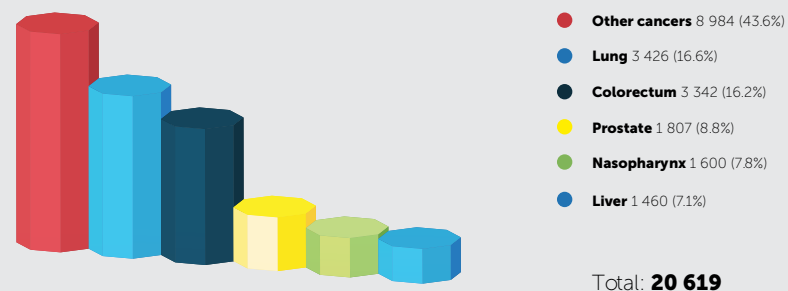
While 50 per cent of the population of the world is Asian, we make up only 10 per cent of the genetic studies worldwide. The majority of cancer research and efforts to find new cures has been and is being conducted primarily by pharmaceutical companies and universities based in North America or Europe. As a result, research has largely been focused on western populations and cancers that predominantly affect them – breast, colon, lung, prostate, and melanoma.

Malaysian Country-Specific Statistics

Number of new cases in 2018, both sexes, all ages



Number of new cases in 2018, males, all ages



Number of new cases in 2018, females, all ages



Source: International Agency for Research on Cancer, 2018

There aren't enough studies on colorectal and nasopharyngeal cancers, which make up the top 10 cancers affecting Malaysians. Additionally, the findings from the West may not apply to Asians because of genetic and lifestyle factors. Asian studies are important, urgent even, but not many are aware that organisations like CRM require long-term funding.

Established in 2000, Cancer Research Malaysia's vision is a future free of the fear of cancer. To achieve such a bold purpose, the organisation needed equally brave and stalwart supporters from the start. Prof Teo credits two core donors that have made its work possible – including Yayasan PETRONAS which pays for approximately 70 per cent of the overhead costs. This enables CRM to focus on the real work of studies into cures, early intervention and timely adherence to treatments while competing for international grants.

"That belief that we can make a difference in Malaysia is possible because PETRONAS supports an effort by a group of people who want to do the right thing and change the way things are done in this country," says Prof Teo.

PETRONAS has supported CRM since 2001, recently pledging an additional RM8 million to the non-profit organisation, bringing its total contribution to RM21.5 million so far.

Yayasan PETRONAS Chief Executive Officer Lita Osman says that CRM's work benefits all Malaysians, either directly or indirectly. "This is very much in-line with Yayasan PETRONAS' commitment towards enriching lives for a sustainable future. That's why CRM is a vital partner for us. From research, we will be able to understand the factors that cause the disease, find ways to curb it and control it further. We also strongly

believe that social progress must be inclusive. A community cannot sustain economic growth with a heavy burden of healthcare. Therefore, our approach is prevention is better than cure.

"By providing funding, we are also nurturing young researchers in this area. At Imbak Canyon, for example, we support research in conservation and biodiversity. Establishing a better understanding of existing risk and potential factors will help us drive more effective outcomes – for our people, and for our planet," she adds.

Malaysian Cancer Research on World Stage

Prof Teo remembers the early days of CRM when she had to carry a tank with liquid nitrogen to collect fresh oral cancer tissue samples from a surgical theatre. "Today, CRM has one of the largest Asian

oral cancer cell lines in the world. We use it to figure out which genes go wrong in oral cancer so that we can target them in new therapies. Understanding oral cancer has helped us develop a vaccine to boost the patient's immune system to fight the cancers more effectively. The experiments in animals so far suggest that this therapy works beautifully," says Prof Teo.

CRM also has a few initiatives involving breast cancer, which is the number one cancer in the country. Today, CRM has 8,000 breast cancer patients in studies. It is the largest Asian study looking into breast cancer risks. CRM is leading an effort to target breast cancer screening towards individuals at higher risk. This would potentially eliminate overdiagnosis and overtreatment while providing more equitable access to screening to people who need it most. The model combines genetic and lifestyle factors, as well as mammogram images with an Artificial Intelligence (AI) component, brought in to increase accuracy. The study brings together investigators from Japan, Korea, China, Hawaii, and California, with CRM leading these studies from Malaysia.

There is also a cancer prevention trial which measures a feature of a woman's breast that accurately tells researchers how high her risk is. Then, with an intervention and using that measure, CRM will test to see if her risk can be reduced. This is the first time this is going to be done on Asian women.

While studies into genetic factors are important, including them in the screening process requires genetic counsellors. According to Prof Teo, there are only four to 10 genetic counsellors in this country serving a population of 32 million people. In the US, there are approximately 50,000 genetic counsellors for a 327 million population. CRM decided to explore ways to enable more genetic counselling in Malaysia.

"We decided to test whether, instead of training many genetic counsellors, we could train oncologists and gynaecologists to provide basic genetic counselling. If we're going to roll out services in a new way, we need to first establish we are not providing inferior service to patients as a consequence. We set about training doctors in 23 centres in the country to provide genetic counselling services. Now, we have 23 active centres that are competent to provide genetic counselling and genetic



testing. More than 800 women have already gone through this system and we're the first Asian country to roll out national services on this scale," she says.

The not-for-profit organisation has also analysed 600 breast tumour samples and by the end of this year, that number should reach 1,000. It will be the largest map of Asian breast cancers in the world. "By doing that, we have already been able to demonstrate that Asian breast cancers are slightly different and they have an enriched immune profile that we think arises from the genetic background or the lifestyle factors in Asian populations only. Because of that information, we have already put in place a clinical trial to test a new immunotherapy in Asian breast cancer patients. Based on our data, we suspect that we will see a response in Asian women that may not be known in Caucasian women because this profile doesn't exist in Caucasian women," says Prof Teo.

Another exciting initiative is the Patient Navigation Programme at Klang General Hospital. It was based on a similar programme formulated by American surgeon Harold Freeman, who trained

at Memorial Sloan-Kettering Cancer Center in New York. CRM's pilot project in Klang is a one-stop centre where the clinical flow can be changed to ensure timely diagnosis, access to treatment and appropriate counselling. Part of the programme involved developing decision tools that would help patients understand what was going on based on research, local cultural values and belief systems.

"We also set up a network of support for the patients to help them with daily tasks like taking the kids to school and preparing food for the family. Because of that system and the community partners we had, we were able to set up that one-stop centre where the sole aim was to make sure we leave no one behind. As a result, the timeliness of diagnosis went up from 70 per cent to over 90 per cent. We were able to ensure that the results were disclosed much faster and we were able to improve services. This is the first time anyone has set up such a system in this. By doing that, we have proven that this is the way forward," says Prof Teo.

Partnering with the Ministry of Health, CRM has now launched three more

Geography



Numbers at a glance

Total population in Malaysia

32,042,455



16,526,726



15,515,729

Number of new cancer cases

43,837



20,619



23,218

Number of cancer deaths

26,395



13,937



12,458

Number of prevalent cases (five-year)

106,262



43,537



62,725

Source: International Agency for Research on Cancer, 2018



Yayasan PETRONAS, led by Lita Osman, presenting its contribution to Cancer Research Malaysia.

one-stop centres in Seremban, Kota Kinabalu, and Kuching. CRM's goal is to make sure these are scalable solutions.

Apart from this, the research organisation also has a mobile phone app that can be used for early detection of oral cancer. This app has won several awards, including a global award from the Medical Research Council to develop an AI-powered module of the app so that in future the mobile phone can be used to scan an individual's mouth and detect if there is a suspicious lesion.

With so many milestones achieved in the past two decades, it is no surprise that CRM has secured international accolades. It is the first organisation in Malaysia to win a Collaborative Award from the London-based Wellcome Trust UK, the world's largest medical research charity funding research into human and animal health. Wellcome Trust has traditionally funded Nobel Laureates and well-established professors. In the UK, it funds the top five per cent of scientists.

"We wouldn't be where we are without PETRONAS. It has been one of the main donors from day one that has bought the equipment and made it possible

for us to make all these discoveries. Its contributions have underpinned all our activities," says Prof Teo.

Yayasan PETRONAS' Lita reiterates that cancer is one of the foundation's focus areas as it commits to supporting better health and improving the livelihood of communities. The foundation also organises talks on cancer to raise awareness amongst its employees. This year, under its Sentuhan Kasih programme and in conjunction with Hari Raya, Yayasan PETRONAS visited the children's cancer ward in selected hospitals and conducted programmes for the children and families.

Through Petronita (association for wives and female staff of PETRONAS), PETRONAS has also supported cancer work, including through the annual Orchid Run & Ride. "Hopefully, in the future, we will have the opportunity to reach out to the rural communities to create cancer awareness as the disease can affect anyone, and the lower income group are equally at risk, with possibly lower awareness and less access to screening facilities. We might also collaborate with more NGOs like BCWA (Breast Cancer Welfare Association) which works with breast cancer patients," says Lita.

WHERE GOOD FLOURISHES



Yayasan PETRONAS

yayasanpetronas.com.my



Ideas for a Conducive Worksite

Datin Anita Azrina Abdul Aziz

Pengerang Integrated Complex employed over 65,000 workers from 60 nationalities during its peak construction period. The complex was also home to 40,000 workers living at site. The melting pot of cultures required proper measures to be in place to ensure that the workers were happy. So we began to build a home away from home with centralised emergency response teams, medical facilities at all workers camp making safety a priority.

We built an indoor mosque that can accommodate 8,000 congregants. Sports and recreational facilities were also put in place. There are outdoor cinemas built, each playing different genres of movies, catering to the various nationalities. The PIC also has football and cricket pitches with 42 football teams and friendly matches taking place daily. To the workers' delight, we also introduced the *Pasar Malam* (night market) where the workers can find freshly cooked food. The PIC too has its own convenience shops offering various items that are only available in the workers' respective homelands and we even brought the barbers to PIC so the workers are well-groomed!

In addition to all these measures, we also made sure that a mechanism for the workers were in place so that they can always voice out their grievances. In PIC, we provided the highest level of care to the workers ensuring their well-being onsite at all times, resulting in a conducive workplace while ensuring that the project is safely delivered.

Ideas for Beating Plastic Pollution

Ahmad Zaki Daud

In the matter of plastic pollution, is plastic the sole culprit? Aren't we, the users of plastic, equally guilty? We need to solve the plastic pollution problem in a holistic manner by changing our business model from a linear plastic economy to a circular plastic economy.

With the linear plastic economy, the raw materials that are manufactured into plastic will eventually end up in landfills even though they are valuable enough to go back into the businesses streams. Some 80 per cent of plastic that leaked to the environment will end up in the rivers. But with the circular plastic economy, the change begins at the start of the process where the design of plastics is rethought to be 100 per cent recyclable. This is only possible with the collaboration of the entire supply chain, including the plastic manufacturers, converters, retailers, brand owners, consumers, collectors, and so on. We also need to enhance the segregation at different sources and then combine that with material recovery and technology solutions. This then will further divert plastic waste from landfills up to 40 per cent. And this is how we complement the 3R approach of reduce, reuse, and recycle, making it even more efficient.



Rewriting History on the Formula One™ Tracks

by **Chai Li Tiing** and **M Haikal H Saharuddin**

Come the final race of the 2019 FIA Formula One™ World Championship in Abu Dhabi, Mercedes-AMG PETRONAS Motorsport would have officially rewritten history, setting a new record as the only team to win six consecutive World Constructors' and Drivers' Championship since the sport's inaugural season in 1950.

In the Japanese Grand Prix, Valtteri Bottas roared across the finish line to a triumphant victory, clinching the spot at the top of the podium – his first win in Suzuka. Allied to Lewis Hamilton's third place, the achievement handed the



Silver Arrows the ultimate silver lining – a sixth consecutive F1™ Constructors' Championship title with an unassailable 612 points.

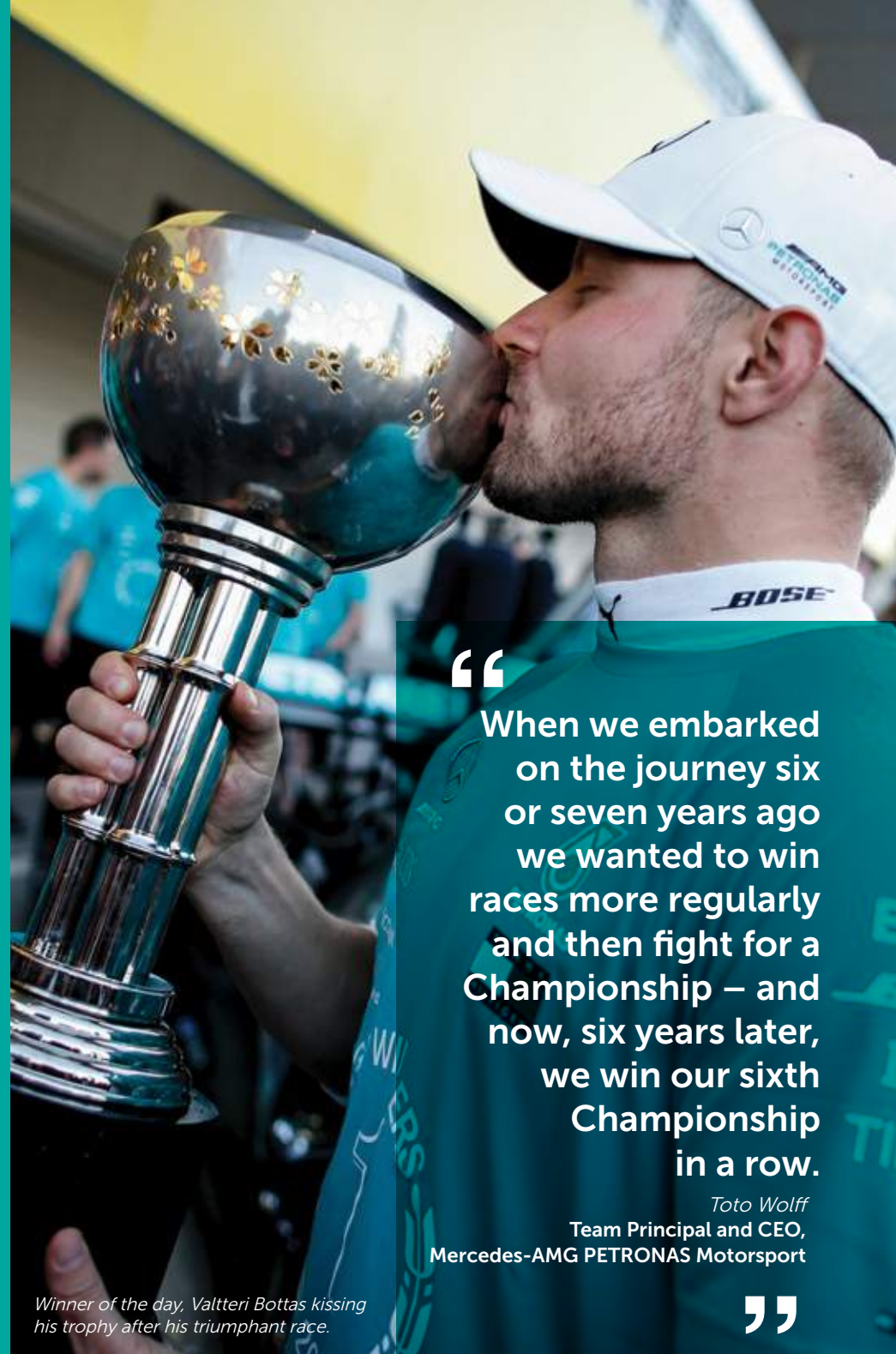
Two races later, in the United States Grand Prix, Valtteri drove another perfect weekend to clinch his fourth win of the season. However it was not enough to deny Lewis from claiming a historic sixth world title, joining Michael Schumacher as one of only two drivers to win six F1™ championship titles.

Team Principal and Chief Executive Officer, Toto Wolff looks back at the team's beginnings after the win and said, "When we embarked on the journey six or seven years ago we wanted to win races more regularly and then fight for a Championship – and now, six years later, we win our sixth Championship in a row."

To a common spectator with little knowledge of the inner workings of an F1™ team, the team with the best drivers or the fastest cars stands the best chance. But F1™ is no simple mathematics.

With an average of 80,000 parts per car and some 250 to 950 people per team at the circuit over a race weekend, there are countless factors that contribute to a championship winning team. State-of-the-art engineering technology, exceptional driver skills, clear communication, performance-driven culture and teamwork – all of these are key ingredients for a successful team.

For PETRONAS, another important factor that is not to be overlooked is the fluid technology.



Winner of the day, Valtteri Bottas kissing his trophy after his triumphant race.

“
When we embarked on the journey six or seven years ago we wanted to win races more regularly and then fight for a Championship – and now, six years later, we win our sixth Championship in a row.
 ”

Toto Wolff
 Team Principal and CEO,
 Mercedes-AMG PETRONAS Motorsport

In 2010, PETRONAS became a part of the Mercedes-AMG PETRONAS Motorsport team not only as Title Sponsor, but also a Technical Partner, playing a pivotal role in powering the team to the greatest run of success in the modern F1™ era.

Through the continuous development and improvement of their Fluid Technology Solutions™, PETRONAS blend its PETRONAS Primax fuel, PETRONAS Syntium lubricants, and PETRONAS Tutela functional fluids to create what is dubbed the PETRONAS Winning Formula – the knowledge and development behind its fluid technology.

With its products constantly being tested under harsh conditions on the F1™ track, the knowledge and developments have also been translated into the Primax fuel and Syntium lubricants for road users in Malaysia and the rest of the world.

Since the dawn of the partnership, PETRONAS has played an integral role in delivering consistent performance, reliability, and efficiency to the team through its Trackside Laboratory where two dedicated PETRONAS Trackside Fluid

Engineers work alongside the on-site team to monitor the health of the fluids during a race, while a team of scientists support their efforts from Malaysia.

"It's not always been easy, the entire team put in a lot of hard work and we had our fair share of painful moments, but we were always able to pick ourselves up. Everyone in Brackley and Brixworth worked incredibly hard for this achievement and I can't thank them enough. We also could not have done this without the continued support from Daimler and PETRONAS who have always been by our side." Wolff added, recognising the contributions of all the team members and partners.

Now that the team is at the pinnacle of motorsports with a historic achievement in the bag, PETRONAS is fully-dedicated to its role as Technical Partner and continues to work alongside the Silver Arrows, poring over each detail in search of small, incremental improvements and innovations that will take the team even further, writing greater history and creating unmatched records.



The Mercedes-AMG PETRONAS team pose for a group photo after their sixth consecutive double-title win is confirmed at the Suzuka Circuit.

PETRONAS Yamaha SRT Riding High

by **Brigitte Rozario**



Celebrating Fabio Quartararo's podium finish at the Japan Grand Prix at Motegi.

The fireworks exploding over the PETRONAS Twin Towers to celebrate PETRONAS' 45th anniversary in August heralded more achievements for the national flag-bearer.

This year marked PETRONAS Yamaha Sepang Racing Team's maiden season in MotoGP™ and the results speak for themselves: Fabio Quartararo won Rookie of the Year as well as secured five pole positions and six podium finishes, while Franco Morbidelli consistently finished within the top 10. The satellite team also secured the Best Independent Team Award at the Malaysian Grand Prix recently.

Outstanding results on any motor racing circuit cannot be solely attributed to the rider. There is a team behind every podium finish. In the case of the PETRONAS Yamaha Sepang Racing Team (SRT), credit must also be awarded to the Fluid Technology Solutions developed by PETRONAS Project Delivery and Technology (PD&T) and Yamaha Motor Co Ltd (YMC).

“Through PETRONAS' Fluid Technology Solutions, we aim to significantly contribute to the teams' performance by developing and testing customised product formulations to further boost its competitive edge.”

*Tan Sri Wan Zulkiflee Wan Ariffin
President and Group CEO,
PETRONAS*

”

“Through PETRONAS' Fluid Technology Solutions, we aim to significantly contribute to the teams' performance by developing and testing customised product formulations to further boost its competitive edge,” said PETRONAS President and Group CEO Tan Sri Wan Zulkiflee Wan Ariffin early this year at the unveiling ceremony of PETRONAS Yamaha SRT.

PETRONAS Yamaha SRT this season is represented by 2018 MotoGP™ Rookie of the Year, Quartararo and Moto2 graduate, Morbidelli. Khairul Idham Pawi competes in the Moto2 category under the PETRONAS Sprinta Racing banner, while fellow riders Ayumu Sasaki and John McPhee take on the Moto3 challenge.

PETRONAS Yamaha SRT is the first South East Asian MotoGP™ team, and this is the first season the team has a presence in all three tiers of Grand Prix motor racing. In the past, the team had only competed in the junior categories (250cc, Moto3 and Moto2). It now has a full-fledged programme, allowing talents to progress through the ranks seamlessly.

The MotoGP™ team is the only one capitalising on PETRONAS' products this season. Strict regulations in Moto2 and Moto3 bar teams from using their preferred fuel and lubricants to reduce cost, making sure that teams are focused on developing riders' skills on the track.



Ayumu Sasaki, John McPhee, Franco Morbidelli, and Fabio Quartararo visiting the PETRONAS Research and Technology Centre in Turin, Italy.

“

When we first embarked on the project to develop products for the team, the timeline given was two years but in less than a year, we successfully assimilated two products into the bikes – PETRONAS Tutela (transmission fluids) and PETRONAS Sprinta (engine oil). We are proud to have reached this milestone at an accelerated pace.

Noor Afiza Mohd Yusof,
General Manager, Brand Management
Department, Group Strategic
Communications, PETRONAS.

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“When we first embarked on the project to develop products for the team, the timeline given was two years but in less than a year, we successfully assimilated two products into the bikes – PETRONAS Tutela (transmission fluids) and PETRONAS Sprinta (engine oil). We are proud to have reached this milestone at an accelerated pace,” said Noor Afiza Mohd Yusof, General Manager, Brand Management Department, Group Strategic Communications, PETRONAS.

At the start of the season in Qatar, PETRONAS introduced PETRONAS Tutela. Developed through PETRONAS’ in-house proprietary formulation, this functional fluid is designed to protect the gearbox and provide reliability. This is in no way trivial because by definition a gearbox is designed to transfer ‘almost all’ the energy and its power to the wheel.

The second product PETRONAS introduced to the team this year was PETRONAS Sprinta at the Dutch GP. Specifically tailored to meet the characteristics of the Yamaha M1 engine, Sprinta’s main function is to protect the engine and provide smooth performance and ensure reliability. The PETRONAS Sprinta engine oil is formulated using proprietary base oil produced in PETRONAS’ refinery in Melaka. The product is also sold in the base oil market and it’s called Etro+. It features unique performance points and is the result of years of research and fine-tuning by researchers within the Fluid Technology Solutions™ group together with the PETRONAS refinery engineers’ community.

“We are very proud of PETRONAS Sprinta engine oil and Tutela transmission fluid. It has been highly impressive how quickly PETRONAS has responded to the unique challenges of

MotoGP™ and been able to perform at the highest level from the off,” said Wilco Zeelenberg, PETRONAS Yamaha SRT Team Manager.

Dr Andrea Dolfi, Head, R&D Fluid Technology Solutions™, Technology Research, Group Research & Technology, Project Delivery & Technology, PETRONAS, said, “We started with Tutela because it was the product that concerned us the most: the gearbox is paramount to the rider’s safety. If something breaks down, then it might become stuck, broken and the rider could crash while riding at 300kmph. Then, we looked into delivering performance and reliability through Sprinta. Reliability is an important element in motorsports because there is no point going faster and having more power if you damage the engine or do not finish the race. The key for this success, which we are starting to enjoy right now, is through the winning collaboration between us (PETRONAS) and Yamaha,” he added.

While PETRONAS Yamaha SRT shone in MotoGP™, in Moto2, the team saw a setback when Khairul Idham had to pull out of the race in the Czech Republic in August. He was still suffering the effects of a hand injury sustained at the Spanish Grand Prix in May and had to undergo surgery for it.

In Moto3, the team remained competitive through McPhee and Ayumu. McPhee has taken three podiums this season, two of which are victories, while Ayumu has shown strong race pace.

As the season comes to a close, one can only imagine more achievements in store next year for PETRONAS Yamaha SRT.

FLOW IN CONVERSATION:
Emeliana Rice-Oxley

Shaping the Future of Women in PETRONAS

By **Nik Fara Liza Nik Kamaruddin**

She rose to high ranks in oil and gas, an industry made up of only 20 per cent women. Being a specialist from the start of her career, she had no problem standing out from the crowd and did not recognise what gender bias looked like. Today, she is on a mission to advocate for gender diversity and inclusion in the workplace - one that raises the tough question, whether women need to change to fit into the mould or should the mould itself be changed. FLOW speaks to PETRONAS Vice President of Exploration, Emeliana Rice-Oxley, to find out.





We need to increase the intake of women so at least if the number drops later, there is still a decent number left.



What was your ambition growing up?

I had an inclination towards medicine in my early teens. But when PETRONAS offered me to study abroad, I quickly said yes to geology without really knowing what it was. I was eager to study abroad. At that age, I just wanted to go out and see the world. I was born in Kota Kinabalu and raised in Labuan where I spent my entire childhood. The idea of being good enough to study in the States was exciting, so yes, anything goes! Later on, I realised that medicine was not my ambition. It was my dad's. So it was a good decision after all.

How long were you in the US? What was studying there like?

I did four years of basic undergraduate study at the University of South Carolina. You know what's funny? I initially thought I was headed to Southern California

because PETRONAS referred to the university where I was going to as 'USC'. But I found out later, as I was filling in forms and applying for my visa, that the 'USC' they had in mind was definitely not located on the west coast of America!

Despite the location misunderstanding, I still enjoyed myself there. It gave me the opportunity to be very independent.

When you first started in the oil and gas industry, did you have problems with visibility or access to opportunities?

I get asked these kinds of questions a lot being in a male-dominated industry. But looking back at my experience, I was fortunate because I started out as a specialist, and by definition, that is already different. As a biostratigrapher and the first female geologist from Sabah

to join Shell back then, I sort of had an automatic visibility. I was even the poster girl sometimes.

So access to opportunities was not necessarily a challenge. Learning about the gender issues that still exist these days, I think I have been blessed. However, being unique is just the icing on the cake. I always believe that you have to know your core competencies, and you've got to perform and show your abilities, only then will you be given opportunities.

After a year of my specialist training, I became the head of the Paleontology Department in charge of 11 male colleagues who had decades of experience. A year later, I wrote a paper on the paleoenvironments of the Lower Miocene to Pliocene of NW Sabah. I

am pleased that until now, that paper is still being used as a reference. Again, knowing your stuff well, that's how you get visibility. In my case, I didn't see any hindrance because of my gender.

Even when you're in charge of 11 men? No hindrance from any of them?

At that time I wasn't aware of gender issues or gender bias. My mom never told me I couldn't do things because I'm a girl. Knowing some of the challenges today, maybe there was. But I'm not going to sit down and think about the past. If there was, I guess it didn't really affect me. Would I have been promoted faster? Would I have been given different and bigger roles? I don't know. I did not know what gender bias was or looked like back then because I was not fully aware that it existed or that it mattered.

What about currently? Are there any challenges because of your gender?

Challenges exist. There are hints of them, yes. Have they prevented me? I don't think so. But when you look at the senior leadership team in Upstream now, there's only one female VP. How does that impact me? It's lonely up here, sometimes. Men get to do things together, hang out socially and strengthen their network, which they carry to work. This can be quite difficult if you're the only woman. But more importantly, I think, is to ask, "What are the challenges for women in the organisation?"

What are the main reasons for the low female representation in the oil and gas industry?

There are a host of reasons. First, there's a built-in perception about the industry

being very male-dominated and the usual images of men on oil rigs do not help. If you're a young woman trying to decide on your career, oil and gas may not be one of the things you'd want to choose because of this. So when it comes to intake, there's always a low number to begin with. So when you see the progress through the funnel, the number will remain low across the board. We need to increase the intake of women so at least if the number drops later, there is still a decent number left.

Secondly, there's a tendency for women to quit at certain points in their career due to the additional responsibilities they have to carry for their family. It is sometimes easier to do what is expected of you. This is not unique to PETRONAS - it is a global trend.

There are also challenges in terms of how women are generally perceived relative to men, with regard to their technical capabilities or leadership skills and, at times, how they are evaluated. Perceptions like these matter because they have connotations, negative or positive, which could affect decision-making. And they affect how opportunities, mobility or promotions are given, or not, to women. And I believe these decisions are not done out of ill-intent, but out of lack of awareness and understanding. These are called gender bias.

In what way does a more gender-balanced workforce lead to a company's better performance?

Studies after studies have shown that there are many benefits to a company that has a more balanced, diverse, and inclusive workforce. A McKinsey research reveals that a one per cent increase in gender diversity correlates to a three per cent increase in revenue. Whether it's performance excellence, financial rewards or returns, you can link those metrics to the number of women in an organisation and the number of women in senior leaderships.

From a PETRONAS' perspective, we are a company that is present in so many countries. Naturally, we want to be a truly diverse and inclusive organisation that develops and enriches the lives of the people and communities where we operate. A diverse workforce brings about a more progressive and creative work environment that delivers better outcomes as we grow within and beyond our core business. The business benefits of gender diversity are also well-established. For example, given the fact that more women will graduate and make up a larger percentage of the future labour workforce we want to be that company that can attract future women talents. After all, we want to have a strong women leadership presence because we believe in diversity in leadership and business thinking. In my opinion, gender diversity and inclusion brings about better ideas. You won't be stuck in a box.

Do you think PETRONAS Leading Women Network (PLWN) has been successfully implemented? Have the policies been effective in addressing the gender diversity and inclusion in PETRONAS?

When we launched PLWN in 2015, we wanted to create a platform for women to grow and support each other, and to

nurture the presence of strong female leadership. Our President, in his speech, recognised that there are factors that prevent women from staying and from achieving their full potential in the organisation.

But PLWN had no policies, and no target other than to create a more supportive environment for women to thrive. So based on that, how would you then measure whether or not PLWN has been successful? And when it was implemented, each business had their own PLWN champion who would run whatever initiative they think was right for their business. We recently figured that this might not have been the best way. A single PLWN chapter for the whole company would have been better, so that the entire organisation can reap the benefits, not just in pockets of the organisation.

That was when I was appointed, in February 2019, to lead PLWN for the whole of PETRONAS. We revisited the approach to achieve what we set out to do, to do good for our women workforce and for the business.

In 2017 and 2018, we carried out a survey on gender diversity and inclusion in our Upstream and Downstream businesses, respectively. The survey showed that the majority of us believe that gender diversity is feasible and would create value for the business, and in an ecosystem that supports it. This is all good. But our results also showed that there was a small percentage of the population that showed bias against women. What's interesting was that this bias did not just come from men, but also from women.

Knowing that we needed to address the bias, especially given the majority of the survey respondents were in supervisory or managerial roles and can affect women's progress, we came up with gender bias awareness sessions for middle and senior managers who shape women's day-to-day experience.

Our programmes include workshops on gender diversity and inclusive leadership, gender bias training, and bias-free performance evaluation. For example, we created 'Tips on Removing Bias' cards to guide our conversations during performance appraisal, discussions, and assessments.

We received positive feedback from both male and female colleagues on the

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We also held link-up sessions, voluntary talks, and mentor-mentee programmes to reach out to women from other divisions.

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usefulness of the 'tips' cards. We also held link-up sessions, voluntary talks, and mentor-mentee programmes to reach out to women from other divisions. In the future, we hope to be the advocate for policy change, where needed, so men and women can have equal opportunities to grow with the organisation.

One of the achievements that I'm proud of is our new procurement contract to supply safety coveralls specially designed for women. Prior to PLWN, women had to be fitted in the same coveralls as men despite the fact that women are not just the small size of men but also a different shape to men. Ill-fitted PPE is not helpful in protecting our women workforce. But this issue was never raised. This is

one example of how awareness can help address, in this case, unconscious gender bias. Through PLWN, we want to create a conducive environment where women feel welcomed and appreciated. These are just some of the impactful things we do that we hope will become an everyday culture in PETRONAS.

Despite the fact we are just a few years old, we are quite well-known, even externally. We have been invited to give talks, to be part of important conversations, and participate in the Malaysian Women in Energy (MyWie) advocacy group.

There's more to be done and we are excited by the momentum and support

we received from both men and women alike.

Is there a female leader whom you most admire? Outside or inside the industry?

I don't look to one individual as a role model but rather I look at particular traits or particular leadership attributes that I admire in many individuals, and some of them are ordinary people doing extraordinary things. For example, I look at my late mom as one of my role models. To me, she was the CEO of the family when my dad passed away. She raised the three youngest kids, me being one of them, on her own. Sometimes I even see exceptional leadership behaviours in characters in movies!





Keeping the Skies Blue

What do we do when the sky is no longer blue, the water no longer clear and the trees no longer there? What do we tell our children?

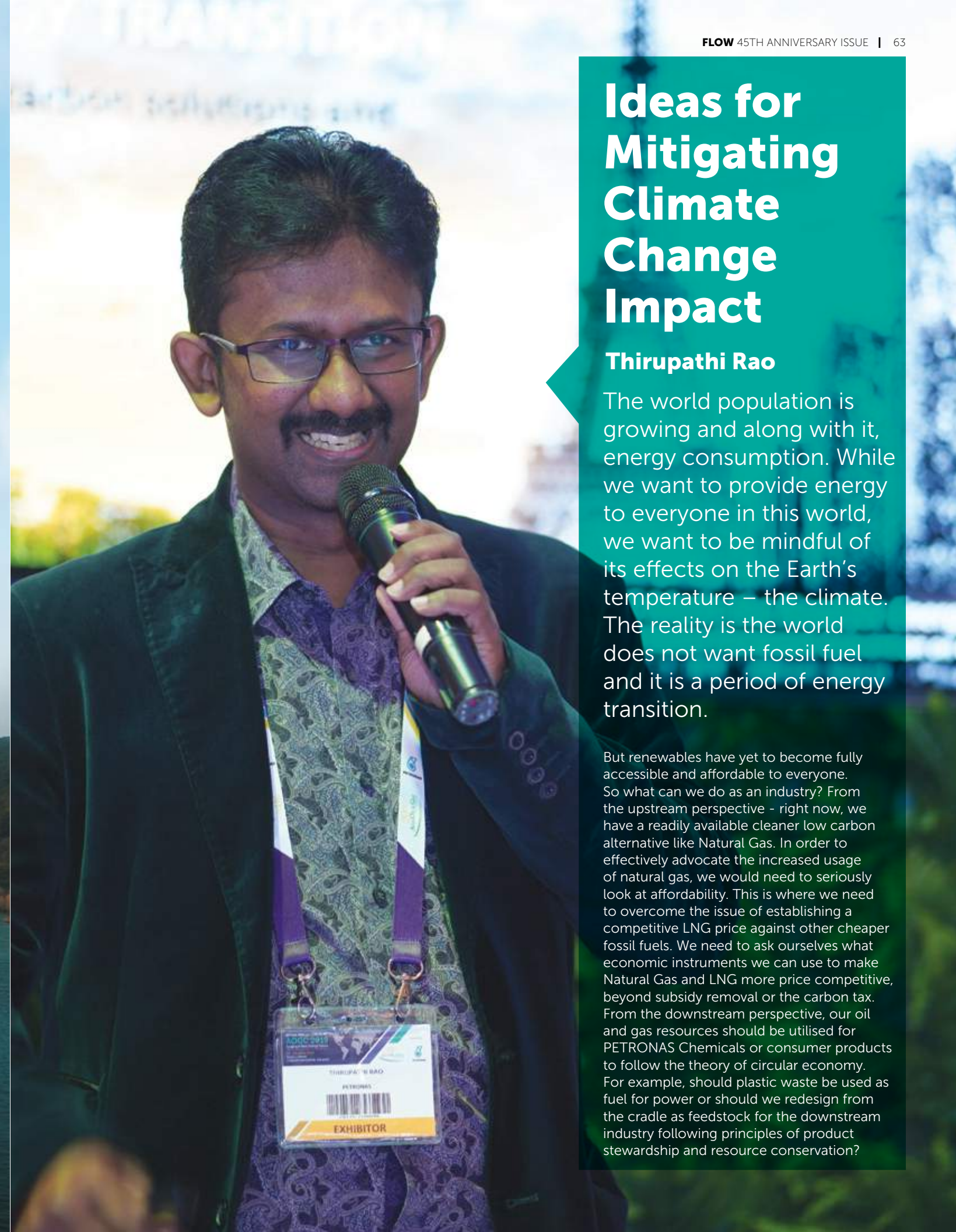
Climate change is the biggest challenge of our time with the most devastating and irreversible impact. Through the PETRONAS Carbon Commitments, we are driving operational excellence and investing in new energy, low carbon solutions, as well as environmental protection, in line with the UN Sustainability Development Goal 13.

We are committed to keeping the skies blue, so that we can tell our children a better story.

PETROLIUM NASIONAL BERHAD (PETRONAS) (20076-K)

Find out more about PETRONAS Climate Actions in our Sustainability Report at:

www.petronas.com



Ideas for Mitigating Climate Change Impact

Thirupathi Rao

The world population is growing and along with it, energy consumption. While we want to provide energy to everyone in this world, we want to be mindful of its effects on the Earth's temperature – the climate. The reality is the world does not want fossil fuel and it is a period of energy transition.

But renewables have yet to become fully accessible and affordable to everyone. So what can we do as an industry? From the upstream perspective - right now, we have a readily available cleaner low carbon alternative like Natural Gas. In order to effectively advocate the increased usage of natural gas, we would need to seriously look at affordability. This is where we need to overcome the issue of establishing a competitive LNG price against other cheaper fossil fuels. We need to ask ourselves what economic instruments we can use to make Natural Gas and LNG more price competitive, beyond subsidy removal or the carbon tax. From the downstream perspective, our oil and gas resources should be utilised for PETRONAS Chemicals or consumer products to follow the theory of circular economy. For example, should plastic waste be used as fuel for power or should we redesign from the cradle as feedstock for the downstream industry following principles of product stewardship and resource conservation?

28
January
2019

Looking Back at 2019

A Regional First!

The PETRONAS Yamaha Sepang Racing Team was unveiled, making it the first team from the Southeast Asian region to have a representation in all three tiers of Grand Prix motorcycle racing. At the event, it was announced that Franco Morbidelli and Fabio Quartararo would represent the team in MotoGP™, while Malaysian, Khairul Idham Pawi would be racing in Moto2 under the PETRONAS Sprinta Racing banner. Lastly but not least, Ayumu Sasaki and John McPhee were selected to ride in Moto3.



29
January
2019

Committed to Sustainability

PETRONAS Group emerged as the winner for the Business Responsibility and Ethics category at the inaugural Sustainable Business Awards (SBA) Malaysia for 2018, while subsidiary KLCC Property Holdings Berhad (KLCCP) was chosen as the winner for the Workforce category. The recognition by SBA signifies PETRONAS and KLCCP's strong commitment in driving sustainability.



ADAC

ENERGY ASSEMBLY



Three Times the Honour!

PETRONAS was announced as the winner of the Energy Council's National Oil Company (NOC) Award for the third year in a row. During the awards, PETRONAS was also recognised as Company of the Year (Downstream). Meanwhile, PETRONAS Upstream Vice President (Exploration) Emeliana Rice-Oxley was named the Female Executive of the Year at the Energy Council's Asia-Pacific Energy Assembly's Awards Dinner held in Singapore.



31
January
2019

16
February
2019

Guardian of the Brand

PETRONAS President and Group CEO Tan Sri Wan Zulkiflee Wan Ariffin was included in Brand Finance's list of the 100 best global Brand Guardians for 2019 at number 95. Brand Finance's ranking rates CEO's success in marketing investment, stakeholder equity, and business performance.





1
March
2019

Founding a Foundation

Deputy Prime Minister Datuk Seri Wan Azizah Wan Ismail launched Yayasan PETRONAS, a foundation that functions as the Corporate Social Responsibility arm of PETRONAS, carrying out projects that help to improve the wellbeing of the people. The launch was also witnessed by PETRONAS Chairman, Datuk Ahmad Nizam Salleh, and President and Group CEO, Tan Sri Wan Zulkiflee Wan Ariffin.



6
April
2019

Riding on a High

The PETRONAS Le Tour de Langkawi 2019 was officially flagged off by Prime Minister Tun Dr Mahathir Mohamad accompanied by PETRONAS President and Group CEO Tan Sri Wan Zulkiflee Wan Ariffin and Youth and Sports Minister YB Tuan Syed Saddiq Syed Abdul Rahman. PETRONAS is the exclusive sponsor of the prestigious cycling event which saw the participation of 132 riders from 22 teams who cycled from Kuala Lumpur to Tampin, Negeri Sembilan.





We're in
BRAZIL



4
May
2019

Honourable Guest

HE Marta Gabriela Michetti, Vice President of Argentina visited the PETRONAS Twin Towers. She was welcomed by PETRONAS Chairman, Datuk Ahmad Nizam Salleh and Deputy Prime Minister, Datuk Seri Dr Wan Azizah Wan Ismail.



Olá Brasil

PETRONAS entered into a Sales and Purchase Agreement with Petróleo Brasileiro SA (Petrobras), for a 50 per cent equity in the Tartaruga Verde Field (concession BM-C-36) and its facilities, Module III of the Espadarte field, both located in the deep waters of the Campos Basin, offshore Brazil. This move signifies PETRONAS' official entry into the country.



25
April
2019

24
June
2019

Fostering Collaborations

Prime Minister Tun Dr Mahathir Mohamad officiated the 20th Asian Oil Gas Conference which was hosted by PETRONAS. The conference brought together 4,500 people from 28 countries. In his welcoming address, Tan Sri Wan Zulkiflee Wan Ariffin called on industry players to explore non-traditional partnerships beyond the energy space towards creating efficient solutions for better cost management, heightened customer centricity and value-creation to ensure sustainability in the industry.



17
August
2019

Bersama Merentas Zaman Concert



Birthday Bash

PETRONAS took to the road with a 45-day celebration of its 45th anniversary. The celebrations began with a cross-country 'Time Travel Truck' and on-location events, and peaked with a free concert featuring legendary artistes to thank Malaysians for their continuous love and support through the years. The concert, entitled 'Bersama Merentas Zaman' was attended by Tun Dr Mahathir Mohamad and his wife, Tun Dr Siti Hasmah, YB Tuan Syed Saddiq, and throngs of Malaysians!





Run & Ride for Charity

More than 7,000 people participated in the Orchid Run & Ride 2019 which raised more than RM500,000 for various charitable causes. Held for the fifth consecutive year by the Association of Wives and Women Staff of PETRONAS (PETRONITA), the proceeds from the run went to non-profit organisations such as Breast Cancer Welfare Association Malaysia, the Child Development and Rehabilitation Centre of the Women and Children Hospital Kuala Lumpur, Tabung PPUMCare founded by University Malaya Medical Centre as well as the Mental Illness Awareness and Support Association.

6
October
2019



13
October
2019

Making History

The Mercedes-AMG PETRONAS Motorsport team clinched its historic sixth consecutive FIA Formula One™ World Constructors Championship. Thanks to PETRONAS' Winning Formula and a stellar team, this achievement is a first in the history of the sport.



PETRONAS AT A GLANCE

Petroleum Nasional Berhad (PETRONAS) is a global energy and solutions company, ranked amongst the largest corporations on Fortune Global 500®.

We seek opportunities in energy investments both in hydrocarbon and renewables across the globe and maximise value through our integrated business model. Our portfolio includes conventional and unconventional resources as well as a diverse range of fuel lubricant, and petrochemical products. This is further strengthened with a successful product delivery track record. Our customers are at the heart of everything that we do and our businesses are anchored on meeting their needs.

Our technology is our differentiator and the key to ensuring excellence in all that we offer – energy, products and solutions, as well as unlocking new business frontiers. Sustainability is at the core of everything that we do, as we believe in harnessing the good in energy to add quality to everyday lives. People are our strength and partners for growth. We believe in progressing with our partners in addressing the evolving needs in today's changing energy landscape.

STATEMENT OF PURPOSE

A progressive energy and solutions partner enriching lives for a sustainable future.

SHARED VALUES

- LOYALTY** - Loyal to corporation
- INTEGRITY** - Honest and upright
- PROFESSIONALISM** - Strive for excellence
- COHESIVENESS** - United, trust and respect for each other

TOTAL LNG SALES VOLUME OF 28.94
MILLION METRIC TONNES

390 BCE LNG LOADABLE

DELIVERED FROM PETRONAS LNG COMPLEX IN BINTULU, SARAWAK

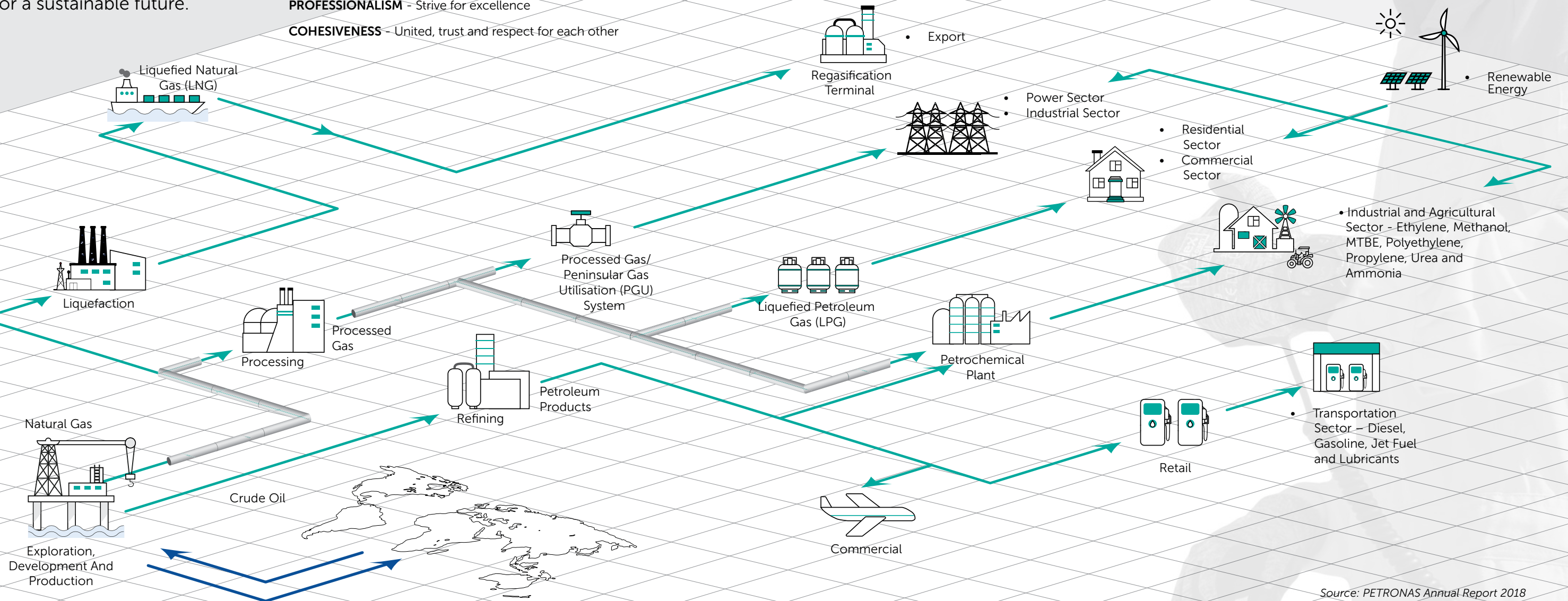
AVERAGE PRODUCTION 2,361 kboe/d

91.9% Downstream Plant Utilisation

94.4% Overall Equipment Effectiveness (OEE)

97.9% Downstream Reliability

6 6-TIME CONSECUTIVE WORLD CONSTRUCTORS' CHAMPION IN FORMULA ONE™



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