GLOBAL BUSINESS REPORTS

GBR SERIES

SOUTHEAST ASIA CHEMICALS 2024

Petrochemicals - Specialty Chemicals - Oil and Gas
Energy Transition - Hubs - AI - Supply Chains

Dear Readers,

Over the past twenty years, Global Business Reports (GBR) has been reporting on various countries in Southeast Asia, with Singapore receiving our most consistent attention. However, while researching each report, our attention was lured further into the region, something that any discerning investor has probably also experienced. ASEAN is the fourth largest economic bloc globally and hosts the third largest population in the world. For the chemical industry, ASEAN is impossible to ignore. It is thus time that GBR added to our portfolio of mostly country-specific reports a new regional format: We are delighted to introduce Southeast Asia Chemicals 2024.

Taking a multi-country perspective poses the risks of over-generalizations and asterisked lines of argument. Another challenge of scale is where do chemicals start and end? It is a long way from the oil well to the toothpaste tube and the other myriad products derived from chemicals. Do new arenas of bio-based ingredients, materials, and fuels fit under the definition of chemicals?

To resolve these conundrums, we like to think of the articles that make up this book as explorations of simple questions with no simple answers. The first article is nothing more than a "Why Southeast Asia?", where we look at the growth promise of Southeast Asia to explain why this region matters from a demand and productivity perspective. We then analyze three countries in the region: Singapore, the nation that is itself ready to move beyond traditional definitions of "chemicals"; Malaysia, a prototype oil and gas cum chemicals powerhouse that must snap out of its comfort zone through investments in higher-value products; and Indonesia, whose vast population makes it the most likely contender for the largest chemical industry in the region, yet the distance from potential and realization largely depends on the country's politics.

Then, we start dismantling the hydrocarbon value chain. Southeast Asia's chemical industry is shaped directly by its linkages with the upstream and, more than before, by how close it can develop linkages with its downstream. We found that investments are cascading down the supply chain, with oil and gas players taking positions in petrochemicals, while petrochemical companies evolve into more specialty production. Specialty chemicals companies, meanwhile, are working closer with their end customers. Lastly, we check the supply chain, placing the industry into a global context, where geopolitics, logistics, and shifting economic powers place the region in a new light.

We would like to thank our more than 70 interviewees and our loyal readers for engaging in being a part of these fascinating conversations.

Alfonso Tejerina
Director and General Manager
GLOBAL BUSINESS REPORTS

SOUTHEAST ASIA CHEMICALS 2024
GBR SERIES

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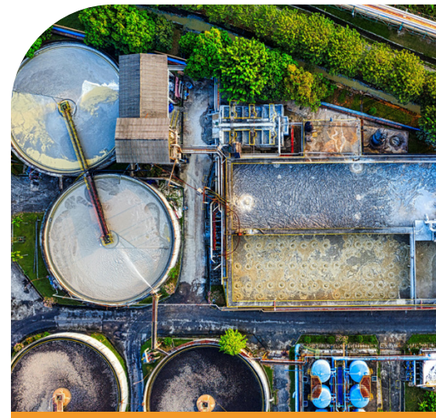

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Southeast Asia in the World

> Multibillion-dollar companies are finding in Southeast Asia a unique mix of low, medium, and highly skilled workers in very close proximity. The region has a lot going for it, and, as a regional bloc, it has the potential to become a chemical powerhouse.

Aaron Montgomery
President and CEO
OURAY

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Image courtesy of Bain & Company

GDP Lopsided to the East

In a growth-starved world, ASEAN plays a demographic card

GDP growth is a modern fixation, introduced at the end of the Second World War (WW2). Ancient dynasties, kingdoms, empires and the first republics all sought to accumulate territory and wealth, but countries today frame their central policies for above x % annual growth and large GDPs in PPP (purchasing power parity) terms, which are believed to be the recipe for development and prosperity. But in the "tepid twenties," to use the words of IMF head Kristalina Georgieva describing the current decade, global growth is laggard, expected to stay quite flat at 2.8% to 2030. This historically weak figure mixes bleaker prospects in the Western hemisphere with rampant growth in the East: China is to be steady at 3.5%, ASEAN to continue its run of near-constant growth above 5% over past 20 years, and India, leapfrogging both, has a turbocharged growth at 7.5%.

Jump ahead another 25 years and the world looks quite different, with the E7 (Emerging 7) economies dominating the world's top 10 ranking, whereas the G7 countries take lower positions, according to IMF projections. With China (1st), India (2nd), and Indonesia (4th after the US), at the top, the balance of power is shifting decisively towards Asia by 2050. That could rewrite the rules of the world, including the standing of institutions like the IMF, created at the end of WW2 to organize a GDP-driven world order. After all, GDP is more than an economic yardstick; it is also a measure of power.

For the scope of this report, we will stick to understanding the basis of growth and its drivers - because it informs the focus of the chemical industry for today and tomorrow.

After a miserable 2023 and no clear recovery in sight, the short-term scenario for the chemical industry is weighed down by wars, a thickening so-called "economic iron curtain" between the US and China, and persistent inflation. The chemical industry must look further into the future for growth projections and follow these carefully. ASEAN, the political and economic union that comprises 10 of the 11 nations located in Southeast Asia, scored a couple of wins on the investment front recently: In 2022, foreign direct investment (FDI) in ASEAN reached an all-time high at US$224 billion. ASEAN has also beaten China as the number one destination for manufacturing investment coming from OECD countries, according to fDI Markets, as investors use the region as a hedge to the tit-for-tat tariff measures imposed between China and the US. According to BCG, ASEAN could reap up to US$600 billion a year in additional manufacturing output.

Predictably, the chemical sector has also shifted to Asia, with net outflows normally directed to Western Europe going to Asia Pacific in the past three years. The Southeast Asian chemical industry is forecasted to grow from US$239 billion in 2022 to US$448 billion by 2030, noted the Minister of Investment, Trade and Industry of Malaysia.

ASEAN is emerging as a prominent FDI destination both because it is in the middle of APAC, indirectly benefiting from that rising Asian-centric consumer and manufacturing hub, and for its own merits as a rising growth engine: As a bloc, ASEAN is expected to rise from fifth to the fourth largest economy in the world by 2030. Singapore, one of the Four Asian tigers (alongside Hong Kong, South Korea, and Taiwan) is a magnet for FDI investment, especially in high-tech and R&D-heavy sectors. Meanwhile, the so-called "tiger cubs," the developing economies of Indonesia, Malaysia, the Philippines, Thailand, and Vietnam (known also as the Emerging 5), have the strongest growth outlook to 2030 among major regional groupings. The Philippines and Vietnam will be making the biggest jumps, predicted to become the 19th and 20th largest economies globally by 2050.

Behind these performances sits something as fundamental as it gets: demographics.

Ask anyone why they invest in Southeast Asia (and we did) and they will give the same simple answer - that it has one of the most attractive demographics. At the most basic level, ASEAN represents 8.4% of the world's population. Its 671.7 million people make it the third-most populous region and, by default, a key market for the chemical industry. But there is more to it. French philosopher Auguste Comte put it beautifully, if a bit vaguely: "Population is destiny." Demographic economists have a crueler way of looking at the same idea, seeing the people inhabiting a country in productivity-versus-liability metrics. This article will take a similarly desensitized approach: Southeast Asia has a window of demographic premium that will be propelling its growth.

ASEAN countries are to yield a demographic "dividend" for the next two to three decades, which accounts to a big extent for its projected economic boom over that same period. While many of the developed economies in Europe, Japan, and soon China are facing an aging demographic, and the global South, primarily Africa, has explosive fertility rates and rapidly growing populations, ASEAN is in a (temporary) sweet-spot, with a high and growing working-age human capital and low numbers of dependables, or people of non-working age, namely children and the elderly.

Image courtesy of Azelis

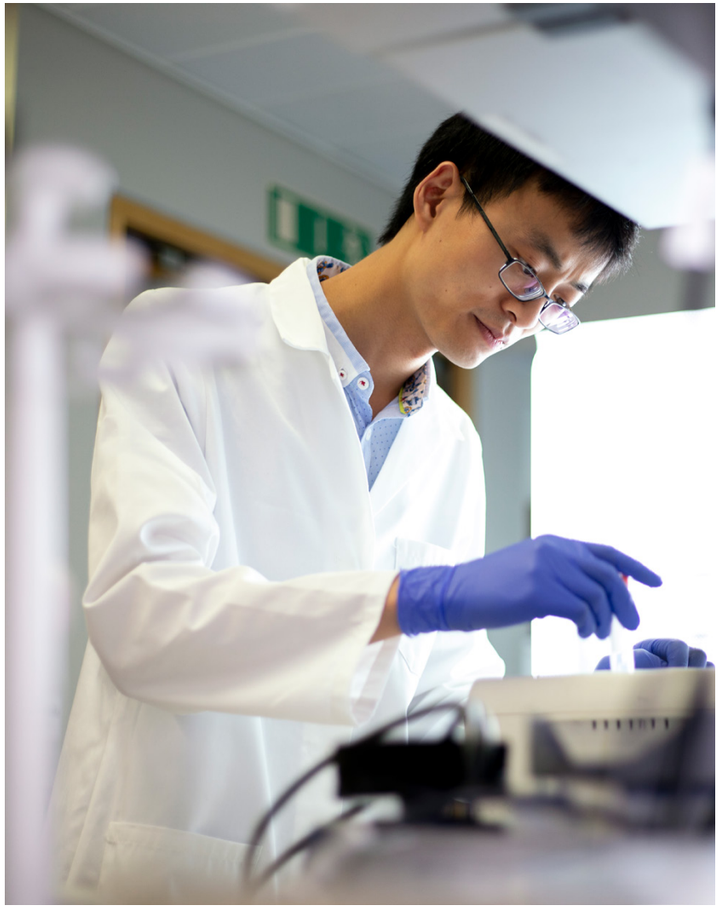
There is a direct correlation between the rise of the middle classes with an increase in demand for commodity and specialty chemicals production and trade. As an example, in low-income households, smaller quantities of products like cooking oils are bought, but as disposable incomes increase, order volume rises with purchasing power; that has an impact on the producers, but also on transporters like ISO tanks, since bigger volumes call for the use of ISO tanks over the smaller forms of packaging. The whole supply chain changes. Younger generations are also found by marketing analysts to be more eco-conscious. The chemical sector has taken note of this. "One megatrend, increasingly more prominent with Southeast Asia's young demographic, is eco-consciousness. Consumers want more sustainable products, on top of that, seeking products that are highly functional and appealing," said Ramon Brentan, VP for Scent, Greater Asia, at IFF.

The correlations are at every level – demand for electronics, cars, housing, supporting infrastructure related to increased urbanization, consumer products from shampoos to luxury perfumes, and, of course, food is on the rise. Rui Fernandes Teixeira, vice president for sales, marketing & strategy at Bureau Veritas (Asia-Pacific & Middle East) summarized the key mega-trends driving the company's growth in the testing and certification space in the region: Infrastructure development; the energy transition and the need to make power supply more affordable, reliable, and greener for the region; and urbanization, as agricultural economies turn into industrialized economies.

At the same time, a young working population also translates to higher manufacturing and service productivity. The global share of manufacturing, especially in the heavy industries, has already shifted and continues to shift to Asia, where it finds lower production costs. Marcelo Tarkieltaub, regional director for Rockwell Automation in Southeast Asia believes Asia is on the path to becoming the world's largest manufacturing center in the next 10 to 30 years. "Within this huge region, the ASEAN bloc fits nicely as an emerging economy, powered by a growing middle class and improving education standards. Together with India, Southeast Asia checks all the boxes as a key manufacturing powerhouse," he completed.

BCG estimates that ASEAN could generate up to US$600 billion per year in additional manufacturing output; export outputs from the region are already outpacing the global average, at 5% annual growth against the 3% globaly. Nevertheless, ASEAN'total trade only accounts for 7.7% of global trade, writes the Jakarta Globe. ASEAN countries could leverage a lower-cost advantage compared to China, where manufacturing wages have doubled in the past decade, according to Roland Berger, a business management consultancy in Germany, but it cannot rely on that cost advantage alone. The same source mentions the productivity gap between many ASEAN countries and China remains a large one, which means the region would have to take the bitter bill of investments in upskilling and digitalization to compete on more than a cost basis.

All that said, the relationship between demographics and growth is not a directly causal one. Nor are the mathematics of GDP a reflection of a country's real prosperity.



ASEAN is certainly not a monolithic region and some of its countries are already aged. Singapore is on its way to becoming the country with the lowest fertility rate by 2050, writes the Diplomat. Singapore has the advantage of being a top destination for immigration to make up for a declining domestic workforce. Though it attracts both blue-collar and white-collar workers, most of the menial jobs in the country are done by immigrants, primarily from South Asia, while its older population continues to work to a very late age to be able to withstand the cost of living. In the last few years, Singapore has reviewed its immigration policy, introducing the Complementarity Assessment Framework (COMPASS); the number of work permit holders increased by 15% in the last two years, noted Airswift, a recruitment firm.

The demographic dividend will eventually end, both because of declining birth rates and longer lifespans leading to higher numbers of retirees, with the over-65 population doubling or tripling in all Southeast Asian countries. It is the latecomers to globalization, such as Myanmar, Laos, or the Philippines, that will maintain a higher (above 2.0) birth rate in the coming decades. In Indonesia, the country's dependency ratio (children under 15 and adults over 65 per 100 working-age adults) will start rising by the next elections in 2029. That raises some question marks for a country whose healthy GDP growth has been primarily rooted in household consumption, banking on growing domestic demand.

One in four people in the region will be over 60 by 2050, according to Marketing Interactive. That does not necessarily mean a demand ceiling, however. The Japanese found a silver lining in the "silver" generation, a term to describe the over-60s as significant spenders and growth contributors.

If there is anything that can learned from China's draconian one-child policy, it is that demographics are not controllable: the Chinese experiment came biting back, resulting in a shrinking workforce. After this preamble, the next articles will work through the many other considerations that either override or are influenced by demographics. ■

One cannot paper over the fact that growth is often unequally distributed, more so for such a diverse region as Southeast Asia. The richest 1% in both Indonesia and Thailand control over half of the countries' wealth, noted Business Sweden. Inequality is widening in the region, and the urban-rural divide is starker.

Rapid urbanization is putting pressure on the resources of large cities and potentially leading to higher levels of poverty and inequality, rather than elevated middle-classes. A further 70 million people are to move into cities by 2025 in the region, according to estimates by the ASEAN Secretariat. That creates a big infrastructure gap estimated by the Asian Development Bank to be between US$2.8 trillion and US$3.1 trillion for the 2016-2030 period. Infrastructure spending exceeds GDP growth in some of the countries. The right population mix is not a guaranteed precursor of growth without the right policy mix. Urban sprawls can lead to the spread of slums, growing inequality, urban congestion, and, in many cases, more poverty.

Also, the region is highly fragmented, which makes the argument for its total or combined growth prospects more difficult, despite the success of ASEAN, the most prolific economic bloc after the EU: "Unlike the EU, ASEAN is not a single market, each country has its own rules and regulations. When there are existing FTAs in place, these can still be difficult to navigate," mentioned Paul Nai, managing director for Southeast Asia at Lubrizol, a specialty chemicals producer supporting the additives and advanced materials businesses in APAC.

Image courtesy of Azelis

> "A lot of the requests we receive from our clients are around doubling down on costs, becoming more efficient in conversion, produce higher grade polymers, and commercial excellence."

Thomas Luedi

Senior Partner, Head of Asia Chemicals and Commercial Excellence Practices
BAIN AND COMPANY

Could you briefly explain Bain & Company's footprint and set-up in Southeast Asia, within the Energy and National Resources (ENR) practice?
Bain & Company has offices in Bangkok, Kuala Lumpur, Singapore, Jakarta, and two years ago we opened two new locations, in Manila and Ho Chi Minh. Energy and Natural Resources is one of the top three global practices, encompassing oil and gas, chemicals, mining, utilities, and agriculture, across which we see a much deeper level of cross-integration as opposed to 10 years ago when these verticals were more silo-ed. Bain & Company has done well integrating these cross-sector perspectives at both country and regional levels. I personally lead the chemicals division in Asia, as part of a team of 100 consultants dedicated to this industry.

How is the Southeast Asian petrochemical market doing in 2024?
The Southeast Asian petrochemical market faces multiple import pressures. China is continuing to invest in the capacity to become self-sufficient across several key chemicals, like polycarbonates (which it managed a while back) or polypropylene (more recently). The transition from importer to potential exporter of the world's largest petrochemical market is a tectonic shift for the industry. Additionally, discussions in the Middle East about more crude oil to chemicals production, as opposed to fuels, in the context of the energy transition and uptake of electric vehicles, are also mounting.

Due to its geographical positioning, Southeast Asia is exposed to imports not only from China, where surpluses of intermediates have built up on account of a slower Chinese economy, but also from the Middle East and the US Gulf Coast. Tariffs between the US and China turned both countries towards Southeast Asia, so the region has become a sort of "catch-all" market for petrochemicals. That poses challenges for domestic producers, who are losing significant market share to lower importers.

What can Southeast Asian players do to overcome current challenges and boost their competitiveness?
In the current market, most Southeast Asian petrochemical companies have returned back to the basics, focusing on margin optimization and capacity utilization. A lot of the requests we receive from our clients are around doubling down on costs, becoming more efficient in conversion, produce higher grade polymers, and commercial excellence to try to capture the maximum of the domestic market (where they have better control of the product and can enjoy higher profitability since export costs are removed). When we do diagnostics for our clients there is always some opportunity for further harmonization, digitalization, etc. to drive efficiency across functions and squeeze further value.

How do you see the economics stacking up in terms of circular plastics (whether bio-based or recycled)?
Circularity has gained more steam over the course of last year. The industry is trying to figure out the economics of plastic waste and what is the real demand for it, especially since some brands have made announcements to postpone their circularity targets. That has caused some uncertainty over how big the market really is, the willingness to pay for the premium, access to materials, and even the role of traditional petrochemical companies versus independent recyclers.

The economics remain quite challenging. It will be down to investment subsidies and incentives to essentially build more capacity and optimize the process – the higher scale of production will eventually drive costs down. We will likely continue seeing strong demand for virgin plastics in this region until recycling and bio-based plastics catch up.

How has the commodities downcycle impacted transaction-making and investments in the chemical space?
If we go back a few years, both PTT GC and PCG forayed into specialty chemicals, with PTT GC buying Allnex in 2021 and PCG buying Perstorp a year later; Indorama also completed a series of transactions, prioritizing inorganic growth as part of their growth engine. Globally, ADNOC made a bid for Covestro, and Aramco continued to take minority stakes in various Chinese producers. It will be interesting to see if this underlying activity of investments will continue among Southeast Asian players. Another transaction/partnership driver could be between naphtha suppliers and standalone crackers that need access to low-cost feedstock. ■

ASEAN IN FIGURES

672
MILLION
THE WORLD'S THIRD LARGEST POPULATION

373.7
MILLION
PEOPLE OF WORKING AGE IN 2022
(THE LARGEST AFTER INDIA AND CHINA)

POPULATION

	(Million)
Indonesia	275
Phillippines	115
Vietnam	98
Thailand	71
Myanmar	54
Malaysia	33
Cambodia	16
Laos	7
Singapore	5
Brunei	0.45

GDP PER CAPITA

	(USD)
Singapore	88,450
Brunei	35,110
Malaysia	13,130
Thailand	7,810
Indonesia	5,270
Vietnam	4,620
Phillippines	4,130
Cambodia	2,630
Laos	1,980
Myanmar	1,250

ASEAN is the fifth largest economy in the world, expected to become fourth largest by 2030

GDP (2022)
US$3.6 TRILLION

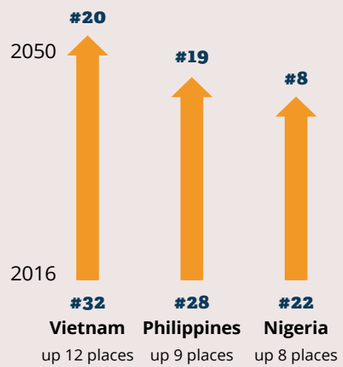
	(USD)
Indonesia	1.319 trillion
Thailand	495.4 billion
Singapore	466.8 billion
Malaysia	407 billion
Vietnam	408.8 billion

WORLD'S TOP 10 ECONOMIES IN 2030 (GDP AT PPPS)
Source: IMF (2016), PwC (2050)

2016	2050	
1	1	China
2	2	India
3	3	US
4	4	Indonesia
5	5	Brazil
6	6	Russia
7	7	Mexico
8	8	Japan
9	9	Germany
10	10	UK

E7 economies G7 economies

GREATEST MOVES UP THE RANKINGS
Source: IMF for 2016, PwC for 2050 projections



ASEAN's Growth Story

Alexander Donau, Regional Head Asia Pacific, Leschaco

"If we look at the historic growth of China, it was long expected that half of the world's economy will happen within APAC. While East Asian countries like Korea and Japan have reached a high level of economic maturity, with moderate growth expectations, Southeast Asia is waiting for the 'big bang' and is ready to take off. Ongoing nearshoring and onshoring investments are supporting this shift."

Paul Nai, Managing Director Southeast Asia, Lubrizol

"Whereas China is going through a phase of aging demographics, the median age for Southeast Asia remains very young, at under 30. The dominant young generations are tech-savvy, better educated compared to their parents, and are moving faster into the middle-income tier. These factors drive the move up the manufacturing value chain, something that most countries in the region are eager to see."

Rui Fernandes Teixeira, Vice President, Sales, Marketing & Strategy Asia-Pacific & Middle East, Bureau Veritas

"As agricultural economies transform into industrialized economies, and populations shift from rural areas into cities, huge investments in secure energy, electrical vehicles, digitalization, and network infrastructure will be required to accommodate them."

Jun Saplad, Regional President APAC, dsm-firmenich

"Southeast Asia is full of opportunities. To focus on three specific ones, I would name the rising middle classes, an accelerating aging population, or what we call the 'silver' generation with higher purchasing power, and the growth of the conscious consumer."

Andy Ang, Managing Director APAC, Royal Den Hartogh Logistics

"Asia is home to the fastest-growing middle class population in the world. We established local offices in what we call the 'six dragons in Asia'- China, Korea, Thailand, Malaysia, Singapore and Indonesia - petrochemical hubs with their own refineries and downstream chemical chains."

> As industries and customers diversify their presence in Asia, I would like to position BASF as the main growth partner and innovator in this transition.

Marcelo Lu

President, Asia Pacific (excl. China)
BASF

What are the main goals you set out as you take over this role at BASF?
I am excited to take on the challenge of leading BASF's growth in the Asia Pacific region outside our Greater China operations. As industries and customers diversify their presence in Asia, I would like to position BASF as the main growth partner and innovator in this transition.

Could you give our readers a sense of the importance that Southeast Asia holds for BASF?
Almost half of our net sales in Asia come from outside of Greater China. We have a strong production, sales and innovation base already in Southeast Asia, which we will continue to expand. In ASEAN we see unique opportunities for growth given the population profile and fast adjustment of consumer habits. Additionally, Southeast Asia is going through a strong infrastructure boom, which is driving the demand for chemicals used in various industries such as construction, automotive, electronics, and packaging. Interestingly, Southeast Asian countries are also strategically located in areas where renewable feedstocks are more broadly available, which also supports interesting potential sustainability initiatives.

How do you envision the future of Singapore in the petrochemical and specialty chemical space?
BASF has been in Singapore since 1978. In August 2022 we launched our fourth production facility in Tuas, Singapore. The addition of this new Tuas site strengthens our commitment to Singapore and our market presence in the Asia Pacific region. Singapore has established itself as a key player in the region's chemical industry and has been actively investing in infrastructure, research and development, and talent development to maintain and enhance its competitiveness. Singapore's strategic location, excellent port facilities, and well-developed logistics network have made it a preferred hub for petrochemical and specialty chemical companies. The government's support through various initiatives, such as tax incentives, grants, and infrastructure development, has further attracted investments in the sector. By fostering collaboration between industry, academia, and government, Singapore can further strengthen its position as a leading hub for petrochemical and specialty chemical innovation in the region.

BASF is introducing more bio-based products. Could you delve into some current areas of innovation within BASF's portfolio?
BASF has introduced various bio-based and sustainable products in the Asia Pacific region, addressing areas like carbon footprint, recyclability and circularity. The Australian food packaging manufacturer Confoil and BASF have cooperated to develop a certified compostable and dual ovenable food tray based on paper. The paper tray is coated on the inside with BASF's ecovio® PS 1606, a partly bio-based and certified compostable biopolymer especially developed for coating food packaging made of paper or board. The trays extend the end-of-life options for paper-based packaging by being organically recyclable. Additionally, BASF offers Chelastop®, a line of biodegradable chelating agents, including Chelastop® HP, derived from renewable raw materials. These chelating agents are used in applications like laundry detergents, improving cleaning performance while being environmentally friendly. The BASF dispersions plants in Dahej and Mangalore, India, have each received REDcert2 certification. These plants are the first in India to achieve the REDcert2 standard, an independent third-party audit process. This certification enables BASF to supply certified low-carbon-footprint dispersions through the biomass balance (BMB) approach that perform identically to fossil-based dispersions. These are just a few examples of sustainable products and measures that BASF has launched in the Asia Pacific region.

What is your outlook for 2024 for the specialty chemical markets?
We are looking for a stabilization year in 2024 after a challenging 2023. We still need to see China recover as the Asian region outside China is very dependent on Chinese economic activity. In the specialty chemicals market in Southeast Asia, we already see some signs of stabilization and pull from the market, but it is not clear that this is yet a recovery. Given the experiences during the pandemic and supply shortage situation, there was a lot of inventory built up that in some areas is still being consumed. Depending on how the economy and geopolitics develop, we should see this normalizing and, by end of the year, get back to a growth path. The key remains to keep innovating and keep bringing good solutions to our customers and industries. Differentiation and formulation capability are key winning factors to continue to expand the specialty chemicals market. ■

> These are times to stick close together as partners, be it our distributors, our customers, or suppliers.

Vinod Agnihotri

Managing Director, ASEAN & VP and Head of MPP APAC
LANXESS

Could you remind our readers of Lanxess' presence in Southeast Asia? How has this presence changed with the integration of the microbial control business of IFF?
Singapore serves as a regional headquarters and is part of a broader network of capabilities which includes: one legal entity in Singapore, two in Thailand, two in Malaysia, one in Vietnam, and one in Indonesia, complemented by two representative offices in Vietnam and Indonesia, respectively.

Since the acquisition of the IFF microbial control business in 2022, we have been consolidating our presence in the region. On the production front, we retain a production site for material protection products business unit in Singapore, expanding and introducing new products as part of newly created synergies with the IFF business; these include specialty chemicals for the care and industrial preservation markets, all integrated into our existing site. Furthermore, our technical center in Singapore has also been enriched with the acquisition, merging additional capabilities and knowledge.

What is the 2024 outlook for Lanxess' core business units, particularly for the Southeast Asian region?
Southeast Asia has become a critical region for our consumer protection business. Meanwhile, our lubricant additive portfolio is also high-value and less cyclical, with a broad base of uses, including the aviation industry or other heavy metal industries, whereas rubber additives find usage in tires for the automotive sector, as well as the shoe industry and other niche applications.

Could you give some examples of how your consumer portfolio adapts to the trend for more natural products?
For the rest of 2024, we continue to leverage our setup in Southeast Asia to offer a comprehensive product basket, following those growth segments, especially in personal care, home care, preservatives, and anti-microbial, as well as aroma chemicals from our flavors and fragrances portfolio. We are presenting an extensive portfolio for the cosmetics industry, for instance, including multifunctional ingredients for different pH ranges and end-product requirements in lotions, soaps, shampoos, and so on. We are also focused on formulating more sustainable solutions for innovative personal care products, tailored to a broad pH spectrum and with a lower content of conventional chemistries. Biodegradable alternatives for the preservative, fragrance, and flavor markets are also a big part of our focus.

Could you brief our readers on Lanxess' sustainability targets and its recent progress towards these targets?
Back in 2019, Lanxess committed to carbon neutrality by 2040 for our Scope 1 and Scope 2 emissions; since then, we have extended our goal to include Scope 3 emissions with a deadline set for 2050, aligning with the Paris Agreement. This entails a full, cradle-to-gate approach. Lanxess has been consecutively ranked at the top of the Dow Jones Sustainability Index, coming first in Europe and third globally in the last ranking. Many of our sites are ISCC Plus Standard, an international certification for circularity. Lanxess is also on the "A List' of the Carbon Disclosure Project for the seventh time.

Besides these external validations, Lanxess has developed an internal label called "Scopeblue" to identify products that rely on sustainable raw materials (either recycled or bio-based) by at least 50% or provide a minimum of 50% carbon footprint reduction when compared to traditional products. Products that wear this label include our NEOLONE BioG Preservative and Purox S Scopeblue.

High product stocks have been slow to be absorbed due to low demand. How are things looking in 2024?
Global demand has not yet returned to normal levels and 2024 will therefore remain a challenging year for the chemical industry. However, we see a slight upturn in the first quarter this year. The positive trend is expected to continue in the second quarter, leading to a slight increase in demand for the rest of the year.

Do you have a final message for our international audience?
These are times to stick close together as partners, be it our distributors, our customers, or suppliers. Historically, the chemical industry has been going through multiple cycles, some of great intensity, and we must hang on because soon enough, the markets should be back in full throttle. ■

> As a manufacturing service provider for multinationals we are privileged to have become an important business partner, as they redraw their supply chain footprint and build local capacity.

Johnson Lai

Vice President
CHEMICAL SPECIALTIES LIMITED (CSL)

How have a weaker demand and ongoing supply chain disruptions reverberated on CSL's business?
2023 was a challenging year for the chemical industry, which had somewhat impacted on the volumes of our customers serving the region. Instead of the big recovery that everyone was hoping for, recovery came in small pockets. While demand stayed flat, the crisis in Ukraine and major disruptions in the Red Sea added further pressure on supply reliability. The silver lining from CSL's business perspective is that these global disruptions have further motivated companies to actively pursue a more resilient supply chain footprint. Rather than shipping from Europe through the Red Sea into Asia, they can work with a contract manufacturer like us to bypass these long lanes and secure their product manufacturing capability locally (within Asia). The more serious the issues in Europe and the Middle East, the more resolute the manufacturers' decisions to reduce as much dependency on long supply chains to serve the region. Taking everything into account, CSL is in a sweet spot: As a manufacturing service provider for multinationals we are privileged to have these conversations with new customers and become an important business partner, as they redraw their supply chain footprint and build local capacity.

CSL produces specialty chemicals for third parties. How is the structural surplus in the commodities space impacting the specialty side?
While CSL is a mid-volume, mid-range specialty chemicals toll manufacturer that does not deal with commodities directly, we are not immune to imbalances in the commodity markets. As some producers have shut down / scaled down production to curb overcapacities, specialty producers face raw material (commodity) shortages. It is a curious contradiction to see the price of raw materials for specialty chemicals escalating due to throughput cutdowns at a time when commodity basket prices are trending low.

Based on the discussions I have with peers in the industry, it may take take until the second half of 2024 for excess inventory in some markets to digest itself and for supply to regain balance.

As a toll manufacturer, how do you fit within your customers' emissions cutting mechanisms?
Toll manufacturers have no influence in Scope 2 (upstream raw materials/ purchased utilities) or Scope 3 emissions (supply chain emissions), so we can only play a role within the Scope 1 emissions footprint, which are generated through the production process. As the middle part of that chain, CSL takes responsibility for the energy and water use, making sure the plant is run as energy efficient as possible, and striving to minimize waste generation.

In terms of the products we make, there is always the opportunity to work with oleo-chemistries by making oxide based surfactants. While biodiesels and other natural feedstocks fall under the commodity range and are therefore outside of our focus, surfactant chemistries are compatible with our hardware, as specialty chemicals / esters used in personal care and cleaning chemicals. CSL is geared up to producing these green chemistries and we are looking out for opportunities in the esterification chemistry and surfactants space.

CSL is one of the only mid-to-large scale specialty chemical toll manufacturers in Singapore. Why is that and how does CSL differentiate?
Over the past 14 years, CSL has carved out a reputation as a large-scale contract manufacturer for specialty chemicals, exclusively serving third-party clients, setting ourselves apart right from the outset. We operate independently and with high integrity on customers' IP rights, in a country that is recognized as one of the best in the world for advanced patent protection, which gives our customers peace of mind. Singapore's geographic, logistical, and trade advantages position it as an ideal regional hub. Moreover, we are tapping into the feedstock available on Jurong Island, being connected via pipeline to critical raw materials molecules. By capitalizing on these advantages, CSL offers our clients a low-risk entry point into the region, enabling substantial savings in CapEx and time investment, yet having a reliable, safe and knowledgeable operating team to make their products.

Do you have a final message?
CSL is right in the middle of the transformation from a global to a regional manufacturig footprint. ■

> Being able to service this region from Singapore plays out as a significant advantage for us. With the future growth potential of China in question, I believe Southeast Asia will be the beneficiary.

Aaron Montgomery

President and CEO
OURAY

Could you explain Ouray's core expertise?
Ouray is a chemical service provider with a legacy in emergency response, but we also do special projects, as well as scheduled projects. Around 98% of our customers are either chemical manufacturers like Dow, Solvay, and Chemours or ISO tank operators like Hoyer, ITT and Suttons, all typically multinationals with facilities or shipping in many different countries. Almost no matter where in the world our customer is, Ouray can organize a response – this is our specialty. For example, we just completed a small project at the port in Sri Lanka and are embarking on a large project in the Philippines. We have service capabilities in over 100 countries. Sometimes the intervention can be managed over the phone using local contractors or collaborating with local port authorities, while other times we may need to send our team on the ground to manage situations like a spill.

What have been the main market developments over the past year?
In the first quarter of 2023, we were watching the beginning of a slowdown in raw material prices. This trend has carried on through the year, recovery seemingly "one quarter away" until that quarter has passed. However, the ISO market seems to be picking up, with more volumes moving. As the market recovers and budgets loosen, we should see an extended reach into Southeast Asia in terms of large- and small-scale projects in the region. We also noticed a shift in our transloading business where renewable fuels have provided revenue growth in the spot of specialty chemicals. With our diverse mix of services, Ouray has maintained steadly growing revenue.

In your experience, what is something that is key when dealing with hazardous materials and risk situations?
Ouray is lucky - or unlucky, depending on how you look at it - to deal with a large variety of chemicals all the time. This guards us against complacency. If you deal with the same chemical every day you are more prone to complacency, but if you constantly need to learn about new chemistries, some not seen before and each with a different safety data sheet, you are always on guard to understand and mitigate the hazard. From the vapor pressure and boiling points to the protective equipment and everything required to conduct a repair on a damaged container, we stay alert about the risks and make sure people also understand these risks. We have many internal processes and procedures, which can get onerous, but they are necessary to keep everyone safe. Maintaining constant vigilance and adaptability, especially when facing diverse chemicals and novel hazards, is paramount for effectively managing hazardous materials and risk situations.

What markets present the most opportunities for growth?
We strongly believe in Southeast Asia. Countries like Vietnam, Malaysia and Indonesia are increasingly attracting investment in hard assets for chemical production and blending and this naturally drives the local ISO market too. Being able to service this region from Singapore plays out as a significant advantage for us. With the future growth potential of China in question, I believe Southeast Asia will be the beneficiary. Multibillion-dollar companies are finding in Southeast Asian countries a unique mix of low, medium and highly skilled workers in very close proximity. The region has a lot going for it, and as a regional bloc it has the potential to become a chemical powerhouse.

In the coming months, we are also looking to add new capabilities in Latin America, specifically in Brazil, where there is a gap for our type of service.

Meanwhile, in our domestic United States market, we have seen a huge amount of growth in chemical transloading. The US is quite unique in its ability to transport large amounts of chemicals over large distances by rail. We are looking to add new locations for imports-exports. For importers into the US whose clients only accept rail cars, we can import the product at the port of New Orleans, and transfer it to railroad tank cars to Ohio or other states; vice-versa, exporting clients with a chemical plant in West Virginia or Missouri can rail to New Orleans, from where we can load the product into ISO tanks for the international markets. ■

Country Analysis

“People have an outdated image of Indonesia from 20-30 years ago, but they must let go of that image and open their eyes to the manifold ways the country is changing.”

Fahrurrozi Zaini
President Director
INEOS AROMATICS (INDONESIA)

Image courtesy of Lummus Technology

Singapore

Change is on the horizon in the lion city

Ever since Shell announced a "strategic review" of its Singaporean assets last year, many questions were laid open over what may happen to the Pulau Bukom refinery and 1.1 million tons ethylene cracker that supplies ethylene oxide, ethoxylates, styrene monomers, and propylene oxide to chemical companies on Jurong Island. The review concluded with the announcement this year that Shell will be selling the complex to CAPGC, a JV between Indonesian leader Chandra Asri, as a majority owner, and giant Swiss trader Glencore. Shell's departure created an opportunity for two new entrees - with Chandra Asri gaining a foothold in the region's largest oil refining and trading centers, as well as access to naphtha feedstock for its Indonesian cracker, while Glencore makes Singapore, already one of its main marketing hubs, the only country where it has physical refinery assets, besides South Africa.

Image courtesy of Chevron Oronite

Once the transaction is complete by the end of this year, the refinery will likely continue processing sour crude to make transport fuels (60%) and chemicals (14%), at least in the short term, depending on the discussions between the new JV partners. It is possible they may decide to shift more into chemicals in the future. Companies on Jurong Island that depend on Shell's feedstock supply can rest assured for now, but the clarifications over the sale did not stifle bigger, more existential questions around the meaning of Singapore's losing one of its largest and first investors, even as it gains two other large players to the island. Is Singapore still attractive as an investment destination, especially for refining and petrochemicals? In fact, there is controversy around these questions. Of course it does. Probably more so today than ever before, because it is evolving into an increasingly more sophisticated hub and pushing innovation boundaries. But one must understand why the mooted review created so much anxiety.

First, the final decision was prefaced by a long period of uncertainty, which began back in 2020 when Shell decided to halve refining capacity at Bukom to 237,000 barrels per day (bpd), and three years later it proceeded to cancel two planned projects for biofuel and base oil production in Singapore. These actions sent the message that Singa-

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> "Last year, Singapore attracted close to US$9.6 billion in fixed asset investments; interestingly, the energy and chemical sector led the way, accounting for 35.6% of the total FDI."

Josephine Moh

Vice President, Energy and Renewables, Chemicals and Materials
SINGAPORE ECONOMIC DEVELOPMENT BOARD (EDB)

What have been the most recent developments toward the Sustainable Jurong Island vision?
Back in 2021, we announced plans to transform Jurong Island into a sustainable energy and chemicals park that both operates sustainably and exports sustainable products. We have made significant progress toward both threads. Within the focus of operational sustainability, a recent highlight is the creation of an industry consortium with ExxonMobil and Shell as lead developers for a cross-border carbon capture and storage (CCS) project that aims to capture at least 2.5 million t/y of CO_2 emissions by 2030. The S-Hub and the EDB signed an MoU in December last year to coordinate the planning and development of this project to reduce CO_2 emissions at scale by storing CO_2 deep underground or under the seabed.

In terms of producing sustainable products, there have also been multiple developments. Neste celebrated the opening of its biorefinery expansion project, making Singapore home to the world's largest production facility for sustainable aviation fuel (SAF). Arkema has also begun production of their bio-based high-performance polymer that uses castor oil for feedstock, while Evonik started the construction of an alkoxides plant, alkoxides being used as catalysts in biodiesel production and the chemical recycling of plastics.

How attractive does Singapore remain as an investment for the chemical and energy sectors?
Last year, Singapore attracted close to S$13 billion in fixed asset investments; interestingly, the energy and chemical sector led the way in terms of new investments in fixed assets, accounting for 35.6% of the total FDI. This reflects that Singapore remains a very attractive FDI destination, including for the chemical sector. Singapore continues to be a leading global hub in terms of refining capacity, the number of companies operating here (especially on Jurong Island), and the range of activities carried out in the country, from HQ-hub services to manufacturing and R&D. Specialty chemicals, or those products differentiated through technology and innovation, are a prominent area of interest. Companies are targeting certain growth segments like food and beverage, hygiene or electronics, and semiconductors. For example, this year Evonik established a Skin Institute, while Symrise has expanded its innovation capabilities at its enhanced naturals (plant-based) facility in Singapore last year.

Could you share the main mechanisms available to incentivize investments associated with the energy transition?
From a government perspective, we have a Low-Carbon Energy Research (LCER) Funding Initiative (FI), where we put aside S$55 million to support 12 hydrogen and CCS projects. In 2022, we announced a top-up of an additional S$129 million, essentially tripling our funding to support innovation efforts. When it comes to scaling up infant technologies, an initiative called Carbon Capture and Utilization Translational Testbed is being led by A*STAR, with the support of the EDB.

As the first country in Southeast Asia to introduce a carbon tax, how do you balance doing the right thing with cost competitiveness?
Singapore is a small island state with limited opportunities for alternative energies; not to mention, we are vulnerable to the impacts of climate change, such as rising sea levels. The country has committed to reduce our emissions to around 60 million t/y by 2030, and then reach net zero by 2050 Carbon abatement technologies are only one side of how we can get there. The other side is understanding and signaling that carbon comes with a price and that we will all pay for it.

Of course, we are sensitive to the fact we are an export-oriented country. For that reason, we introduced a carbon tax transition framework to help large emitters and export-oriented emitters adapt to the changes. We also have a scheme called Resource Efficiency Grant for Emissions available for industrial facilities undertaking projects that will reduce their emissions. Also, the proceedings collected from the carbon tax are channeled back into helping Singapore decarbonize and reach net zero.

How are Singaporean companies positioned when it comes to tapping into opportunities in Southeast Asia?
Singapore is right in the middle of this region, on a four-hour flight radius to all key markets. We also rely on an extensive network of 28 FTAs in place, meant to facilitate trade and business. Together with Enterprise Singapore, we established the Southeast Asia Manufacturing Alliance to help businesses grow their manufacturing and innovation footprint in the region. ■

> Through our Enterprise Sustainability Programme, energy and chemical companies can access subsidised sustainability courses and customised programmes to kickstart their sustainability journey more effectively.

Lee Pak Sing

Assistant Managing Director, Trade & Connectivity
ENTERPRISE SINGAPORE

Trade is one of the key contributors to Singapore's economy. Can you share more about Singapore's position as one of the world's leading global trade hubs?
Singapore is one of the leading commodities trading hubs globally. Today, we are home to around 400 global traders from all over the world and across key commodities, including energy and chemicals, agri-commodities, and metals and minerals. Key to Singapore's attractiveness is our robust trade financing framework, business-friendly environment, and strong connectivity to markets around the world.

By tapping our extensive trade network and ecosystem, global traders in Singapore can orchestrate global trade flows, ensuring that the right product is delivered to the right place at the right time, and in the most cost-effective way.

Singapore has refreshed its strategy to ensure competitiveness of our trade hub status. Singapore's Trade 2030 strategy seeks to deepen and widen trade. This entails working with traders to grow new business functions such as sustainability, engage in innovation projects and capture new markets. Widening trade by diversifying our network of global traders and encouraging trade flows through Singapore in new emerging areas, including green commodities such as biofuels and carbon credits.

Southeast Asia is one of Singapore's key trading partners. Specific to energy and chemicals, what are some trends and opportunities that you see in the region?
Singapore's proximity to SEA as a source and demand market puts us in an advantageous position to capture growth opportunities in the region. SEA is growing and industrialising fast. This means that the region's demand for energy, including clean energy, is expected to grow significantly.

As Asia's leading energy hub, Singapore is home to more than 150 major energy players in oil, gas, and LNG – this includes major players such as Vitol, Ecopetrol, Saudi Aramco, and Sinopec, that trade a diverse range of products from oil to liquified petroleum gas (LPG) to Liquified Natural Gas (LNG) to petrochemicals. Energy traders anchored here can access SEA to service demand in the region.

Demand for biofuels is expected to increase with the global push for decarbonisation, and the role of Asia and SEA markets will gain increasing importance. SEA markets like Indonesia and Malaysia are Asia's largest producers of biofuel feedstock, and Singapore's proximity to these supply markets has attracted both energy and agri-commodities traders to anchor their operations in Singapore. Enterprise Singapore is committed to growing our biofuels ecosystem, and we have set our sights to become Asia's leading biofuel hub.

The SEA region is also rich in nature-based solutions – this makes it favourable for Singapore-based companies to provide services to originate, finance and trade carbon credits from the region, and to develop insetting projects within SEA-based supply chains.

Home to over 120 carbon services and trading firms today, Singapore has the highest concentration of carbon service providers in the SEA region. Of which, close to 40 companies are also active in the trading of carbon credits in both compliance and voluntary markets – from independent traders such as Trafigura and Glencore, to large energy majors like BP and Shell, to natural resources companies and agri-commodities companies such as BHP and Agrocorp.

How else is Enterprise Singapore supporting energy and chemical players to explore new growth opportunities?
Beyond supporting companies in their trading activities, we also provide companies with resources and networks to support their innovation efforts or encourage knowledge sharing in areas such as sustainability. To facilitate the co-innovation of sustainable solutions, EnterpriseSG organises Open Innovation Challenges (OICs) that provides a platform for corporates to collaborate with global and local startups. Global energy majors such as ExxonMobil and Chevron have participated in previous iterations of such challenges.

EnterpriseSG also has several initiatives to support energy and chemical companies in their sustainability transition. Through our Enterprise Sustainability Programme, energy and chemical companies can access subsidised sustainability courses and customised programmes to develop a deeper understanding of sustainability and kickstart their sustainability journey more effectively. We organise knowledge-sharing sessions, including a recent Sustainability Outreach Information Session to share information about sustainability practices in the chemicals sector. The session saw the participation of representatives from close to 30 companies in the sector. We also work with companies to provide targeted support for sustainability-related projects, including sustainability strategy development, standards adoption, and the development of sustainable processes and solutions. ■

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pore is not only less competitive in the refining business, but it does not fit the bill either for Shell's lower-carbon businesses. Besides the three to four years of extended uncertainty, which typically makes investors nervous and invites speculation, the other reason why Singapore is taking Shell's divestment to heart is the symbolic role this plays, for the Bukom refinery is the country's oldest of its three (together with ExxonMobil and Singapore Refining Company), inaugurated back in 1961; it represented the first vote of confidence to establish the Singaporean oil refining and petrochemical sector, now among the largest in the world. For that, a transaction reported in the range of S$1.3 is more than a change of ownership between leading players; it cuts deep into Singapore's own standing as an energy hub.

Singapore can nod to Shell's quoted reasons for the divestiture – a focus on lower-carbon, higher-value, and more profitable products, as part of its wider value-over-volume current global strategy, because this is where Singapore is heading as well. But it does beg the pointed question of how Singapore can reinvent itself into a sustainable, green nation without alienating its CO_2-heavy petrochemical industry, or if being both green and heavily entrenched in the oil and gas business may not be mutually exclusive.

Exacerbating concerns over Singapore's competitiveness are two main policy changes, one outside of Singapore's control and the other driven from within. The first is the Global Minimum Tax (GMT) of 15% minimum rate applied to all multinationals, to which 140 countries agreed to. Singapore, whose attractive fiscal incentives have been at the core of attracting MNCs to its shores, will have less room to play on tax advantages beginning next year when the rule becomes effective; however, Singapore has already prepareda new program, called Refundable Investment Credit (RIC) in Budget 2024, offering up to 50% support on each qualifying expenditure category (including R&D, new production facilities, decarbonization projects, and other) for up to 10 years.

The second taxation that is feared might dent Singapore's attractiveness is the carbon tax applied to all facilities emitting more than 25,000 tons of GHG/year, which has grown from S$5/ton in 2023 to S$25/ton this year, and is planned to gradually expand to up to S$80/ton by 2030. According to an article by Channel News Asia, a refinery complex of the profile of Shell's would mean a carbon tax impact of up to S$2 per barrel. Singapore is the first country in Asia to implement a carbon tax, putting itself at a cost disadvantage compared to its peers.

Fortunately, Singapore does not want to play in a price game that it cannot win. High utilities, rental, and labor costs do not let Singapore compete on a cost-base with its neighbors. If we look at the unit business cost index of manufacturing for Singapore, this has remained relatively stable in the last 10 years (at 91.5 in 2023, according to data from Statista); meaning that Singapore has not become more expensive. But other countries have become cheaper. Investments in the Middle East, China, and the US, which benefit from cheaper feedstocks, indirectly erode Singapore's competitiveness, with no feedstocks to call its own.

"Historically, Singapore positioned itself as the refining hub for Asia, but a lot has changed since," commented John Hong, APAC sales director and Singapore country head at Infineum, a lubricant additives producer in Singapore.

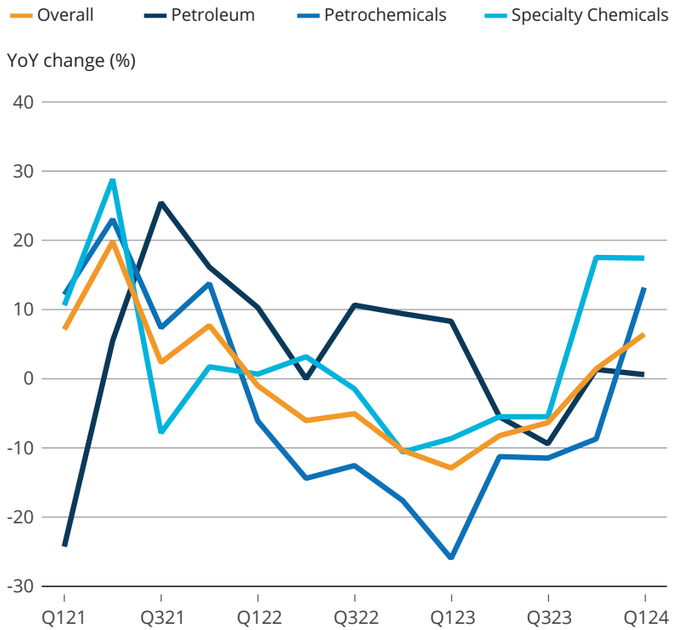
Hong explained that China's heavy investments in both large-scale and "teapot" refineries with capacities in the 300,000-400,000 bpd range, pushed everyone to invest in integrated complexes, leaving Singapore without sufficient export outlets. But, as Hong was quick to add: "Singapore has formidable skills in R&D and business-friendly policies, and excels in the development of smaller-volume, higher-value products further up the value chain."

These qualities are what investors in Singapore are paying for. Recently, Siemens announced the construction of a high-tech factory in Singapore, which will create approximately 400 new jobs. When looking for the right location for the investment, Siemens considered multiple locations but chose Singapore. "In the totality of things, time, such as the efficiency of customs clearance, is also a cost," said Andreas Kappler, head of chemical & pharma for Siemens ASEAN, " and Singapore stood out as the best all-round destination for many reasons, including a transparent, pro-business environment with a high level of governance; excellent infrastructure in the context of communication, power, and logistics, crucial for a hub location (...) Other aspects, such as a highly skilled labor force, not to mention the appeal of the place to attract new talent, speak to Singapore's favor."

Boon Joon Chua
General Manager Southeast Asia
NEWPORT TANK CONTAINERS

> The divestment of Shell's business is the biggest talk in town, yet it does not mean Singapore is losing its shine, it simply points to new directions as the global petrochemical companies look towards green energy and fuels.

PERFORMANCE OF THE SINGAPOREAN CHEMICAL CLUSTER IN RECENT QUARTERS
Source: Economic Development Board



Singapore remains the third largest oil trading hub after ARA (Amsterdam, Rotterdam, and Antwerp) and Houston, as well as a major petrochemical hub, serving as a natural entrepot between the Straits of Malacca and the South China Sea, but its ecosystem is now also becoming more relevant in the high-tech, renewable and circular value chains. For example, Singapore is already home to the world's largest sustainable aviation fuel (SAF) production facility and is projected to see the biggest capacity increases in SAF, alongside the US and China, according to Global Data.

Spelling out Singapore's long-term vision are multiple government programs. Singapore plans to see the value-add of its manufacturing sector going up by 50% between 2020 and 2030. Manufacturing, trade, and connectivity are some of the key pillars within Singapore's national Research, Innovation and Enterprise 2025 Plan, a fifth such plan that saw gradual budget increases over the years, S$25 billion being set aside for the current one – or 1% of the country's GDP, according to official sources.

With its notorious sticks-and-carrots approach, Singapore gives large emitters no option but to seek to decarbonize or pay for the GHG they let out, channeling the proceeds from the carbon tax to fund decarbonization projects, but it also offers them the tools to run expensive decarbonization projects. "We are sensitive to the fact we are an export-oriented country. For that reason, we introduced a carbon tax transition framework to help large emitters and export-oriented emitters adapt to the changes. We also have a scheme called Resource Efficiency Grant for Emissions available for industrial facilities undertaking projects that will reduce their emissions," said Josephine Moh, VP & head, Chemicals & Materials, at the Singapore Economic Development Board (EDB).

So far, the Energy Efficiency Grant (EEG) introduced in 2022 has been used by 2,000 companies, and the budget was ramped up this year. In term of R&D for energy transition projects, Singapore has put aside S$55 million, later topped up with another S$129 million, within its Low-Carbon Energy Research (LCER) funding initiative, supporting hydrogen and CCS projects. The A*STAR-led Carbon Capture and Utilization Translational Testbed, in conjunction with the EDB, as well as Singapore's Institute of Food and Biotechnology Innovation (SIFBI), are part of the broader innovation ecosystem that the city-state has built.

The chemical sector falls under the banner of Singapore's Sustainable Jurong Island vision, which seeks to see the output of sustainable products growing 1.5 times from 2019 levels, as well as realizing 2 million tons of carbon capture, by 2030. These objectives become even more ambitions against a 2050 deadline. The latest stride has been the formation of an S-Hub consortium with Shell and ExxonMobil to develop a cross-border carbon capture and sequestration (CCS) project. In the same way that Singapore succeeded in amalgamating seven islands to create the Jurong cluster, home to a third of the country's manufacturing output, Singapore's ultimate goal is to potentially use stored CO_2 from Jurong Island, where half of the country's emissions concentrate, and turn it into a feedstock to make new products. This is a far-off dream, but possible for a country that has already done the near impossible by turning itself into an energy hub despite having no natural resources.

Hendyono Djunaedi
Managing Director
AXIS PETROCHEM

> Besides its unparalleled geographical location, Singapore is efficient, safe, and globally connected with direct flights anywhere in APAC. The government is notoriously pro-business and pro-investment. There are some concerns about high costs and the labor market, but these can easily be managed through a high level of efficiency.

Julian Soong
General Counsel, APAC & MD, Singapore
ARLANXEO

> Singapore has been pioneering carbon taxation in this region, taking a bold step ahead of its neighbors, which adds additional competitive pressure. The carbon tax gives a strong nudge to the export-driven manufacturing sector to reduce emissions, but Singapore has also provided incentives and grants to support local producers' transition by optimizing operations.

Singapore has always sought to differentiate by doing things that cannot be easily copied. The garden city, where tropical trees cover almost half of the country's land, is aware of the pressures it puts on companies with carbon taxation, yet it does it anyway. Rather than being a crowd-follower and potentially a price taker, it prefers to be a leader and a first mover, making sure it will also be the price maker once innovative high-risk technologies become commercial. Rather than being taken by surprise, it leads change from within. Its stern stance on carbon may lead to some tectonic changes along the way, perhaps even other multi-billion-dollar divestitures.

Investors are aboard with Singapore's vision

The hard evidence that speaks of Singapore's continuous attractiveness are recent investments. Singapore remains the top FDI choice for ASEAN greenfield investment, absorbing a record net inflow of US$224 billion in 2022. Last year, Singapore attracted $13 billion (S$12.7 billion) in fixed asset investments, with the energy and chemical sector leading the way (35.6%), according to the Economic Development Board (EDB).

Accounting for 15.9% of the manufacturing sector's nominal value-added (VA), the chemical cluster is central to Singapore, petroleum and petrochemicals accounting for the largest share within the cluster (63.7% in nominal VA). After seven consecutive quarters of decline between Q1 2022 and Q3 of 2023, the chemical cluster returned to growth since Q4 of last year, according to data from the Ministry of Trade and Industry. The change is driven mostly by Singapore's specialty chemical sector, with output rising by 29.1% versus 1.7% in the petroleum-based sector on a year-on-year basis, based on ICIS.

Big investments in Singapore in recent years were from both existing players consolidating their presence in the region as well as the arrival of new companies. Singapore's hub role and the qualities underpinning it, from unparalleled logistics to high levels of governance, lack of corruption, political stability, and its strengths as the fourth largest financial hub, second only to Hong Kong in Asia (according to the Global Financial Center Index or GEFI), apply equally to traditional petrochemicals and more advanced manufacturing value chains that the city is successfully building.

Many investments target Singapore's lively chemicals, energy, and ingredients scene, but the common thread is the focus on building capabilities, whether in manufacturing or research, for innovative and differentiated products, thus resulting in the creation of new value chains, especially lower-carbon value chains. These are likely to co-exist with traditional ones. ■

Examples of recent investments

- ***ExxonMobil,*** operating the largest refinery on the island, has invested in a multi-billion-dollar expansion to convert fuel oil and other crude products into higher-value lube base stocks and distillates.
- ***BASF,*** which has been in Singapore since 1978, inaugurated a few years ago a fourth production facility in Tuas, boosting its capabilities in the crop protection market.
- ***Evonik*** began the construction of a new plant for alkoxides within its Smart Materials business in 2023, while earlier this year it unveiled a new Skin Institute in Singapore.
- ***Afton,*** a lubricant and fuel additive company, completed a third expansion to add Gasoline Performance Additives blending to its additive facility on Jurong Island.

Traditional Chemicals Manufacturing and R&D

- ***Chevron Oronite,*** Afton's competitor, has undergone multiple expansion projects at its Jurong Island plant to drive further supply stability in the region.
- ***Kuraray*** announced a US$140 million investment early this year in a new ethylene vinyl alcohol (EVOH) copolymer plant on Jurong Island, where it will produce 36,000 tons/year, to be ready by 2026, with future expansion in the future. EVOH resins are used in food packaging.
- ***Ineos Phenol*** made its entry in Asia with the acquisition of Mitsui Chemicals' phenol production plants in Singapore for US$330 million last year.
- ***Baker Hughes*** inaugurated its first chemical plant in the region two years ago.
- ***Cariflex*** is investing in a polyisoprene latex plant, the first such in Singapore and the largest worldwide. Polyisoprene latex is an alternative to natural latex.
- ***IFF*** broke ground with one of the company's largest Innovation Centers, located at Biopolis, an R&D life sciences cluster. This will support IFF's customers globally, being equipped with 60 evaluation booths for all product categories, from fine fragrances to consumer products in personal care, home care, and beauty.

- ***Arkema***'s bio-based polyamide 11 global production was doubled following its major investment in Singapore.
- ***Neste***'s 1.6 billion euros expansion at its biorefinery in Singapore doubled its capabilities in the production of sustainable aviation fuel (SAF) and renewable polymer feedstock globally, with 2.6 million tonne out of its 5.5 million tonne renewable capacity sitting in Singapore. The Finnish player also built its first R&D facility outside of headquarters in Singapore.
- ***Symrise*** unveiled its "Enhanced Naturals @SPark" in the city last year, a multi-functional innovation and technology center catering to the food and beverage industry with an emphasis on sustainable and plant-based ingredients.
- ***SPCI-HELM***, a JV between South Pacific Chemical Industries (SPCI) and German distributor HELM formed in 2022, has built the region's largest molten sulfur processing plant in Singapore, converting waste sulfur into sulphur pallets with applications in fertilizers, EVs, water treatment, and animal-feed additives.

Low-Carbon and Circular Solutions

- Groundbreaking research and pilot testing in low-carbon ammonia and methanol are also carried out on the island, leveraging Singapore's capabilities as one of the largest shipping hubs globally. These efforts are almost always done in conjunction with the Singaporean government. ***Fortescue***, an Australian mining company, together with the government of Singapore, conducted the world's first ammonia marine bunker operation in the port of Singapore.
- Singapore's generous support of innovation and R&D, and its well-developed academia and incubating sector, backed by government grants, is giving rise to a plethora of start-ups looking at material science. For example, ***Greenitio***, which developed a platform to convert natural molecules into advanced biomolecules to replace petrochemicals, emerged out of the deep-tech accelerator program "Entrepreneur First." Other start-ups, including, ***Seppure***, offering chemical-resistent nanofiltration membranes to separate chemicals without heat, or ***Xinterra***, using AI to accelerate material research and development.

- ***Maersk*** plans to invest half a billion US$ in Southeast Asia, including a distribution mega-hub called World Gateway 2 in Singapore.

Supply Chain

- ***Goodrich Maritime*** also moved the operating base for the tank business from Dubai to Singapore.

Eugene Ng

General Manager for Sales & Marketing, Asia Pacific Region
CHEVRON ORONITE

Paul Nai

Managing Director, Southeast Asia
LUBRIZOL

John Hong

APAC Sales Director & Singapore Country Head
INFINEUM

Could you remind our readers of Chevron Oronite's capabilities on Jurong Island, Singapore, and the broader Asia Pacific ecosystem?
Our Jurong Island plant has been active since 1998 and has been in commercial production for more than 25 years as one of the largest lubricant additive plants in Asia. In APAC more broadly, Chevron Oronite has grown to become a market leader by focusing on establishing a reliable supply network in the region, supported by our world-scale facilities in Singapore and regional-scale facilities in Japan, China, and India. We also boast strong R&D capabilities, with the largest additive R&D center in the region, located in Japan. This R&D center supports the needs of OEMs, including Japanese carmakers, across APAC. We also have our Shanghai Technical Center which mostly supports the needs of Chinese OEMs, as well as serving as a field-testing hub.

Are there any other significant developments that you would like to share with our audience?
We are also following our customers' needs in their energy transition journey by working to reduce the carbon footprint of our products, which also contributes to a lower carbon footprint along the value chain of our customers. For example, one trend that is rapidly gaining momentum is the use of re-refined base oils. ■

What is a key challenge to fully capturing the opportunities presented by Southeast Asia?
Unlike the European Union, ASEAN is not a single market, each country has its own rules and regulations. When there are existing FTAs in place, these can still be difficult to navigate. With our local presence, Lubrizol is well positioned to help our customers navigate these challenges.

What are some current undertakings at Lubrizol Southeast Asia?
Driven by governments' response to sustainability, their aspiration to build higher value-added economies, alongside growing, more sophisticated consumer demands, we expect the markets in Southeast Asia to continue to prosper.

Southeast Asian markets are evolving to be increasingly performance conscious. In turn, this will create growth opportunities for Lubrizol. We constantly look for ways to make the region function more seamlessly, leveraging our science and sustainable solutions to advance mobility, improve wellbeing, and enhance modern life.

This involves a lot of collaboration with our customers and partners across the value chains of the industries we serve, and many efforts to improve the way we work. Another workstream is building AI tools into our integrated business planning processes to help us better manage forecasts, supply planning, and inventory, areas which have become vastly more complicated in recent years. ■

What role does APAC play within Infineum's new strategy?
Two major markets driving growth in our combustion engine driven businesses are India and ASEAN. APAC is also a key focus market for our Energy Applications business – no surprise when the top 10 battery makers are all Asian (one Japanese, three Korean, and six Chinese).

Could you also update us on your sustainability targets?
One way in which we are targeting emission cuts on the input side is by using re-refined base oils. Used motor oil is collected and goes through an extensive re-refining process to remove any contaminants, following which the base oil can be used again in motor or other lubricant applications.

How competitive does Singapore remain today as a petrochemical and trading hub?
Historically, Singapore positioned itself as the refining hub for Asia, but a lot has changed since. China invested heavily in refining and Chinese feedstocks were so competitive that it forced everyone else to build integrated petrochemical complexes, which left Singapore without enough export outlets. However, Singapore has formidable skills in R&D and business friendly policies, and excels in the development of smaller-volume, higher-value products further up the value chain. ■

> Recent trends in the process industries have been characterized by significant transformations, driven by technological advancements, sustainability goals, and regulatory changes.

Wayne Yap

Executive Director
ASSOCIATION OF PROCESS INDUSTRY (ASPRI)

How has ASPRI's membership evolved in recent years and what attracts new members to join the organization?
ASPRI's membership has seen a consistent uptick with an increase of 25% in the last five years, growing to represent over 650 Engineering Service Providers. This growth is not just in numbers but in the diversity and depth of its member base, ranging from SMEs to MNCs.

A key component of this growth is attributed to ASPRI's robust advocacy and representation, offering a strong voice for its members at both governmental and industry levels. Additionally, ASPRI facilitates invaluable networking and collaboration opportunities, enabling members to forge strategic partnerships and share industry best practices. Through the Institute of Process Industry (IPI), it also offers specialized craft training programs aimed at upskilling the workforce to meet the industry's evolving demands. Moreover, ASPRI's commitment to member welfare is evident in its provision of quality accommodation services at the ASPRI-Westlite Papan dormitory, ensuring a conducive living environment for employees.

What have been the recent trends in the process industries?
Recent trends in the process industries have been characterized by significant transformations, driven by technological advancements, sustainability goals, and regulatory changes.
Digitalization has emerged as a pivotal trend, with the adoption of Industry 4.0 technologies like the Internet of Things (IoT), artificial intelligence (AI), and robotics enhancing efficiency, reducing operational costs, and improving safety. Sustainability has taken center stage, with companies increasingly focusing on reducing their environmental footprint through energy-efficient processes, waste reduction, and the adoption of renewable energy sources. This shift is further propelled by stringent environmental regulations and a growing demand for green products. Companies are also reevaluating and diversifying their supply chains to ensure continuity and mitigate risks. These trends reflect the sector's adaptation to a rapidly changing business landscape, focusing on innovation, sustainability, and resilience to meet the challenges of the future.

How is the reduction of the Dependency Ratio to 1:5 (local/foreign worker) impacting the process industry?
After January 2024, the reduction of the Dependency Ratio Ceiling (DRC) from 1:7 to 1:5 for the local to foreign worker ratio presents both challenges and opportunities for Singapore's process industry. This adjustment compels companies to rethink their workforce strategies, prioritizing the employment of local talent while managing reliance on foreign workers. In the short term, firms will face operational disruptions and increased labor costs as they adjust to the tighter quota. The immediate challenge lies in addressing the skills gap, particularly for specialized roles traditionally filled by foreign workers.

However, this policy should also accelerate the industry's move towards digitalization and automation. Companies are now incentivized to invest in advanced technologies to enhance productivity and reduce dependency on manual labor. This shift not only aligns with global industry trends but also promotes a more sustainable and efficient operational model.

Since our report has grown to encompass Southeast Asian markets, could you comment on how ASPRI is helping members, especially Singaporean companies to project their services more broadly in SEA?
ASPRI aims to play a crucial role in supporting its member companies' internationalization through various strategies and initiatives.

ASPRI, the Malaysian Oil, Gas & Energy Services Council (MOGSC) of Malaysia, the Myanmar Oil and Gas Services Society (MOGSS) of Myanmar and the Association of Singapore Marine Industries (ASMI) of Singapore have joined hands in a historic move to enhance cooperation and drive advancements in the Oil, Gas & Energy and Process Industry within the ASEAN region. The Memorandum of Understanding (MOU), signed at the Oil and Gas Asia (OGA) in September 2023, aims to foster greater collaboration and synergies and reflects ASPRI, MOGSC, MOGSS and ASMI's commitment to advance the interests of Oil, Gas & Energy and Process industries within the ASEAN region, contributing to greater economic growth.

Beyond 2024, ASPRI will facilitate networking opportunities with foreign delegates, international business councils, and trade associations to help member companies build valuable connections and explore potential partnerships. The association will continue to organize overseas trade missions and participate in regional trade shows enabling members to expand their presence overseas. ■

> A*STAR is developing a translational testbed for low-carbon technologies together with Singapore's EDB and JTC Corporation, designed to offer speech, flexibility, and cost-effectiveness in accelerating the translation of such emerging technologies.

Ng Wai Kiong

Acting Executive Director, A*STAR's Institute of Sustainability for Chemicals, Energy and Environment (ISCE²)
A*STAR

What research platforms are currently engaged in the area of lower-carbon energies?
Certain industries, including the chemical sector, may find it difficult to decarbonise due to their energy-demanding processes, which generate a significant amount of carbon emissions. Capturing CO_2 from exhaust gas released from chemical and power plants can be one way to reduce emissions and harness them to create useful products, however it can be challenging to capture CO_2 at low concentrations.

A*STAR researchers have developed a specially formulated liquid which can help intensify the concentration of the collected CO_2. By combining the captured CO_2 with incineration ash (IBA) and recycled concrete aggregates (RCAs), researchers from A*STAR, National University of Singapore (NUS) and Nanyang Technological University, Singapore (NTU) have been able to create an alternative type of sand. Its unique ability to encapsulate heavy metals prevent them from leaching into the environment, making it suitable for construction and manufacturing purposes. With an average carbonation capacity of around 10%, the innovation has the potential to capture and store 200,000 t/y of CO_2 emissions to create 2.2 million t/y of valuable sand per year, from around half a million t of IBA and 1.5 million t of RCAs generated annually as waste in Singapore.

There is a growing demand for sustainable aviation fuel (SAF), which offers a scalable solution to decarbonising the aviation industry. Currently there are efforts to use biomass as feedstock to create sustainable aviation fuel, however, one key concern is that the supply of feedstock will be insufficient to meet future demands. A*STAR scientists are developing technology with the ability to produce carbon neutral sustainable aviation fuel (SAF) from CO_2. The new streamlined process allows CO_2 to be combined directly with hydrogen, which will generate a more efficient yield of aviation fuel while using less energy

Companies can tap on A*STAR's Accelerated Catalyst Development Platform (ACDP), which uses artificial intelligence and machine learning to speed up the development of new catalysts that can be used to convert various feedstocks such as CO_2 into useful products such as chemicals. A*STAR has also developed a Life Cycle Assessment (LCA) digital web tool to help companies gain visibility of their sustainability performance such as raw material usage, energy consumption and their associated environmental impact, so that they can quantify their environmental impact and identify ways to reduce their carbon footprint. Such technologies can also contribute to long term improvements in power sector through decarbonisation planning, and A*STAR is working together with other public sector partner agencies on such efforts through channels like the Centre for Energy and Emissions Modelling (CE2M).

What are some current projects that A*STAR is collaborating with the chemical, materials, and energy sectors?
A*STAR, in collaboration with ExxonMobil and NTU have established the ExxonMobil-NTU-A*STAR Corporate Lab to develop solutions that would help lower carbon emissions, contribute to resource efficiency, and help build a more sustainable future. Researchers in the S$60 million Corporate Lab will apply their expertise to advance global research efforts in lower-emissions technologies in five areas: Convert biomass into lower greenhouse gas (GHG) emission fuels for adoption in aviation, maritime and chemical sectors that are potentially more cost-effective and efficient; Carbon capture and utilisation using by-product industrial brines, such as desalination brine to produce alternative construction materials, turning industrial side streams into useful materials; Turn methane into low-carbon hydrogen and solid carbon materials: Develop new process technologies to produce hydrogen from natural gas, while identifying potential and new applications for carbon; Develop efficient carbon capture and carbonation technology for industry by-products: to produce solid carbonates for use in building and infrastructure applications; Large-scale application of carbon in concrete: Produce and validate concrete with carbon materials for large-scale deployment to enable, durable, and sustainable building and construction applications.

To enable industries to decarbonise and establish new business opportunities, A*STAR is developing a translational testbed for low-carbon technologies together with Singapore's Economic Development Board (EDB) and JTC Corporation (JTC), designed to offer speed, flexibility, and cost-effectiveness in accelerating the translation of such emerging technologies. Its plug and play modular concept will allow energy and chemical companies to be very flexible and agile in how they configure their plants and optimise their processes. ■

John Savage

Managing Partner
HAFNIUM HAFAWAY

What have been the latest developments at Hafnium ?
Since we established Hafnium as a private investment firm seven years ago, our focus has broadened beyond specialty chemicals to now include natural ingredients and materials that span agricultural and food technologies. This wider remit reflects the chemical industry's own crossovers with biochemistry – as there is an undeniable drive toward bio-alternatives in many applications traditionally consigned to chemical products. Hafnium's evolution has opened up many new opportunities, drawing on the agri/food tech expertise we had built within the business. During this period, we also have developed a sharper focus on identifying opportunities where our combined commercial, technical, and operational expertise we can add transformational value. When you look at our portfolio today, you will see the importance of the agri/food tech space to us.

Could you elaborate on the kind of opportunities Hafnium normally invests in?
Our target opportunities are where we can add real commercial value and typically are early-stage, scalable technologies where we can bring our expertise and get hands on in accelerating their development. At any given time, we have about three or four companies where we are hands on in our portfolio. As these become more independent and are ready to seek additional external funding, our direct input naturally decreases.

Could you introduce SoiLabs to our readers?
SoiLabs solves 100% of the okara residue problem for soy bean processers by converting the okara into a highly versatile intermediate product (which we call Soi-X). This intermediate is then transformed into multiple high value added applications in the agri-food space. We are now ready to move into a commercial production phase following successful pilot production trials conducted late last year.

What is next for Hafnium?
The industry is pivoting towards us: About 18 months ago, the alternative protein/meats reached a peak; the winners were established long ago whereas new start-ups now are struggling to get funding. ■

Jian Min (Edmund) Sim

Founder
SOURCESAGE

Could you introduce SourceSage to our international audience?
SourceSage was founded in 2015 as a B2B marketplace for (predominantly) oleochemical companies. Between 2020 and 2023, we launched two lines of product, seller.sourcesage.co and buyer.sourcesage.co, becoming a white-label platform for companies to buy and sell in a closed-loop environment. The chemical industry is quite protective - you will see at conferences how people stick closely together, and business is done in closed circles, considering they are dealing in high-value products with a high degree of financial risk.

Our mandate as a business is to facilitate how companies conduct business in a more efficient and streamlined manner, cutting down unnecessary costs, by making the most of the data visibility and analytical tools built within our platform. We do not target raw materials critical spend, which is imbued in protective relationships and sensitive transactions; instead, we focus on what we call peripheral items. Our revenue has spiked by about 10 times in the last couple of years, 95% of our revenue generated from peripheral products (indirect procurement) used by the chemical industry.

Could you walk us through your scale-up strategy?
Moving forward, we are expanding vertically into each of the product categories handled, moving up the value chain. By combining greater volumes, we can provide better pricing above discount from the end-supplier in each region, as well as increasing our top line and net revenue.

Do you have a final message?
AI is quickly disrupting the way we are buying and selling. At SourceSage, we are looking to develop AI and a Sustainability Index as core features into our platform this year. For example, if a company wants to spend 20% of its budget on "green" suppliers, tracking the supplier is the easy part, but getting them to formulate analytics is not, so we want to be the benchmark for green buying when it comes to indirect spend. ■

Amit Kumar Khan

Co-Founder and CEO
GREENITIO

Could you introduce Greenitio to our readers and the market gap it sets out to fill?
I identified a clear market gap: there are many first-generation natural alternatives in the market but they fail to meet performance and cost expectations. I sought a solution to enhance the performance of current bio-alternatives without compromising their inherent bioactivity and biodegradability. Since then, we created a platform to convert low-cost, abundantly available yet underperforming 100% natural molecules into advanced biomolecules that perform equivalently or better compared to their petrochemical counterparts. Our efforts have resulted in two IPs, with two more currently in the pipeline and two ready products entering the market in July this year.

What's the scalability of the product?
We started Greenitio with scalability in mind, choosing the right ingredients and the right technology. Chitosan, our starting material, is the second most abundant amino polysaccharide polymer occurring in nature, after cellulose. Traditionally, the molecule was animal-derived from crab or shrimp cells, but we are using a fungal source. This abundance makes it instantly scalable. With chitosan as the base, we are bringing to market two products, Chitobela and Chitobe, both versatile, vegan biopolymers for skincare and haircare applications. Chitosan derivatives are our first product and only the beginning.

And what's the strategy for manufacturing?
Rather than investing in our plant, we will initially work with a toll manufacturer. Once we have the first production running with our contract manufacturing partner in India this month, we can add volume by finding new plants running in parallel.

Do you have a final message?
The whole industry is desperately looking for sustainable solutions. Performance is what wins the game, while cost comes second. As a company, Greenitio prioritizes performance. Rather than starting from scratch, we enhance existing bio-alternatives that are partially effective at 50-60% of their potential. ■

Patrick Teyssonneyre & Jatin Kumar

PT: CEO and Co-Founder
JK: CTO & Co-Founder
XINTERRA

Could you introduce Xinterra to our readers?
PT: Xinterra uses an AI-driven platform called Xinterra Design Factory™ or XDF to radically accelerate materials R&D, fully disrupting the slow and expensive traditional materials R&D process. Using AI and high-throughput experimentation, Xinterra is a materials IP factory, coming up with many materials in a fast and competitive way. We monetize the IP either by licensing the technology or by partnering with companies that will manufacture the materials.

Could you elaborate on the commercialization opportunity, drawing on your first experience with COzTERRA?
JK: The first manifestation of the material creation from the Xinterra AI-driven platform and the first IP launched is branded under the name of COzTERRA – a carbon capture liquid formulation used in the production of textiles to capture CO_2 from the air. We engaged a prominent manufacturer, and we will sell either directly to textile mills or through distributors. Four commercial trials have been done successfully and a distributor has been engaged. While our typical business model is to license the IP, in this particular case we created a legal entity for COzTERRA, as a subsidiary of Xinterra, to accelerate the commercialization of the product and therefore the monetization of this IP. However, in the future, we want to adopt a licensing model. At the same time, we are open to co-developments with chemical and material companies that can bring in industry knowledge and reduce the commercial risks as off-takers of the materials we develop.

This is only one material, but our vision is to have 100 new materials or formulations in the next 10 years, something that even the largest and best-financed companies in the materials space could hardly match.

Are there any materials that you cannot work with?
PT: The platform is material-agnostic. It can be applied to everything from pulp and paper, chemicals, polymers, paints and coatings, or even battery materials. ■

The economics of the energy transition

Recycled plastics:

"The industry is trying to figure out the economics of plastic waste and what is the real demand for it, especially since some brands have made announcements to postpone their circularity targets. (...) When you look at the complexity of getting access to large, clean, high-quality feedstock, the economics also start to look a bit challenging. Recycling infrastructure is not quite there in Southeast Asia."

Thomas Luedi, Senior Partner, Head of Asia Chemicals and Commercial Excellence Practices, Bain & Company

Bio-based plastics:

""One problem we have as a society is that fossil resources are too cheap: The cost of virgin fossil plastics does not nearly cover all of the destructive effects it has on humankind. Fortunately, more and more consumers and brand owners are realizing that the price difference for a molecule that does not take carbon from the ground pays off unmeasurably."

Jeroen C. Verhoeven, Vice President Value Chain Development, Renewable Polymers and Chemicals, Neste

Hydrogen:

"The volumetric energy density of hydrogen or ammonia is less than natural gas, therefore higher volumes are required for the same energy output creating both fuel cost and infrastructure challenges. As such, the greatest challenge for the adoption of low carbon hydrogen is reducing the cost of the value chain to a competitive point where either people are willing to utilize it, or governments provide incentives to offset the additional cost (such as through carbon tax or carbon credits)."

James Laybourn, Regional Sales Director, APAC, DNV Energy Systems

Methanol:

"The economics of methanol as a bunker fuel have only modestly improved. As it stands, e-methanol producers would have to charge shipowners about US$1,200/ton for the product just to cover the costs of the investment. Shipowners are naturally reluctant to pay so much. (...) That leaves the low-carbon methanol in a place of uncertainty but great promise."

Mark Berggren, Founder & Managing Director, Methanol Market Services Asia (MMSA)

Image courtesy of Arlanxeo

> "With our strong regional presence in ASEAN, UOB's ambition is to be the number one cross border trade bank in the region."

Khong Cai Wei

Head of Chemicals
UNITED OVERSEAS BANK (UOB)

Please provide a brief introduction to UOB in Southeast Asia?
As the One Bank for ASEAN, we connect businesses to new growth opportunities. With our strong regional presence in ASEAN, UOB's ambition is to be the number one cross border trade bank in the region. To achieve this, we invested S$800 million over the past eight years to continually drive the adaptation of new digital banking capabilities in regional payments, cash management, cross-border trade, and financial supply chain management (FSCM) platforms to power businesses.

UOB's dedicated sectoral specialist teams not only have regional sector expertise, but also local market knowledge. Supported by our robust branch network across ASEAN, we help businesses navigate market complexities and seize growth opportunities.

Could you provide an overview of UOB's portfolio and the importance of Chemicals within UOB's corporate financing?
The Energy and Chemicals (ENC) sector is one of seven prioritised industry sectors in UOB. Specifically, the chemicals portfolio contributes to a third of ENC sector revenue and continues to grow year-on-year. Across the region, we support a clientele of over 1,000 companies in the chemicals sector, and help to connect businesses across the supply chain, from production activities of large chemical manufacturers to commercial sales of chemical products by regional and local chemical distributors to end-use industries.

Could you elaborate on UOB's role in supply chain financing and the key trends you observe in the market?
UOB connects the ecosystem partners of our clients, both domestically and across the region through our network, cash management, trade and FSCM capabilities. Our clients can tap on our deep understanding of the local in-market operating environment, business practices and a strong network of local SMEs, which allows us to provide independent financing to suppliers and buyers in our clients' ecosystem. We adopt a parameter-based approach to streamline the credit assessment process, which helps expedite onboarding of both suppliers and distributors. As disruptions from geopolitical factors and climate change are expected to persist, there is an increased importance to help our clients enhance the financial robustness of their supply chain to help reduce the impact of potential disruptions through the implementation of supply chain financing solutions.

Please comment on the demand trends in sustainable financing and UOB's "Transition Finance Framework"?
To align with national commitments and to incite action from the private sector, UOB has developed a Transition Finance Framework to support companies from the carbon-intensive sectors, such as chemicals, in their decarbonisation efforts through a structured assessment of credentials for financing and relevant disclosures. Our transition finance solutions will support carbon-intensive companies as they pivot their business models towards more climate friendly activities including projects, technological improvement or equipment that contribute to their overall transition plans and emissions reductions.

We partner closely with companies on their sustainability transformation journeys, to simplify their access to sustainable financing and help them reach their decarbonisation goals. Over the course of 2023, UOB provided S$19.5 billion in sustainable financing, which includes green loans, sustainability-linked loans, sustainable trade finance and transition finance. By the end of 2023, UOB's total sustainable financing portfolio hit S$44.5 billion, with a year-on-year growth of 78%.

How would you describe the current environment for the chemicals sector, and its outlook for 2024-2025?
The Chemicals industry is currently experiencing a downcycle due to the overcapacity in chemicals production and a sluggish post-covid recovery from key demand centers. We expect this challenging environment to persist in the next few years, before we can see some recovery after 2026, as capacity expansion slows down and chemical demand picks up gradually. Despite these challenges, chemicals demand growth in ASEAN will still outpace the rest of the world, as driven by the region's rapid economic development.

What are UOB's priorities and objectives moving forward?
As the industry develops, UOB remains committed to support our clients. As the One Bank for ASEAN, the long-standing relationships we have with our clients across the region will give us invaluable insight into the chemicals industry. This enables us to partner them along their energy transition journey and support them to maintain healthy and resilient supply chains, by financing their ecosystem partners. ■

> BV can instill trust into the process to ensure our customers' reporting are trustworthy, traceable, measurable, and, in one word, reliable.

Rui Fernandes Teixeira

VP, Sales, Marketing & Strategy Asia-Pacific & Middle East
BUREAU VERITAS

Could you elaborate on the new LEAP | 28 strategy, how does it build on top of the 2025 plan, especially in the areas of sustainability services?
Under the new LEAP 28 vision, BV aims to expand leadership in existing strongholds while accelerating growth in new strongholds to drive better performance while putting sustainability at the heart of our business strategy. We will be able to support with a specially designed service offering underpinning the efforts of our customers to transform from brown to green. In the downstream chemical segment, we can help customers identifying the hotspots for GHG emissions alongside their Scope 1,2,3 emissions targets, build a roadmap, as well as manage, control, and help them to mitigate these. Also importantly, we will help them better communicate these efforts, since many well-meaning initiatives can be perceived as performative (or "greenwashing") without the proper backing. With our 200 years of expertise, BV can instill trust into the process to ensure our customers' reporting are trustworthy, traceable, measurable, and, in one word, reliable.

Could you share your thoughts on the evolution of sustainability reporting?
There are now multiple reporting standards available. Regardless of which is used, be it the Global Reporting Initiative, UNDGs or another, there is a need to synchronize these across jurisdictions and legislations, which is why BV, as a global player with boots on the ground everywhere in the world, can provide standardization of processes, delivery and peace of mind to our clients. Also, supply chain reporting, across various tiers is now a requirement for European customers, and soon also for US customers, where new regulations are coming up to ensure there are no violations in terms of usage, of inclusivity and diversity, health and safety, under-age workers, instances of slavery, and other social responsibility practices across the value chain. The chemical and O&G industries are some of the largest carbon emitters, with most players having pledged carbon neutrality by 2050, for which they will need partners such as BV to support them on this transition in order that they can meet their goal. Essentially, we can help them to identify, measure, mitigate, and offset those hard-to-abate emissions.

What are the main macro drivers for growth in Southeast Asia?
There is a great need for infrastructure development across the region. New rails, ports, airports, roads, and efficient buildings to ensure greater connectivity in the region. Respecting all standards and guidelines and making sure there are no shortcuts in the whole process taken is crucial. To give one example, a 7.5 scale earthquake in Japan resulted in no fatalities, but the same-intensity event in Turkey led to the tragic death of about 60,000 people. The difference is in the third-party control of the process of design verification, construction safety and ensuring fully compliance by the different contractors with respect to the architectural and engineering planning and execution, and so on. We believe that as a result, outsourced Testing, Inspection and Certification needs are growing significantly.

In short, what do you think makes Bureau Veritas the TIC partner of choice? Do you have a final message for our international readers?
Bureau Veritas is a 200-year-old company; we have overcome two world wars, financial crises, a pandemic, and many more, creating value for our customers and society along the way. And yet, we feel that we are still at the beginning – we will continue growing, innovating, and staying close to our customers, for another 200 years and beyond. Besides this long history that speaks for itself, what differentiates us is our customer-centric approach and unfaltering commitment to solving our customers' pain points and to build up sustainable solutions that meet the customer requirements. Whether it is a large infrastructure project, an LNG terminal, a chemical plant, a datacenter or whatever other asset, our objective is to deliver excellence, raising the bar as high as we can on every occasion. Our 400,000 customers worldwide are a testament to the fact that Bureau Veritas is a trustworthy partner of choice as a Business to Business to Society organization. ■

Tony Ong

CEO Southeast Asia
VEOLIA WATER TECHNOLOGIES

Could you give our audience a sense of the context for water reuse in Southeast Asia?
Water conservation is a wake-up call for most people today, and countries in the region are tightening recycling and reuse policies, with Singapore being a front-runner. Singapore's pursuit of water security includes investments in catchment areas for potable water and the creation of "new" water for industrial use. Other countries in the region are also acting with regulations and policies being put in place for water security and conservation. No matter the starting point that they are at, each country must urgently address the control of pollutants in the water streams as the agricultural sector depends on it, and their populations, in turn, depend on agriculture.

What growth opportunities do you identify moving forward and what makes Veolia a partner of choice for the chemical sector?
Many resources used in the manufacturing sector are currently underutilized. Recycling these resources is a focal point for our work moving forward. Additionally, maximizing energy efficiency through sustainably engineered designs and energy-saving operating methods is a key priority. Veolia offers proprietary solutions across the spectrum of reclamation, recycling, and reuse with a widespread footprint in the chemical and related industries, such as oil and gas, gives us a robust understanding of our systems and their applications. While some of our competitors may offer singular solutions to address individual challenges, we adopt a holistic approach, positioning ourselves as the missing link in our customers' ecological transformation offering peace of mind and safeguarding our communities, both municipal and industrial.

Do you have a final message?
There are billions of us sharing the earth, so we must play our part in preserving its vital resources. We have the means and the knowledge to do it as long as we all put our hearts and minds into it, to protect, preserve, and reuse resources together. ■

Farchad Kaviani

MD Southeast Asia
SUEZ

Could you remind our readers of Suez 's presence in Southeast Asia?
Suez has been in the region for over 70 years, starting our operations in Indonesia back in 1953. This year we were awarded a new contract at the Buaran III water treatment plant in Jakarta, expanding the capacity of the current plant by 260,000 m3 of clean water/day, by the first half of 2025. This shows the trust that the local developers are bestowing on us, decades since helping with the Buaran I and Buaran II water treatment plants. Besides Indonesia, we have been delivering projects for municipalities in the Philippines, Vietnam, and, of course, Singapore. For example, we are currently working on two projects in Manila, after delivering two more (one for wastewater, and another for drinking water) late last year. Across the region, Suez has a growing project pipeline. We should be able to disclose more about these by next year.

What is the biggest challenge you foresee for petrochemical companies in the region when it comes to achieving their sustainability goals in terms of water use and waste disposal?
Three main concerns come to my mind: Resource scarcity is probably the first. The other challenge is the management of complex waste streams, both hazardous and non-hazardous, given the limited number of proper infrastructure for the treatment of waste in the region. The lack of waste treatment facilities including recycling, landfills, and incineration is the third great challenge they face.

Do you have a final message?
Suez has a comprehensive action plan to accelerate growth in Southeast Asia, a historical region for us, to help our municipal and industrial partners achieve their environmental targets. I have been in this business for 30 years and the end goal is really to shape a better future for our planet – this is a target that will always underwrite Suez 's work. ■

Malaysia

Levelling up

Malaysia is the classic reference to the Southeast Asian petrochemical industry, where the discovery of oil and gas resources triggered the development of downstream petrochemical and LNG businesses, led by a national-owned company, in this case Petronas. The sector then attracted foreign investors to a burgeoning export-oriented economy. With Petronas turning 50 years old since its establishment in 1974, one thing becomes obvious in Malaysia's half-a-century-old chemical journey: while focusing on maintaining the upstream to a production rate of around 2 million barrels per day (bpd) in oil and gas equivalent, and establishing into a significant player in the methanol (fourth-largest globally), ammonia and urea (second largest in Southeast Asia) and other basic chemicals, it stopped flat at intermediates, failing to evolve into more profitable specialty chemicals. This is something it wants to change.

Sometime over the last few decades, Malaysia's chemical sector stagnated. In volume terms, the production index flatlined, according to Statista, even though output has modestly increased by about 4.5% per year, according to official sources. In terms of its products basket, base chemicals such as methanol, ethylene, propylene and butadiene make for the largest value contributors, followed by organic intermediates, fertilizers, basic oleochemicals like fatty acids, fatty alcohols and glycerin, and plastics and polymers. Specialty chemicals share is negligible. Malaysia's own economy, heavily reliant on manufacturing, outgrew the chemical industry. For instance, the domestic electrical and electronics sector, one of the largest in Southeast Asia, is forced to import specialty chemicals. According to Malaysia's trade figures, the country imported RM 7.5 billion in specialty electronic chemicals in 2022. More than that, Malaysia's economy has matured; the country has a high human development index, and productivity levels second only to Singapore in Southeast Asia. As a result, its cost base also went up, becoming less competitive than Indonesia, China, or the Middle East.

A lofty US$20 billion investment in the "RAPID" (Refinery and Petrochemicals Integrated Development) as part of the Pengerang Integrated Complex (PIC), was envisioned to help Malaysia position itself deeper into specialty chemicals. The complex is in the southern state of Johor, about 400 km away from Kuala Lumpur and closer yet to Singapore. It is owned equally by Petronas and Saudi Aramco, under subsidiary PrefChem. Though completed in 2018, it has since dealt with multiple issues, including a fire that killed five employees and led to a shutdown of the polymer lines in 2020. PrefChem resumed in 2022, and has since incurred other temporary maintenance halts. The complex is the largest in the region, consisting of a 300,000 bpd refinery, a naphtha cracker able to produce up to 3.3 million tpa of propylene, C3 and C4 olefins and derivatives, and includes a polymer complex producing polypropylene (PP), LLDPE, and HDPE, as well as a glycols complex producing MEG and DEG.

Ongoing operational issues as well as lower market prices have hindered the performance of Petronas' chemical business (Petronas Chemical Group or PetChem) with earnings bottoming in FY 2023. PetChem reported a 73%

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Image courtesy of Pixabay at Pexels

> "We are fast being recognised as a preferred investment destination in Asia."

Tengku Zafrul Tengku Abdul Aziz

Minister of Investment, Trade and Industry
GOVERNMENT OF MALAYSIA

Could you summarize the outcomes of the Chemical Industry Roadmap (CIR) 2030?

CIR 2030 represents a significant stride towards a dynamic, sustainable, and innovative chemical sector. It aims to elevate the industry's value chain, enhance integration, boost competitiveness, and pivot towards carbon neutrality through cutting-edge technology.

Central to this vision are 11 key focus areas spanning base chemicals, plastics, polymers, and specialty chemicals, poised to position Malaysia as a leading chemical hub in the Asia Pacific.

Could you elaborate on Malaysia's "Plus One" strategy?

The geopolitical tension between the USA and China has led MNCs to diversify their supply chain beyond China. Besides the geopolitical tension, the pandemic also triggered MNCs to adopt more secure supply chain strategies including nearshoring, friendshoring and reshoring. Malaysia's leadership has repeatedly advocated its neutral stance when it comes to geopolitics with all countries, including the USA and China.

No global company would want to diversify their operations in Malaysia without our strong value proposition. We are fast being recognised as a preferred investment destination in Asia, not only due to our strategic location within Southeast Asia, but also our multi-cultural, multi-lingual and highly trainable workforce, investor-friendly policies and ecosystem, political stability, as well as a well-developed physical and digital infrastructure.

What investment opportunities does Malaysia's net-zero strategy 2050 entail?

In 2023, Malaysia launched the New Industrial Master Plan 2030 (NIMP2030), which is the first Malaysian policy, and the first Malaysian industrial policy to take a mission-based approach.

One of the four key missions of NIMP2030 is the "Push Net Zero" (Mission 3). This mission has a dual-track strategy to tackle climate change: first, to accelerate decarbonisation of our industry, which include enhancing adoption scheme for energy efficiency or renewable energy, and introducing carbon-related policy, accounting and tax. These are expected to drive investment in decarbonisation and energy-efficient technologies, as well as encourage industry players to adopt sustainable practices to reduce carbon emissions, such as installing solar panels on their factory rooftop, and using thermoelectric generator to transform industrial waste heat into electricity. All these initiatives are supported by existing green incentives.

Secondly, to catalyse new green growth areas by identifying and facilitating the development of key emerging sectors that Malaysia can leverage on, particularly Electric Vehicles (EV) and Carbon capture, Usage, and Storage (CCUS). The catalytic effect of EV will further boost the growth of related sectors in equipment supply, charging infrastructure and software development for an EV ecosystem. These would harness cross-sectoral collaboration across industries including metal, E&E, digital and ICT and chemical. Meanwhile, CCUS is a potential solution for carbon management, especially for the hard-to-abate sectors. By leveraging on our sizeable number of depleted oil fields, Malaysia has the opportunity to be among the first mover and regional leader in CO_2 management via CCUS. The CCUS hubs in Bintulu and Kerteh will support the green and renewable energy needs under NIMP 2030.

In 2023, Malaysia also launched the National Energy Transition Roadmap (NETR) as a comprehensive strategic plan to reengineer our energy systems from conventional sources towards cleaner, more sustainable alternatives. Spanning multiple sectors, it includes power generation, transportation, industrial processes, and residential energy consumption. The NETR aims to achieve net-zero emissions by 2050. The plan is comprehensive and outlines a gradual increase in renewable energy generation, targeting 31% by 2025, 40% by 2035, and 70% by 2050.

Could you comment briefly on the Johor-Singapore Special Economic Zone (JS-SEZ) initiative?

Malaysia and Singapore's total trade amounted to US$80 billion in 2023. Singapore is also one of the top sources of foreign direct investment, amounting to RM43.7 billion or 13.3% of Malaysia's total approved investment in 2023.

The close geographical proximity between Malaysia, particularly Johor, and Singapore is seen as a crucial factor. Apart from goods, the people-to-people ties between both nations also remain strong, with more than 300,000 Malaysians entering Singapore daily, which makes the Malaysia-Singapore causeway one of the busiest land crossings in the world.

Although trade and investment between Malaysia and Singapore are growing, Prime Ministers from both countries believe that this advantage can be further leveraged with the right plan and strategy to be implemented, which inspired the formation of JS-SEZ. To that end, Malaysia and Singapore signed a Memorandum of Understanding (MOU) to create a Johor-Singapore Special Economic Zone (JS-SEZ) to strengthen economic ties between Malaysia and Singapore. ■

> MIDA will continue its robust outreach efforts, ensuring that comprehensive business support and facilitation services are readily available for investors.

Sikh Shamsul Ibrahim Sikh Abdul Majid

CEO
MALAYSIAN INVESTMENT DEVELOPMENT AUTHORITY (MIDA)

What have been the main investment trends and flagship investments made in 2023?
In 2023, Malaysia attracted RM329.5 billion of approved investments. This is a 23% increase as compared to last year. The influx of investments was predominantly led by Singapore (RM43.7 billion), The Netherlands (RM35.5 billion), the United States (RM21.5 billion), the Cayman Islands (RM17.5 billion), and China (RM14.5 billion). The manufacturing sector in Malaysia attracted a total of RM152.0 billion in approved investments, accounting for 46.1% of the total approved investments across all industries. This marks a significant increase of 80.3% from RM84.3 billion recorded in 2022. Foreign investment was a major force behind this surge, contributing RM128.5 billion or 84.5% of the total manufacturing sector investments, showcasing a striking 94.5% growth from the previous year.

The electrical and electronics (E&E) industry, a cornerstone of Malaysia's manufacturing prowess, secured the lion's share of investments with RM85.4 billion, representing 56.2% of the sector's total. This nearly threefold increase from 2022, is a testament to the strategic expansion of global E&E companies in Malaysia, capitalizing on the forecasted recovery in the global technology cycle and the projected 11.8% growth in global semiconductor sales by 2024.

Could you elaborate on the tax incentives introduced for companies looking to decarbonise as part of the National Budget for 2024?
Under the New Industrial Master Plan (NIMP) 2030, the Mission 3: Push for Net-Zero: Carbon Capture, Utilisation and Storage (CCUS) is identified as one of the new green growth areas where a specific pathway was highlighted that aims to decarbonise the manufacturing sector to achieve Net-Zero emissions as early as 2050. Simultaneously, CCUS has become an enabler to turn green carbon emissions into a value investment to support sustainability goals.

Recognising the importance on achieving the Low Carbon Nation Aspiration by 2050, the Government has introduced new incentives related to decarbonisation under the Budget 2023 as follows: Companies undertaking Carbon Capture and Storage (CCS) in-house activity benefit from Investment Tax Allowance (ITA) of 100% of qualifying capital expenditure for a period of 10 years and can be set off against up to 100% of business statutory income; Full import duty and sales tax exemption on equipment for CCS technology commencing from 1 January 2023 until 31 December 2027 (5 years); and Tax deduction for allowable pre-commencement expenses within 5 years before the date of commencement of operation.

Companies undertaking Carbon Capture and Storage (CCS) services also benefit from ITA of 100% of qualifying capital expenditure for a period of 10 years and can be set off against up to 100% of statutory income; or Tax exemption of 70% on statutory income for a period of 10 years; and Full import duty and sales tax exemption on equipment for CCS technology starting 1 January 2023 until 31 December 2027.

In addition, the National Energy Transition Roadmap (NETR) is a comprehensive strategic plan sets forth Malaysia's ambitious goal to steer the energy systems away from conventional, fossil-fuel-based sources and towards cleaner, more sustainable alternatives by 2050.

Do you have a final message to share with our international readers?
MIDA has implemented far-reaching outreach programmes to provide necessary business support and facilitation services for investors with ambitions of establishing their businesses and operations hubs in this country.

In our ongoing efforts to streamline government processes and improve efficiency, we successfully digitised key certificates in the manufacturing sector. This strategic move is instrumental in solidifying Malaysia's standing as a digital hub, marking a significant milestone in our journey towards digital transformation.

To further support investors and reduce bureaucratic hurdles, MIDA established the Invest Malaysia Facilitation Centre (IMFC), providing one-stop facilitation services and customised solutions. The collaboration between MIDA and IMFC through the Project Implementation and Facilitation Office (TRACK) ensures seamless implementation of investment projects.

Malaysia has seen immense success over the past five decades, and as we step into 2024, we are determined to continue positioning Malaysia's attractiveness as a global business and investment hub with many untapped opportunities available in the country.

MIDA will continue its robust outreach efforts, ensuring that comprehensive business support and facilitation services are readily available for investors. We are dedicated to nurturing investments that not only drive commercial success but also bring about positive societal impact. Our focus is on creating a holistic ecosystem that fosters innovation, sustainability, and growth. ■

> The challenge for the Malaysian chemical industry is different: We must question where we go from here onwards and push forward into the specialty space.

Dato' Muhtar Hashim

Executive Director
CHEMICAL INDUSTRIES COUNCIL OF MALAYSIA (CICM)

Globally, the chemical industry has had a tough year. How has the Malaysian industry performed?
Since the Malaysian chemical sector is heavily focused on the production of intermediates and we rely mostly on local raw materials, both oil and gas as well as palm oil, production has, so far, been steady. Approved investments in the chemical sector have also continued to grow, amounting to 8.9 billion Ringgit for the year 2023, according to official MITI figures. 69.8% of this is foreign-led, proving that Malaysia remains a strong candidate for FDI. Investor confidence has also improved under the current "unity government," led by Prime Minister Anwar Ibrahim. The challenge for the Malaysian chemical industry is different: We must question where we go from here onwards and push forward into the specialty space. There is a lot of resistance from basic raw material producers to investing in specialty chemicals. However, to stay competitive, we need to move up the value chain. Oil and gas will eventually deplete and strength in feedstock availability and competitiveness is no longer as it was. The industry needs to add knowledge-based value.

CICM is the steward of Responsible Care in Malaysia. How has this initiative evolved over the years in terms of its key focuses?
CICM has become the steward for Responsible Care in Malaysia since 1994. This global initiative started off from a principle of safety, triggered by the tragic explosion in Bhopal, India. The danger of chemicals came into the public eye, staining, to a great extent, the image of the industry. The global chemical sector reacted to the incident by devising ways how to do better to prevent such disasters. Responsible Care emerged in the mid-1980s in Canada, and was centered around safety, health, and the environment. It took two more decades before sustainability issues were brought to the fore, primarily in terms of disposing and reusing waste. Today, circularity has taken center stage, evolving into carbon credit systems whereby large companies, like PETRONAS, have dedicated reservoirs to mitigate their carbon footprint. Most recently, there have been more discussions about chemical security and how to prevent the smuggling and weaponization of certain chemicals. Another modern variant of safety and security is cybersecurity, especially as chemical operations are digitalized, making it vulnerable to potential cyberattacks.

Could you elaborate on the aspect of chemical security – what drives the risk of chemicals being weaponized in today's environment and how is the government reacting to ward off the risk?
The assassination of Kim Jong-Nam at the Kuala Lumpur airport in 2017 using a chemical substance further raised attention to the issue of chemical security and the need to enforce greater controls in Malaysia.

What are the most important outcomes deriving from the recently published Chemical Industry Roadmap (CIR)?
One of the main outcomes is the move to create a central body for the handling of chemicals. While the rubber or palm oil sectors have dedicated boards governing everything related to these spaces, the chemicals industry fits under multiple authorities. For example, the Department of Environment (DOE) falls under the Ministry of Natural Resources and Environmental Sustainability; the Department of Occupational Safety and Health (DOSH) is under the Ministry of Human Resources, while the Ministry of International Trade and Industry (MITI) covers everything from investment to circular economy and digitalization. As a result of the CIR exercise (in which CICM was involved), the government is addressing this concern raised by the industry by initiating the creation of a central chemical management system.

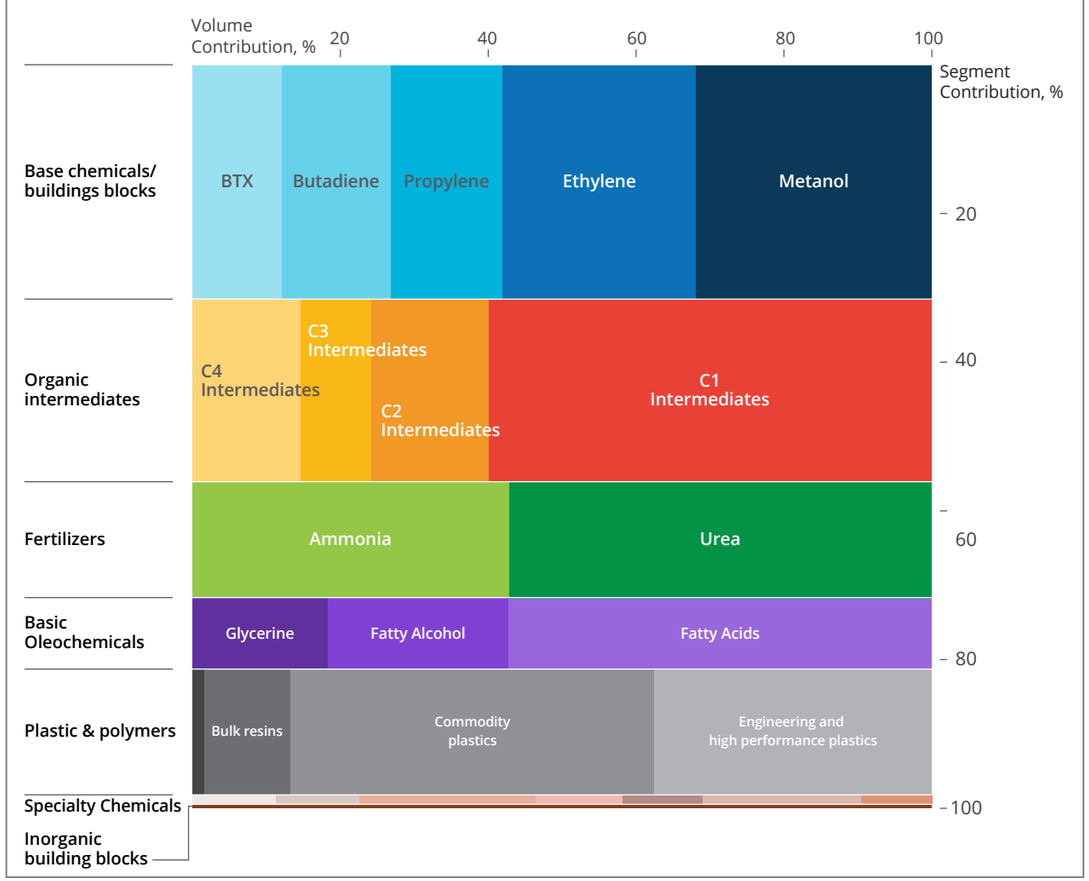
Is there any final message you'd like to send to our readers?
Chemistry is fundamental to our everyday lives. The chemical industry is very mature, but it is also highly dynamic, and continuously transforming. There is a push to always innovate along the way, to do things better, more efficiently, and more sustainably. At the same time, we cannot wait for a spillage or a cyberattack, for example, to occur before starting to take remedial action. Instead, we must undergo a continuous process of self-improvement, to do things differently, more innovatively, and more safely. Reacting can be much more expensive than being proactive. In my opinion, we need to go back to education and raising awareness, focusing on the basics. Our efforts to create awareness of having to act responsibly with regard to safety, health, and environmental protection in general, should go beyond the industry. We must reach out to schools and institutions of higher learning, where the next generation of industry leaders is being nurtured. From there, we can instill safety, sustainability, and other Responsible Care principles as second nature by the time they enter the workplace. That way, they will start questioning whether everything is in place and safe before something goes wrong to alert them. ■

year-on-year drop in earnings at the end of 2023. Petronas is certainly not the only one to report depressing numbers. Lotte Chemical Titan, a subsidiary of South Korea's second-largest chemical group, has been rumored to put its Malaysian assets on sale for about US$600 million, after bleeding money in recent years. In 2023, Lotte Chemical's basic petrochemical division recorded losses of 201.5 billion won. The Group already divested its petrochemical facilities in China to help alleviate losses and is also looking for a buyer for its Pakistani PTA unit. Lotte confirmed the rumor concerning its Malaysian assets, which includes two plants in Johor with a capacity of 3 million tpa of polyolefins.

While petrochemical assets are let go of, specialty assets are in high demand. In a more direct effort to boost its specialty portfolio, Petronas acquired Swedish specialty company Perstorp for US$1.5 billion in 2022. Perstorp brought in a strong portfolio of resins and coatings, engineering fluids and animal nutrition products, together with seven manufacturing sites and three R&D centers. More M&A activity came from Hextar, a domestic agrochemical player, which bought multiple Malaysian specialty chemicals companies in recent years. In 2023, it completed the acquisition of Propel Chemicals, expanding its specialty chemicals for the oil and gas market. In 2021 it acquired all shares of Nobel Synthetic Polymer, a producer of chemical derivatives, coatings and related products, not long after taking over two specialty cleaning chemical companies, Alpha Aim and Chempro Technology earlier that same year. At the closing of the 2023 financial year, Hextar reported stable margins and revenues more than seven times higher than prior to the acquisitions, but below the record numbers of 2022.

With the local production sector unable to meet the domestic needs for specialty chemicals, distributors have found a prolific gap. Multiple international chemical distributors are hurrying to tap into the country's need for complex molecules, especially in the life sciences sector. Azelis bought ChemSol, a distributor of raw materials in personal care, cosmetics and household markets in 2022; IMCD bought Euro Chemo-Pharma and its wholly-owned subsidiary Biofresh Green last year; and more recently, DKSH acquired Elite Organic, with customers in the pharma and nutraceutical sectors: "Elite Organic is a pharmaceutical and nutraceutical company, with a strong footprint in health supplements, whereas DKSH Malaysia has a stronger presence in specialty industrial chemicals. This complementary match enables us to expand strategically in these key areas," commented Victor Liew, director of performance materials for Indonesia, Malaysia and Singapore.

SPECIALTY CHEMICALS, THE SMALLEST SEGMENT IN MALAYSIA'S CHEMICAL PRODUCT BASKET
Source: Chemical Industry Roadmap (CIR)



The chemical industry is currently a solid contributor to Malaysia's economy, representing 6% of its GDP and a significant source of FDI, accounting for 11% of inflows. Despite its importance, the industry stayed for too long in the comfort zone of basic chemicals and intermediates. The current supply cycle is a painstaking reminder that differentiation matters. The Malaysian chemical industry is starting to feel more "loved" after the government identified it as one of the high-growth, high-impact sectors in the National Industrial Master Plan (NIMP 2030).

Futureproofing policies

"We must question where we go from here onwards and push forward into the specialty space. There is a lot of resistance from basic raw material producers to investing in specialty chemicals. However, to stay competitive, we need to move up the value chain. Oil and gas will eventually deplete and strength in feedstock availability and competitiveness is no longer as it was. The industry needs to add knowledge-based value," commented Dato' Muhtar Hashim, executive director at the Chemical Industries Council of Malaysia (CICM), echoing an industry-wide sentiment.

CICM was part of the long-anticipated Chemical Industry Roadmap (CIR), launched by the Ministry of Industry and Trade (MITI) together with its affiliated agency, the Malaysian Investment Development Authority (MIDA), last year. The CIR provides the much-needed top-down directive the industry needs. Its aspirations are interrelated along the theme of spearheading the specialty sector: increasing the value add of the industry through diversification into specialty chemicals; enhancing industry integration between upstream and downstream; boosting competitiveness in export markets; improving the industry's sustainability; and introducing new technology.

In raw numbers, Malaysia would like to increase the industry's gross value add to GDP to 4.5%, up from the current 3.4%, by the turn of the decade. That is the equivalent of adding RM40 billion in incremental value. Another key goal is to become the first destination for FDI in ASEAN for specialty chemicals investment, as well as becoming a top two exporter in the region. These two final aspects are closely correlated, first because Malaysia alone cannot garner the capital to develop its specialty sector and snap out of a lackluster state, with most (over 84%) of its current investment in manufacturing coming from outside the country, according to MIDA, and second because Malaysia requires strong export outlets, its domestic market alone being insufficient to galvanize high-capital, high-tech investments.

According to MIDA, Malaysia attracted RM152.0 billion in approved investment in manufacturing last year, 80% more than in 2022. The chemical industry was the third largest recipient, after electrical and electronics (E&E) and machinery and equipment. To accelerate investment, Malaysia has introduced a Special Tax Incentive or Relocation scheme where investors are spared from paying tax for 10 years for new investments in the manufacturing sector of a value between RM300 million and RM500 million, which goes up to 15 years for investments exceeding RM500 million. A similar exemption is applicable for existing investors relocating overseas facilities into the country. A legion of other pro-business fiscal incentives are available under other schemes, such as the Pioneer Status offering an investment cushion from income tax for up to 10 years from the day of starting production, as well as Investment Tax Allowance and Reinvestment Allowance mechanisms presenting alternative routes for qualifying capital expenditures. A Principal Hub (Global Services Hub Tax) incentive will also become effective after 2024.

A key focus for these incentives is bolstering Malaysia's "hub" quality. In reference to the "China Plus" trend of relocating investment to more neutral countries outside the tariff war zone, Malaysia has launched its "Plus One" policy. To reinforce itself as an ideal manufacturing hub, the government highlights Malaysia's good relationships and free trade agreements with multiple partners, with 16 Free Trade Agreements currently in place, of which seven are bilateral and nine are regional, as part of the ASEAN, RCEP, or CTPP. The potential market size covered by these FTAs spans 4 billion people.

Interestingly, Malaysia is strategically knocking at the doors of Eastern investors, primarily from Japan and Korea, as part of its Look East Policy. Trade with Northeastern partners is expected to grow in the coming years. Japan is already the fourth-largest trading partner and fourth-largest investor in manufacturing, with RM91.89 billion worth

Chua Hock Keng
Founder & MD
ENGE PLAS (AUTOMATION & BULK MATERIAL HANDLING)

> "Malaysia offers a welcoming environment for businesses, boasting excellent infrastructure, education, and a skilled workforce, rivaling Singapore in the region."

Mohd Saifuddin Md Salleh
Country Manager
ABL (MALAYSIA)

> Some people are skeptical about Malaysia's ability to meet its net-zero goals by 2050. The involvement of governments is critical in defining a clear roadmap paving the way for this industry. The push is already there.

Dato' Palaniappan Joseph
Managing Director
SATAKE TECHNOLOGIES

> We leverage the Malaysia-Japan Economic Partnership Agreement (MJEPA) which scrapes import tax levies applicable to our high-technology product, allowing us to transfer value and quality to our local clients.

of projects (2,778 projects) having been implemented to date in Malaysia from Japanese FDI. Japanese firms have been on the growth hunt abroad after dealing with a recessionary economy at home. The Economist writes that the revenue booked by foreign subsidiaries of Japanese manufacturers is at a record 29%, a large jump from where it was in 1996, at just 7%. In Malaysia, there are 1,602 Japanese companies involved especially in the automotive-related businesses.

While automotive, semiconductors and energy are Japan's favorite sectors in Malaysia, the chemical sector is the main attraction point for South Korea. Last year, Malaysia secured RM24 billion in potential investment from the Trade and Investment Mission to the Republic of Korea, including a carbon capture storage project by POSCO Holdings and an undisclosed project from Lotte Fine Chemical. South Korean chemical company OCI Holdings announced in April this year the opening of a regional HQ in Kuala Lumpur (KL), with an investment in Serawak to make polysilicon for the solar PV market.

Malaysia's goal to become the first choice for FDI in specialty chemicals in the region is a direct challenge to Singapore, currently occupying the first position. However, the two neighbors can both generate more investment by collaborating. Malaysia and Singapore are working on a Johor-Singapore Special Economic Zone (JS-SEZ), better integrating the Southern state of Malaysia with its neighbor across the bridge. That would allow investors in either country to tap into Singapore's strong financial capabilities and Malaysia's land availability and lower-cost workforce, at the same time. Both countries have access to one of the most vital shipping channels in the world, the Straits of Malacca.

"The JS-SEZ is expected to ride on the strong growth of Johor and significant investments in the region by Singapore. Johor recorded RM70.6 billion worth of investments in 2022 alone, across various sectors including E&E, medical equipment, food manufacturing and data centers. Singapore was Johor's second-largest foreign investor from January to June 2022, and contributed to around 70% of Johor's total FDI in the manufacturing sector," Tengku Zafrul Tengku Abdul Aziz, Minister of Investment, Trade and Industry (MITI) told GBR.

Finally, to attract investment in higher-tech sectors, Malaysia must not ignore the ABCs – infrastructure, talent, and, from a futureproofing perspective, a strong sustainability framework. The country's economy did not meet the 2023 growth target of 4-5%, recording 3.7%, due mostly to its vulnerability to demand in the electronics global market. Nevertheless, the economy is sturdy, real wages have continued to grow while unemployment is in check, supporting strong household consumption. Both national and corporate debt have dropped. Declining oil revenues left the national budget with little room for maneuver, but the phase-out of subsidies across multiple product classes, including fuels, is continuing, which should free up cash for reinvestment and reducing debt, in turn helping the Malaysian ringgit recover from its current slump.

Malaysia is, at least from a policy perspective, on the right path to increase its share in the specialty chemicals sector and play a bigger role in the international markets, where it currently only contributes to 1.1% of global chemical-derived exports by value, after Thailand (1.6%) and Singapore (2.2%), according to the Chemical Industry Roadmap figures. To play in the higher leagues of specialty production, it will need to make sure it carries through and stays consistent with its multiple policies. Competition will be fierce, with more countries in the region also wanting to climb the ranks. ■

Indonesia

The chemical industry in a post-Jokowi era

Almost half of the global population is choosing their next leaders this year, making 2024 a record-election year. 275 million of them are Indonesian. About 165 million, 81% of the eligible Indonesian voters, went to the polls on the 14th of February in the world's third-largest democracy.

The people of the former Dutch colony mesh together across 1,300 ethnic groups, 700 languages, in 7,000 of the 13,000 islands inhibited between the Indian and Pacific Oceans. This wildly diverse population found a common denominator in candidate Prabowo Subianto, who won decisively with 58% of the vote in the first round. The new president will take office in October, closing the end of a decade under Joko Widodo, known as "Jokowi," the outgoing president. "Jokowinomics," the highly popular infrastructure-led economic development model, a signature of Jokowi, is hoped to stay, together with the nationalistic policies starting to contour more of Indonesia's chemical industry. Many expect the new president, Mr. Subinato, to follow in the footsteps of his predecessor, but this is certainly not a given.

Indonesia has been described repeatedly as the biggest invisible country. Invisibility is an absurd description for the world's fourth-largest population and an economy projected to grow into the top 10 globally in the next few decades. And yet Indonesia has been systematically overlooked. While the world was busy paying more attention to louder Asian giants, namely China and India, Indonesia grew tacitly. That said, its chemical industry has not grown in tandem with its economy and can deservingly be said to be invisible in the global theatre. As ASEAN's largest economy by far, with both an enviable market base and access to local natural resources, Indonesia has a disproportionately small chemical industry. In 2022, Indonesia exported US$40 billion worth of chemicals, less than half compared to tiny Singapore.

The strategic importance of chemicals for the country's downstream manufacturing sectors, as well as the hefty bill Indonesia pays on chemical imports every year, were reasons enough for President Jokowi to declare ambitious goals: He wants Indonesia to become the largest petrochemical base in Southeast Asia, to the extent that it can stop imports altogether by 2027. To get there, the administration must work on two ends: One is to build industrial capacity; and the other, more unorthodox measure, to put barriers on imports. The two are closely linked. Indonesia does not have the opportunity to invest in capacity if it is flooded with competitive stock from abroad. Nor can it cut imports without risking the flight of investors in local production. Meddling with free-market principles is tricky. Not doing it, can also be tricky for the country's dying local industries, not to mention the political risks.

To grow its petrochemical base, Indonesia is first looking at its oil and gas sector, which it can then integrate with the downstream by building refineries and crackers. Indonesia's 600,000 bpd oil and gas production goes mostly into the gasoline and diesel markets, with little left to provide a platform large enough even to meet current petrochemical demand, let alone expanded capacities. Indonesia used to produce 1.6 million bpd of oil and gas during the sectors' heyday in 1995, according to S&P Global, but production has fallen steadily over the years due to maturing oil blocks and declining investment. With a goal to lift 1 million bpd of oil and 12 bcf/d of gas by 2030, the country is offering 54 oil and gas blocks between 2024 and 2028, but optimism is restrained after some blocks offered last year have not received any bids. Among these forsaken blocks is the Natuna D-Alpha exploration block, estimated to hold 230 trillion cubic feet of gas, among the largest in the world. Natuna's high CO_2 content has kept bidders at a distance.

President Jokowi's nationalistic inclinations have been partially blamed for the demise in the oil and gas sector. After his predecessor approved a 7.5 million tons per year (tpa) FLNG facility for the giant Masela gas block, the incumbent president mandated that the

Septian Waluyan
Partner & Country Manager (Indonesia)
YCP SOLIDIANCE

> Indonesia has a rich consumer market, but recently, the purchasing power has been impacted by inflation and a weakening currency. The inflation rate has been brought down to under 4%.

Image courtesy of Irwan Zahuri at Pexels

Joachim Hanssen
CEO of Southeast Asia & Oceania
RHENUS AIR & OCEAN

> Indonesia continues to grow its GDP per capita and therefore presents immense potential in the consumer markets, as well as in semi-finished or finished goods, where the government pushes for domestically produced value-added products derived from its natural resources.

project be developed as an onshore facility, which comes with much higher costs. The president's intervention is said to have precipitated Shell's exit (who operated Masela), bringing the block to a standstill. Pertamina, the national energy company, saw itself compelled to buy the asset in the Arafura Sea. The Masela project would need billions in capital to be brought into production.

Downstream at the petrochemical level, the industry has no choice but to rely on feedstock imports. The country's only naphtha cracker is operated by Chandra Asri, a JV between various Thai and Indonesian firms. The Cilegon cracker anually produces 900,000 tons of ethylene and 490,000 tons of propylene. Following the recent acquisition of Shell's Bukom refinery in Singapore, Chandra Asri may take naphtha from the Bukom facility for its steam cracker. A second naphtha cracker is in the making, an investment by South Korean player Lotte Chemical, building an integrated 1 million ton/year naphtha cracker and downstream facilities in Merak, also in the city of Cilegon. The US$3.9 billion project is to enter commercial production next year, boosting the country's availability of ethylene, propylene, polypropylene, and butadiene.

Besides Cilegon in the Banten province, the other petrochemical hotspot is North Kalimantan, in the Indonesian part of Borneo, an island shared with Malaysia and Brunei. The development of the Tanah Kuning Kalimantan Industrial Park Indonesia (KIPI), touted as the largest integrated industrial area in the world by the government, is a centerpiece of Jokowi's agenda. KIPI is a cross-industrial park, with a capital requirement of about US$132 billion, as reported in the Associated Press. The first big dollars in the area are coming from China. News came recently of a US$8.6 billion petrochemical complex developed by Tongkun Petrochemical, a JV between Hong Kong Huacan International Trading Co Ltd and Shanghai Qinghong Industrial Co Ltd, pending Chinese government approval. If approved, the Tongkun Petrochemical Indonesia North Kalimantan Complex would make xylenes, ethylene, and polyethylene, starting in 2029. This would mark the single largest private overseas investment by a Chinese entity. The scale would also be unprecedented, with a nameplate capacity of 4.3 million tons/year of refined oil, 4.85 million tons/year of paraxylene and half a million tons/year of polyethylene (a total of 14.32 million tons of petrochemicals per year). The owners are giants in the polyester space.

Lessons from the nickel industry

North Kalimantan is also envisioned as a hub for mineral value chain integration, at the center of which sits an aluminum smelter worth about US$2 billion. Indonesia has implemented export restrictions on raw bauxite so that its substantial bauxite reserves on the island of Borneo would be processed locally into aluminum. This is a model tested successfully and fully inspired by the country's nickel policy: Since 2014, Jokowi banned the exports of raw nickel, a resource that Indonesia dominates globally with about a fifth of global reserves. Since then, exports of processed nickel (ferronickel) skyrocketed, going from US$83 million in 2014 to US$5.8 billion in 2022, according to the Economist. The strategy holds dangers, especially when it is being re-applied to other industries, like petrochemicals.

As part of the plan to make Indonesia a leading petrochemical hub, the government started to implement import quotas on key chemical classes, forcing resin importers and converters to absorb the local products before the imported ones. It began with PP block copolymers, but since March this year, the quotas have extended to polyethylene (PE) and polypropylene (PP) grades. Low-density polyethylene (LDPE) and PE with HS code 390140 are currently exempted because these are not domestically available.

Indonesia relies on imports of many commodity chemicals, including olefins (33%) and polyolefins (42% for PE and 57% of PP), according to Argus Media, but even in commodities where the local supply can meet demand, the market is overrun by importers. "The irony is that, while local capacity is sufficient to cover domestic demand for PET, we cannot avoid seeing imported products competing with local producers. This pattern is not only happening at the suppliers' level – the textile industry too has suffered from more aggressive imports, especially as China's economy softened, on top of weaker export markets in Europe or the US. The double shock has rendered the textile sector in a crisis, with exports declining while imports continue to eat into the local market share," said Fahrurrozi Zaini, president director, of PT Ineos Aromatics, operating the half-a-million-tons PTA plant in Merak, Indonesia, acquired recently from BP.

Like many petrochemical businesses in Indonesia, the domestic market represents the bread-of-butter of Ineos' plant in the country. Zaini welcomes recently introduced import restrictions on the textile industry, a support shared by other industry players. "For years now, the local textile industry has been slowly dying, with cheap products entering the Indonesian market. The measure essentially requires importers for a clear reason to import a certain quantity in the country, according to a 'commodity balance' mechanism – or the amount that can be made locally," he told GBR.

With a new president in waiting, investors and the industry may be wondering what will come next for Indonesia. Those who voted for Subianto certainly hope he will carry on Jokowi's legacy – after all, Jokowi's endorsement of Subianto is why many voted for the contestant in the first place. Jokowi is so well-regarded in Indonesia that some even hoped he might fiddle with the constitution to stay in place beyond his two current mandates. Instead, he weighed in his support to Subianto, a former opponent in the two presidential races in 2014 and 2019. After losing behind Jokowi in 2019, Subianto claimed the elections were stolen, sparking protests that led to the death of eight people. Nevertheless, Jokowi, in a keep-your-enemies-even-closer move, made Subianto his defense minister. In a gesture of undeniable support, Subianto's running mate is no other than Jokowi's eldest son.

Subinato used the Jokowi brand to success, but the two men are very different. While Jokowi was more of an everyman figure, as a former furniture salesman, Subianto is an immensely rich former general. He married the daughter of Indonesia's late dictator, Suharto, who ruled the country for 32 years until 1998. Jokowi practiced prudent economic management, transforming Indonesia from one of the "fragile five" emerging economies into one of the world's best-performing economies in recent years, at above 5% growth. By contrast, Subianto makes lavish promises of tearaway growth in the double-digit range.

More concerning is Subianto's dark past, as a former special-forces commander associated with war crimes in East Timor (now Timor Leste), when this was invaded by Indonesia in 1975. He was found guilty of the kidnappings of democracy activists, discharged from his post, and even barred from the US, until former president Trump lifted the ban in 2020. However, with that past long behind him, the 72-year-old incoming president presents himself to Indonesian young voters on Tiktok as a "grandpa" figure who loves his cat, Bobby. His social media campaign has been a hit, personality winning over politics. Despite the makeover, analysts remain nervous about his authoritarian instincts.

Jokowi left behind a stronger economy and infrastructure, but not a stronger democracy. Cronyism is at home in Indonesia. The outgoing president controversially used his family connections, namely his brother-in-law who happens to be the chief justice at Indonesia's constitutional court, to allow his eldest son, Gibran Rakabuming Raka, to run as Subianto's running mate. The rule is that candidates under 40 cannot run in a presidential race. Gibran is 36.

Jokowi was careful to not altogether alienate investors and warp the economy. His "omnibus" law helped remove restrictions on foreign management, despite being met with resistance by unionists; his HGBT policy benefited petrochemical companies to access gas at a cheaper price. Jokowi applied an almost clinical protectionism, but Subianto announcements promise a more fiery nationalism: "Some would have us sell raw materials to foreigners at cheap prices. I say: all our wealth must undergo domestic downstream processing!," called Subianto in one of his speeches reported by the Economist, referring to the policies that push foreign firms to process metals like nickel and bauxite in the country. A similar rhetoric would not be surprising in the petrochemical space either.

A continuation of Jokowism under Subinato's is not easily believable. Subianto has run amok from the official line even in his role as defense minister. For instance, he suggested a peace plan for Ukraine that seemed to favor Russia, even though Indonesia's position was one of neutrality. These "erratic" actions commentators fear could undo the progress achieved by Jokowi, one of the few presidents to have met Joe Biden, Xi Jinping, Vladimir Putin, and Volodymyr Zelensky in 2022. Maintaining those contrasting relationships is challenging for any president, and certainly for one believed to act erratically in diplomatic situations.

Indonesia is no longer invisible. Its significance on the world economy is growing, and with economic power comes a more central seat at the diplomatic table. We are soon to find out what the Subianto model will look like and how much it will borrow from Jokowinomics. ■

Kung Chee Wan

CEO, Oleochemicals
GOLDEN AGRI-RESOURCES (GAR)

Could you introduce GAR and its oleochemical business to our international audience?
Listed in Singapore, Golden Agri-Resources (GAR) is one of the world's largest palm oil companies, managing over half a million hectares of palm oil plantations across Indonesia. We are a fully integrated seed-to-shelf agribusiness operating across the palm oil value chain, including R&D into seeds and agronomy; managing plantations, mills, and refineries; and producing biofuels, oleochemicals, and consumer products such as cooking oils.

The oleochemicals business consists of two entities: a fully-owned GAR subsidiary called Sinar Mas Oleochemical (PT Soci Mas) and Sinarmas Cepsa, a 50:50 joint venture between GAR and Spanish company Cepsa, which was formed about 10 years ago. Together, these two entities have a production capacity of around half a million tonnes of oleochemical products derived from responsibly sourced palm and palm kernel oils and fats. Our product portfolio covers fatty acids, fatty alcohols, glycerine, and soap noodles, as well as tailor-made products for specific customer needs. These products reach a diverse customer base, with applications for home and personal care, as well as food, nutrition, industrial and pharmaceutical applications.

Finally, could you also share some examples of your ESG initiatives in Indonesia?
This is best seen in our upstream businesses where we work closely with smallholder farmers and local communities in and around our operations. Our Sawit Terampil program trains smallholder farmers to implement sustainable practices and prepares them to pursue certification. Recently, a collective of 270 smallholder farmers was awarded Roundtable on Sustainable Palm Oil (RSPO) certification, the global standard that demonstrates palm oil is produced sustainably and responsibly. Our long-term vision is to train over 100,000 smallholders to implement sustainable agricultural practices by 2035. Indonesia is home to more than 16 million hectares of palm oil plantations, and around 4.5 million of these are managed by over 2.7 million independent smallholders. Helping smallholders to adopt positive practices is key to driving change in the industry. ■

Alex Soeriyadi

General Manager Commercial
SALIM AGROCHEMICAL

Salim Agrochemical is investing in both patented formulations as well as an additional distribution arm to the business. Could you walk us through these developments?
At Salim Agro, we have been reflecting on our strengths and where we want to be as a company. We have always been a generic company for the domestic market that prided itself as a second brand to whatever the original product. Our niche or key differentiator has always been our quality and having one of the best R&D capabilities in the country. Moving forward, we would like to strengthen that expertise further by launching into unique formulations. This would see us transition from a premium generic to an off-patent company.

Secondly, we are also starting to work with multinationals as a distributor of their products in Indonesia. Rather than limiting ourselves to our own products, we would like to broaden our portfolio with complementary branded products for companies that want to enter the market.

What is a key challenge and a key opportunity in the Indonesian market?
The most obvious positive that Indonesia offers is its large population, nearing 280 million people, which provides a significant domestic market for any product. Indonesia also has what is known as a demographic bonus – our population is not just big, but also very young, of working age.

Although there have been major improvements, red tape continues to be a key challenge. Geopolitical issues continue to drive a mindset shift from "made in China" to "made around China," and countries like Indonesia or Vietnam fall perfectly within that axis of new investments.

Finally, domestic logistics have always been difficult given that Indonesia is made of many islands, but things are getting better, fast. You may not notice the huge developments in the country if you go to Jakarta, but if you go to rural areas, the changes are stark – the government invested in ports, airports, toll roads, and so on. ■

Masayoshi Namba

Business Director
AGC VINYTHAI PUBLIC COMPANY LIMITED (AVT)

Could you provide an overview of recent developments at AVT?
AGC Vinythai Public Company Limited (AVT) has been successfully producing bio-based Epichlorohydrin (ECH) from 100% renewable glycerine for over 12 years at the Map Ta Phut site, in the Rayong Province of Thailand. AVT is a member of AGC Group, Japan and a leading caustic soda, PVC and bio-based Epichlorohydrin producer in Thailand.

Since we are the pioneer in bringing sustainable, bio-based ECH to customers, we wanted to differentiate our best-in-class product so in July 2022, we launched EPINITY®, our new brand name for our bio-based Epichlorohydrin (ECH) product.

Could you elaborate on your current capacities and the raw materials you draw from?
AVT's ECH production is co-located with our chlor-alkali and PVC production at the Map Ta Phut 1 site. Through debottlenecking work, we ramped up capacity and we are exploring further expansions to increase production in line with demand. EPINITY® is derived from glycerine, a by-product from the production of biodiesel and oleochemicals made from vegetable oil. The sustainability merits are all the greater since the feedstock is of a waste nature.

What has been the recent uptake for bio-ECH?
The coatings market has been under pressure because of weakened economic conditions, but we expect demand to pick up in the future. On the supply side, China has seen a growing number of new ECH producers tilting the market into over-supply. Nevertheless, the imbalance is temporary, and the long-term fundamentals look healthy. From our plant in Thailand, we supply to customers all over the world. EPINITY® provides a differentiation that is sought after by the market and we identify great scope for expansion.

At the same time, regulations are nudging the market towards bio-based alternatives. For example, the European Commission has been paying more attention to seeing more sustainable and safer chemicals used in everyday items, and our EPINITY® brand fits perfectly within this agenda. ■

Chow Pin Tan

VP Asia
TOTALENERGIES CORBION

TotalEnergies Corbion has introduced chemically recycled PLA to the market. Could you elaborate?
TotalEnergies Corbion has been a pioneer in polylactic acid, or PLA. We now can also provide PLA with a recycled content of up to 30%. Luminy® PLA, our product brand, is 100% biobased, and it can now be used over and over keeping the same properties as virgin PLA.

One of the most efficient ways to source used PLA is partnering with customers. The used PLA is chemically recycled at our plant in Thailand through a hydrolysis process that has a significantly higher yield and lower energy requirement compared to the pyrolysis process used for traditional polymers. As the waste is transformed back to the monomer level, the resulting PLA produced will have same characteristic and performance as the original PLA. The recycling facility is part of the chemical reactor where we produce lactic acid, located in Rayong, Thailand.

TotalEnergies Corbion has recently undergone a life cycle assessment of its rPLA. Could you summarize the findings?
Switching from a traditional polyolefin to PLA, such as PET, can result in GHG savings of up to 75%. According to our life cycle assessment (LCA) study, for each kg of PLA produced, we generate close to 0.5 kg of global warming gases, mostly CO2. However, the equivalent for 1 kg of PET is 2.2 kg, which is nearly 4.4 times more. For recycled PLA with 30% PCR content, the carbon footprint reduces by another 30%, to approximately 0.3 kg, seven times less than a virgin PET.

How do you anticipate the uptake of PLA in Southeast Asia?
Bioplastics, which include PBAT, PHA, PBS and PLA, account for around 2.2 million t, just over 0.5% of current global plastic production globally. PLA accounts for 400,000 t, just 0.1% of the total market. This capacity has doubled from five years ago and is expected to double again in the next three to five years. There is immense potential for growth. ■

> By replacing fossil raw materials in the polymers and chemicals industry with Neste's bio-based feedstock, we can reduce GHG emissions by more than 85% over the life cycle.

Jeroen C. Verhoeven

Vice President Value Chain Development,
Renewable Polymers and Chemicals
NESTE

How has the expansion in Singapore augmented Neste's capacity?
In the course of 2024, our global capacity will reach about 5.5 million t/y, also driven by the expansion of our Singapore refinery. Singapore will then constitute close to half of our capacity, with 2.6 million t/y of renewables capability, of which 1 million t/y can be SAF. Our renewable products use 100% renewable raw materials coming primarily from various waste and residue streams like used cooking oil or animal fat waste. Using our proprietary technology, we convert these sources into high-quality fuels and polymer feedstocks.

Through the 1.6 billion euros expansion completed in Singapore, we increased the size of our refinery from 19 hectares to 45 hectares, making the facility the largest SAF production site in the world. Besides the refinery, Neste also invested in its first R&D facility outside of our HQ in Finland: The APAC Innovation Center in Singapore focuses on raw material and pre-treatment processes research to support our growth in APAC. Singapore is also our commercial hub for the region, set within a network of other offices in China, India and Australia.

How does Neste RE polymer feedstock compare to a naphtha feedstock?
By replacing fossil raw materials in the polymers and chemicals industry with Neste's bio-based feedstock, we can reduce GHG emissions by more than 85% over the life cycle. The world tends to focus on Scope 1 and Scope 2 emissions, yet the Scope 3 emissions for plastic-based consumer goods applications can be 10 times higher, especially as end-of-life products end in incinerators. Beyond the indubitable carbon savings, we offer an easy-to-implement and safe solution, compatible with highly regulated applications like the food industry. Compared to some other solutions in the market, Neste's is a drop-in solution that does not require any additional investment in the asset from users deciding to go for our bio-based feedstock. Our customers can simply replace traditional feedstocks with bio-based ones, with the guarantee of the same properties and a significantly reduced carbon footprint.

How does the cost difference play out in terms of product uptake?
If you compare producing a fossil molecule with producing a bio-based molecule, the costs are higher for the latter. But the costs of climate change, from wildfires to flooding and other extreme weather events, together with ocean plastic pollution among the most visible but surely not the only impacts, warrant a mentality shift. One problem we have as a society is that fossil resources are too cheap: The cost of virgin fossil plastics does not nearly cover all of the destructive effects it has on humankind. Fortunately, more and more consumers and brand owners are realizing that the price difference for a molecule that does not take carbon from the ground pays off unmeasurably.

Could you briefly touch upon Neste's recycling facility?
At the moment, only some 10% of plastics are recycled globally. As Neste, we want to contribute to increasing that. We are therefore processing liquefied waste plastic into high-quality feedstock for new plastics. The liquefied waste plastic we are sourcing from various partners, who liquefy hard-to-recycle waste plastic e.g. through pyrolysis or hydrothermal liquefaction. We are then upgrading and refining these liquids. So far, we have upgraded more than 6,000 tons of liquefied waste plastic into quality feedstocks already in the course of trial runs. At the moment, we are building a facility – in the course of a project called PULSE, which is also funded by the EU – to continuously process 150,000 t/y. Our long-term goal is processing more than 1 million t/y of waste plastic.

Singapore mandated the use of 1% SAF for flights leaving from Changi Airport beginning in 2026. What is the significance of this decision?
The Singaporean government adopted a national sustainable aviation fuel (SAF) target as part of its Sustainable Air Hub Blueprint. The SAF target of 1% in 2026 with a goal to raise this to 3-5% by 2030 is an encouraging and positive step towards reducing the climate impact of aviation and sends an important signal which will encourage the wider adoption of SAF across the broader Asia Pacific region. ■

First-Movers Will Capture Outsized Returns in Southeast Asia's Biofuels Market

Authors
Thomas Luedi, Tanguy Morin, Emily Wu, Shreya Thariana, Wren Kabir

BAIN & COMPANY

Southeast Asia's biofuel opportunity
Increasing the production of first-generation (1G) biofuels faces several uphill battles, including the ethical dilemma of diverting farmland and crops away from the world's food supply. These 1G fuels are suboptimal for aviation, and they have significantly lower carbon abatement potential compared to second-generation (2G) crops (35% to 50% abatement vs. 70% to 90%, respectively).
The future of biofuels will include a mix of 1G and 2G fuels, with 2G taking an increasing role. And this is where Southeast Asia's natural advantage unfolds.

Southeast Asia is the world's largest producer of SAF and HVO feedstocks, generating about 35% of global supply. Southeast Asia also has the world's largest feedstock supply for 2G biofuels, such as palm oil mill effluent (POME) and palm fatty acid distillate (PFAD). POME and PFAD are produced with by-products or wastewater from palm oil production—an industry Southeast Asia easily owns. About 85% of the world's palm oil supply comes from Indonesia and Malaysia.

In addition, Thailand and Vietnam are leading producers of sugarcane, which can be turned into ethanol. The region also has an abundance of used cooking oil (UCO).

With better collection methods, Southeast Asia could increase its supply of biofuel from UCO. And with the right support, Southeast Asia could become a global leader in biodiesel production and exports. Southeast Asia could become the top HVO and renewable diesel producer by 2030, and it could claim a leadership position in global SAF production by 2050.

Few Southeast Asian countries have policies to encourage consumption or production, even for the most promising biofuels. Singapore aspires to become the frontrunner and to build a SAF hub, but it lacks formal policies to stimulate the market.

In Southeast Asia, private companies are making progress toward biofuels even without government incentives. Singapore Airlines, Cebu Pacific, and Garuda Indonesia have all trialed SAF in flights. In shipping, Pacific International Lines and PSA Singapore tested a blend of biofuels on the Singapore Qinzhou Shuttle.

Neste, which has a large-scale biorefinery in Singapore, stands out as a regional and global leader in the biofuel market. In addition to increasing capacity and building up commercial capabilities, it invested heavily in feedstock production (its core business) through partnerships, mergers and acquisitions (M&A), and research and development. Through a series of acquisitions and investments, Neste has created a comprehensive, global sourcing platform for biofuels.

Companies that remove bottlenecks along the supply chain will be able to capitalize on the region's natural advantages and capture outsized returns.

Southeast Asia's feedstock market is severely fragmented, especially when it comes to collection. To bring winning strategies to life, organizations across the entire value chain need to consider partnerships. Companies may need joint ventures, partnerships, or M&A to access feedstock, secure offtake strategies, innovate, and gain scale.

Refineries in Southeast Asia are likely to face utilization pressure as demand for conventional oil slows after 2030. Given the gaps in global biofuel supply vs. demand, retrofitting current assets seems like a target opportunity when technology and regulations allow for it. Conversion can also be more cost-effective for producers than establishing greenfield biofuel plants.

To make the conversion, refineries need to consider four key elements: compatibility, compliance, feedstock supply, and the business case.

When biofuel demand takes off, refiners can turn stranded assets into growth engines. For the greatest returns, they need to build the right infrastructure, partners, and capabilities now.

This is the right time to start. ■

Image courtesy of Jake Gard

Value Chain Analysis

"Cheap gas as a backbone for the petrochemical industry in Southeast Asia a few decades ago is fading away with gas resources declining and competition for gas mounting.

Thomas Luedi
Senior Partner, Head of Asia Chemicals and Commercial Excellence Practices
BAIN & COMPANY

GBR Series • SOUTHEAST ASIA CHEMICALS 2024

Image courtesy of Tom Fisk at Pexels

The Midstream - Petrochemicals

The elusive "quarter away"

"In the first quarter of 2023, we were watching the beginning of a slowdown in raw material prices. This trend has carried on through the year, recovery seemingly 'one quarter away' until that quarter passed," said Aaron Montgomery, president and CEO of Ouray, an emergency response service company for chemical manufacturers and chemical tankers.

Montgomery describes the unfulfilled hope that the commodity chemical markets have held on to ever since demand started to weaken towards the end of 2022, leaving the industry submerged in oversupply. As much as we would like to report the later quarters of this year will bring the relief the industry so desperately needs, we are about to relate why this is unlikely to be the case. If the answer had to be reduced to one word, it would be China.

The Southeast Asian chemical industry is to see ferociously more competition, both at home and in its primary export market, China, as demand remains languid and supply is strong, particularly from the Middle East. Southeast Asia is not only a feedstock net importer but also export-focused, a dangerous combination of dependencies that weakens its grip on the market. To make matters worse, most of the local crackers are naphtha-based, subjecting the industry to oil price volatility.

"Elevated oil prices have meant very narrow conversions for the players in SEA. Last year some of our customers turned off their plants, and some even preferred to sell the naphtha feedstock in the spot markets rather than converting it to olefins," explained Ubolrat Wiwattanakul, vice president for Southeast Asia at Lummus Technology, a technology licensor that has worked on some of the largest projects in the region, including PrefChem's petrochemical complex in Malaysia, Thai Oil's clean fuel or Braskem & SCG's ethanol-to-ethylene projects in Thailand.

Wiwattanakul said many plants in the region have yet to return to full capacity since the pandemic. Analysts anticipate this is only the beginning of more serious production cuts and permanent closures in naphtha-dependent regions, which have been running on negative margins. Global operating rates for both ethylene and propylene, the two main building blocks for petrochemical products, are expected to decline to 80% and 71% between 2022-2030, down 8% and 9% from the 2000-2001 period, according to ICIS. Loss-making petrochemical companies have pushed through with hopes of a flare-up in prices, but this prospect does not look likely due to slow demand. China has been the engine of growth for petrochemical demand, delivering demand growth for chemicals at 6-8% per year; however, future projections are much more subdued, forecasted at 1-3% by ICIS. This is causing a "demand recession," as described by Swiss-based consultancy New Normal.

Roger Marchioni, business director for Braskem Asia and managing director of newly formed Thai company Braskem Siam, a JV with SCG, also sees impending closures in the polyolefin space, one of the most affected in the current downcycle: "The polyolefins space has been very slow, forcing the industry to do some serious homework in marking out profitable assets from those that are not, and making difficult decisions accordingly to rationalize production. This has happened before, but in a shy kind of way, yet today, we see firm action across Europe, Northeast Asia, and even Southeast Asia. On the other hand, the US and the Middle East remain quite competitive."

Even at a lower growth rate, China remains a very large demand base for petrochemicals, a base that it wants to self-serve. 10 years ago, China announced its self-sufficiency goals in the petrochemical sector and it has rigurously followed them through. In the olefin market, the International Energy Agency estimates that China makes up for over half of all new olefin capacity between 2022 and 2028.

Eugene Ng
General Manager for Sales & Marketing Asia Pacific Region
CHEVRON ORONITE

> "A key factor driving an upward trend in APAC could be the Chinese government's proactive fiscal adjustments and liquidity injections, which I believe are strategic moves aimed at stabilizing the economy and restoring market confidence."

Image courtesy of Arlanxeo

ChemOrbis reports Chinese plans to introduce 7.5 million tpa of polyethylene (PE) this year, and a further 6.7 million tpa in 2025. That would mean China's self-sufficiency level in PE is to reach about 70% this year. Polypropylene (PP), the second most used polymer, is already reaching parity at about 96%, according to ICIS. If capacity additions follow at the same rate, China could turn into a net PP exporter in the next few years.

ICIS also informs that China has turned from a purified terephthalic acid (PTA) importer, importing about 6.6 million tpa in 2010, into a net exporter, at 3.3 million tpa in 2022. The same drastic transition from importer to exporter also took place in the polyester fibers, polyethylene terephthalate (PET) bottle grades, and polyvinyl chloride (PVC). The shift is extreme. China used to be the world's biggest net importer of PET and polyester fibers. Now it is the largest net exporter. China's 2026-2030 five-year national plan targets self-sufficiency in other chemical value chains. Experts think this would be possible in high-density polyethylene (HDPE), low-density PE (LDPE), and linear-low-density PE (LLDPE). In the styrene monomer market, China is also close to self-sufficiency. Some venture to report that monoethylene glycol (MEG) and eventually paraxylene could be next.

China is leveraging its coal abundance to make petrochemicals at lower prices compared to its ethane or naphtha-based peers, like Southeast Asia. With coal prices coming down from their peaks in 2022, the coal-to-methanol-to-olefins engine has returned to force. The methanol-to-olefins (MTO) is the largest market for methanol globally, informs Mark Berggren, founder and managing director of Methanol Market Services Asia (MMSA), a global intelligence company for the methanol industry worldwide. "The MTO sector takes almost 20% of the olefins supply to China. It is a strategic industry for China and olefin producers from methanol are currently making small but positive cash margins. Unlike naphtha-based olefin products, which depend on a refinery, MTO producers have much greater flexibility, and are able to buy methanol and manufacture polymers and olefin derivatives on-purpose, whenever needed. This gives the MTO 'machine' a significant advantage," Berggren detailed.

With the world's hottest petrochemical market no longer needing imports, Southeast Asia is not only left without a principal export outlet, but it also becomes an attractive import target. In the highly oversupplied high-density polyethylene (HDPE) market, where capacity is exceeding demand by around 12 million tpa at operating rates of 79% between 2020-2030, Southeast Asia is projected to represent the second-biggest "prize," after China itself, which will still account for 37% of the world's HDPE imports. Southeast Asia will be behind at 24%. That could change should China accelerate its domestic capacity in this segment too.

Besides China, Southeast Asian players are also squeezed by Middle Eastern producers venturing further into the deep-sea APAC markets. "Due to its geographical positioning, Southeast Asia is exposed to imports not only from China, where surpluses of intermediates have built up on account of a slower Chinese economy, but also from the Middle East and the US Gulf Coast. Tariffs between the US and China turned both countries towards Southeast Asia, so the region has become a sort of 'catch-all' market for petrochemicals. That poses challenges for domestic producers, who are losing significant market share to lower importers," explained Thomas Luedi, senior partner and head of Asia Chemicals and commercial excellence practices at global consultancy Bain & Company.

The one player that has made aggressive inroads in APAC is Saudi Arabia's supermajor, Aramco. After becoming a 50% partner in Petronas' largest petrochemical complex and flirting with a potential investment in Vietnam, Saudi Aramco sank its teeth into large-scale projects in both South Korea and China. Its subsidiary, S-Oil, is building a 1.8 million tpa ethylene capacity at the Shaheen project in South Korea, to be ready by 2026. Sabic, owned under Saudi Aramco, has also recently announced a US$6.4 billion investment in a 1.8 million tpa cracker in Fujian, China, to be completed in 2026. Aramco's subsidiary AOC also took a small (10%) stake in Rongsheng Petrochemical, the largest privately owned petrochemical company in China, as well as another 10% equity stake in Hengli Petrochemical. Saudi Aramco and Total Energies are progressing with the mixed-feed 1.7 million tpa (ethylene) Admiral project, planned to start in 2027. Supply in other Middle Eastern countries is also picking up. In the UAE, Borouge is building the world's largest single-site polyolefin complex.

Petrochemical investments by Middle Eastern players, whether at home or in other markets, are closely watched because the region is expected to divert its abundant oil into

Murari Rakshit
Founder and CEO
NUTRISOURCE

> “Fertilizer prices have crashed since their peak in 2022-2023 and the market remains quite volatile. Everyone expected sanctions imposed on Russia and Belarus to jeopardize supply and push prices up, but that did not happen as both countries aggressively reduced their prices and managed to avoid banking sanctions by doing more cash transactions.”

petrochemical products, as demand for fuels will eventually decline due to the electrification and decarbonization of the transport sector. In a press release, Aramco said the company could convert up to 4 million bbl/day of liquids into chemicals by 2030. The crude-to-oil-to-chemicals (COTC) is a new concept and a possible way for the Middle East to protect its most vital resource, oil, by shifting more to petrochemicals. Petrochemicals are believed to be the biggest driver for oil demand in coming decades, according to the IEA. Superior cost-per-ton economics in the Middle East could displace current petrochemical players in Southeast Asia, or risk sending the entire market into a long-lasting oversupply.

Fluid catalytic cracker (FCC), using naphtha and aromatics from FFC gasoline as feedstocks for petrochemicals like olefins, is the most known technology in the crude-to-chemical space. Aramco’s subsidiary in Korea, S-Oil, is one of the first to have commercialized the technology. Projects in China including Hengli Petrochemical and Zhejiang Petroleum and Chemicals (ZPC) also use it, having achieved up to 45% conversion rates per barrel of oil, much more than the usual 10% produced in regular refineries. Aramco is working to push the conversion rate to 70-80%. In a more direct diversification to petrochemicals, Abu Dhabi National Oil Company's (ADNOC) has placed a bid on German specialty chemicals producer, Covestro, but the offer was reportedly rejected. ADNOC then proceeded to show interest in the Brazilian leading PE company, Braskem.

Southeast Asian petrochemical companies could also turn to more crude-to-chemicals in theory, but it will be hard to compete with the large scale of the new plants built in China and the Middle East. Also, with gasoline prices in a much better shape compared to olefin prices, Southeast Asian refiners have little incentive to invest in conversions. For now, the industry is focused on survival, making “tweaks” to current plants to mitigate negative margins in saturated products. “Producers are not making large investments, but they are looking at ways to modify their plants to make products with better yields. For instance, if the C3 market is doing very poorly, we can deploy our olefins conversion technology to produce other products. Southeast Asian companies are not young producers anymore, but in the global market, they remain newcomers,” said Ubolrat Wiwattanakul, vice president for Southeast Asia at Lummus Technology.

Cost-optimization and efficiency programs are also high on the agenda of petrochemical players in the region. At the high end of this, successful value enhancement programs have led to huge savings. Thai-based PET leader Indorama Ventures’ “Project Olympus” delivered over US$600 million in cost savings. Similarly, Borouge, a JV between ADNOC and Austria’s Borealis, also delivered US$607 million in positive EBITDA as part of its Value Enhancement Program.

On the M&A front, transactions that match feedstock with the market, potentially from the Middle East into Asia, are likely. The recent acquisition by Thai-Indonesian Chandra Asri, in JV with Glencore of Shell’s refinery in Singapore is one example of intra-regional investment that could give Indonesia’s only naphtha cracker better access to feedstock via Singapore. According to Thomas Luedi, leading Asia chemicals and commercial excellence practices for Bain and Company, standalone (or non-integrated) crackers are the most vulnerable in the current environment and will continue to face challenges, whereas crackers integrated back to refineries have a better cost position. That incentivizes non-integrated crackers to look for feedstock options.

With naphtha prices on a downward trend, futures trading at about US$660/ton, and contract net transaction prices at about half that range, Southeast Asian petrochemical producers should see marginal improvements in the near term. However, the long-term view is uncertain with overcapacities in the olefin space threatening the prices of petrochemicals and expectations that oil and refining could potentially play a bigger role in petrochemicals. A second wave of mainland Chinese naptha crackers is taking shape, writes Chemical Markets Analytics (Dow Jones company). This is primarily led by state-owned enterprises. The new supply could send the ethylene market into oversupply.

Between 1995 and 2020, the chemical industry grew more slowly (175%) than the world GDP (149%), according to the Information Technology and Innovation Foundation (ITIF), a think tank. The correlation between GDP and chemicals has historically been a close one, but this may no longer be the case, the energy transition pressurizing both the oil and gas and chemical sectors to prepare for a lower-carbon future. That makes demand uncertain, especially for countries relying heavily on exports to China, like Singapore and Thailand, whereas Indonesia and Vietnam remain busy with their under-supplied domestic sector. It will be interesting to see whether more petrochemical complexes in these two countries could make sense in light of capacity additions elsewhere.

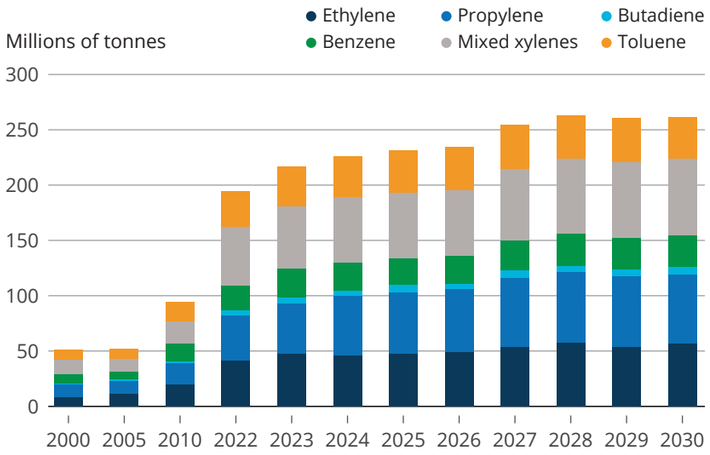
One thing that Southeast Asian countries could learn from China is investing beyond quarterly performance. China has invested during “sickness and health,” driven not solely by profits, but by the longer-term prospects of job creation, stability, and advancing market positions when others were preoccupied with overheads or paused to mend the wounds of past and present challenges. Of course, few have the luxury of subsidies, scale, and integration with a humongous manufacturing sector that China grants, but there are still many spots to fill in specialty chemicals before China catches up to those too.

China is currently in a situation of “low-end surplus, high-end shortage,” which means it has excess or severe excess supply of up to 75% by 2025 in petrochemical products, but it still has to import 50% of its higher-end chemicals, as found by German newspaper CheManager International. With the capacity-demand ratio growing in basic chemicals like ethylene oxide or PTA forcing a reduction in Chinese utilization rates, in 2021 China issued the ”Market Access Negative List” to restrict new chemical projects in saturated areas like ethylene, p-xylene, and coal-to-olefins and coal-to-paraxylene projects, directing its focus on the higher-value markets, including synthetic materials, functional materials or electronic chemicals. China is the largest consumer of specialty chemicals in the world, but it could be a matter of time before the country starts tackling this gap.

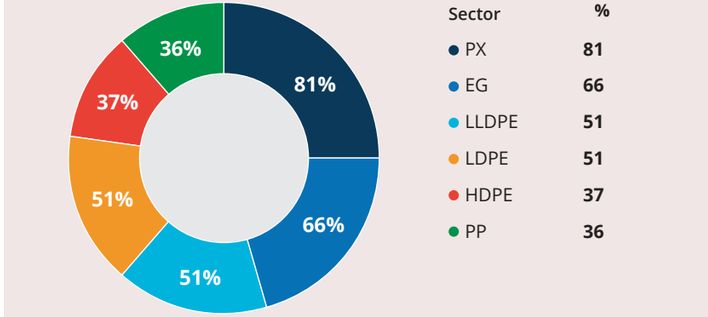
In the meantime, the country that is bringing the most hope for petrochemical makers is India, whose demand for PE and PP is on an upward trend, according to S&P statistics. However, competition to serve this hungry sector will be cutthroat, and Southeast Asian companies do not have the upper hand on costs.

Ubolrat Wiwattanakul, leading Southeast Asia for Lummus Technology, leaves us with the concluding thought for this article: “People used to think in cycles before, but there are bigger things on the horizon now - conflicts, oil crises, shifting geopolitics - all overwriting supply-to-demand fundamentals. The Southeast Asian petrochemical industry has the fighting spirit to invest in its population. If the regional industry operates only in the low-cost arena, there is always going to be a new player producing cheaper. ■

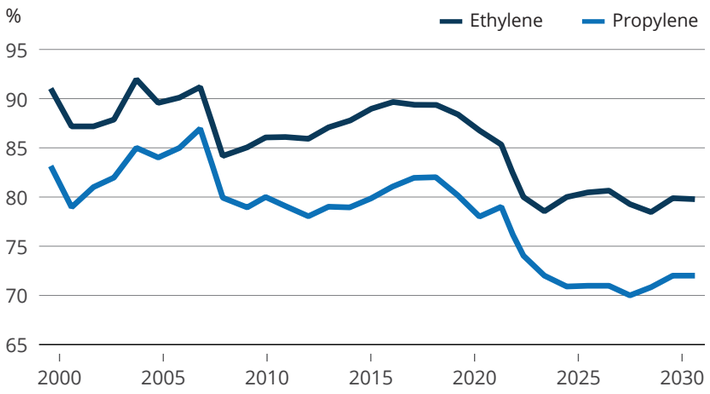
GLOBAL CAPACITY IS EXCEEDING DEMAND
Source: ICIS



CHINA'S FORECAST PERCENTAGE SHARES OF GLOBAL PETROCHEMICAL NET IMPORTS IN 2023-2030
Source: ICIS



GLOBAL OPERATING RATES
Source: ICIS



> Borouge is well-placed to capitalise on several global megatrends such as expanding populations, food waste and scarcity, water access and sanitation, circular economies and energy transition.

Rainer Hoefling

CEO
BOROUGE PTE

What are the recent milestones and developments over the last year at Borouge?
Borouge produced a resilient set of financial results in 2023, reporting a net profit of US$1 billion. Our targeted Value Enhancement Programme also delivered US$607 million in positive impact to our EBITDA through various revenue and cost optimisation initiatives in the face of challenging global market conditions for the polyolefins industry.

Central to our growth plans is the Borouge 4 plant. We are making excellent progress on the project, which will make us the world's largest single-site polyolefin complex when it is completed in 2025, and increase our annual production capacity by 28% to 6.4 million t/y.

We have also opened new offices in South Korea and Kenya, expanding our global footprint to 14 international key markets.

On the Circular Economy front, we are expanding our portfolio of recycled products, leveraging partnerships with local recycling companies, testing feasibility on high-quality recyclates for various applications, and investing in opportunities that will allow Borouge to produce value-added solutions for the industry. For example, Borouge signed memorandums of understanding (MOU) in December 2023 to partner with two Chinese companies in a year-long study on improving waste management on a national level and reducing municipal solid waste.

What areas of application/verticals provide the best growth opportunities for Borouge's differentiated products?
Borouge is well-placed to capitalise on several global megatrends such as expanding populations, food waste and scarcity, water access and sanitation, circular economies and energy transition.

Borouge's high-value energy and infrastructure solutions accounted for 45% of our total sales volume in the first quarter of 2024. Our innovative pipe solutions, such as our PE100RC and PP-R product portfolio, help to ensure durability of pipe networks across the globe, delivering clean and safe content for a long time.

In the energy sector, our differentiated wire and cable solutions help our customers eliminate wastage, which allows them to transport energy from renewable sources over a longer distance more efficiently.

Borouge is continuously developing its suite of electrification solutions ranging from lithium-ion battery applications to high-density polyethylene for solar system components. Borouge has a meaningful role to play in providing the materials needed to build renewable and clean energy infrastructure.

Can you share more about Borouge's latest sustainability initiatives?
We are helping customers achieve their sustainability goals. This includes working with brand owners to develop value-add solutions with recycling content; design packaging for recyclability by standardizing and simplifying packaging structures to mono-material structures; and instilling the importance of circular economy through various education and corporate social responsibility programmes. One such educational programme is Polymers on The Move, which aims to help students understand the circular economy and discover the importance of plastics and proper waste management.

We are also increasing investments that encourage the reduction of carbon footprint. Borouge strives for sustainable mobility by innovating to enhance EV's energy efficiency, such as using light weight polypropylene solutions that will reduce the EV's weight, thereby prolonging battery mileage. We collaborate with OEMs and China's EV car brands to deliver tangible benefits to the industry, drivers, passengers and the environment. In 2023, we launched our first mobility compounds that incorporate post-consumer recycled content, which can achieve up to 32% reduction in carbon footprint compared to virgin grades.

What are Borouge's strategic priorities for 2024?
Our circular economy business is a priority, which continues to complement our virgin resin business and provide innovative recycled resin solutions to fulfill our customer needs. Health, Safety and Environment (HSE) is always on top of our agenda, and we have various campaigns to sustain our best-in-class industry standards in safety records.

On people, we are focused on nurturing Borouge's talented, diverse, and dedicated workforce.

On profitable growth, our Borouge 4 project is under construction with over 60% milestone completion. We are also working on a new expansion project – our second ethylene unit (EU2), to enhance the production of olefin and polyolefin by 230,000 t/y upon the project's completion in 2028. Together with Borouge 4, this will boost Borouge's polyolefin production capacity to approximately 6.5 million t/y.

To support these priorities, we are investing in our people, innovation and technologies. This includes areas such as artificial intelligence and digitalisation, which are integral drivers of innovation, efficiency, and value creation across Borouge's operations. Looking ahead, I am confident that Borouge is well positioned for our next phase of growth. ■

> Whereas traditional petrochemical markets have somewhat stalled in recent years, the opposite is true for biopolymers, which continue to grow at speedy pace.

Roger Marchioni

Business Director **BRASKEM ASIA &**
Managing Director **BRASKEM SIAM (JV)**

Braskem announced a JV with SCG Chemicals to produce bio-PE in Thailand. Could you comment on the company's strategy in Asia?
Braskem has a strong presence in the Western Hemisphere, with production sites in Brazil, Mexico, the US, and Europe. The opening of the Singapore office in 2020 marked our first step toward a bolder presence on the eastern side of the world, by leveraging our strengths in chemicals and polymers, and more recently in biopolymers. With the world economy shifting away from fossil fuels to bio-alternatives, Braskem invested in 2010 in a plant to convert bioethanol from sugarcane into bio-ethylene and further into bio-polyethylene (bio-PE), represented in our I'm Green world-leading portfolio. Whereas traditional petrochemical markets have somewhat stalled in recent years, the opposite is true for biopolymers, which continue to grow at speedy pace. Driving this demand in Asia are countries like Japan, Korea, Australia, and New Zealand, as well as some countries in Southeast Asia. Braskem found an opportunity to bring our expertise to Asia through the JV with SCG Chemicals. This would be our first bio-PE plant in Asia and a huge step in our global expansion strategy.

What led you to Thailand, specifically, and at what stage is the JV in terms of reaching a final investment decision?
Thailand is a natural location for the first plant in Asia due to the availability of biomass (sugarcane) and the presence of important market peers that share same values as us, which is what we identified in SCG Chemicals, one of the top players in the Southeast Asian market by market share, capacity and innovation. Regarding biomass availability, the feedstock (bioethanol) security is critical for a future investment approval. Likewise regulations to unleash the ethanol use for bioplastic and develop regular and competitive supply are key for a long term venture. We are now at the engineering phase, which will take us through to the end of this year.

The new plant in Rayong, Thailand, would bring Braskem closer to its goal of producing 1 million t/y of biopolymers by 2030. Could you elaborate on the company's progress towards this goal and the local impact of the investment?
Adding our plant in Brazil plus the Thai project, and another recently announced study in the US to produce bio-PP, Braskem is on the way to reach 750,000 t/y, with room to pursue further opportunities elsewhere in the region to reach out target. We are running an assessment of all companies interested in supplying the raw materials to develop a Thai Responsible Ethanol Sourcing that respects the local context and the requirements from the end customers. The beauty of the project is that it can impact the whole chain, passing by the ethanol mills and several farmers across the country.

How scalable do you think the sugar-to-bioethanol business is in the long run?
The market is only going up. Compared to other feedstocks, ethanol is abundantly available, and with the existing overcapacity in PE production, the investments might be focused only in the ethylene side. Brand owners, especially in the food and beverage, cosmetics, and household products industries, are reacting to consumers' demand for greener, more natural products. Packaging serves the double role of both protecting a product and communicating its contents; if the product itself is sustainable, the packaging should convey the same value proposition. After a post-pandemic hangover, projects that were on hold or at slow pace, are now picking up speed.

What is your outlook for traditional PE and PP markets?
The polyolefins space has been very slow, forcing the industry to do some serious homework in marking out profitable assets from those that are not and making difficult decisions accordingly to rationalize production. This happened before but in a shy kind of way, yet today, we see firm action across Europe, Northeast Asia, and even Southeast Asia. On the other hand, the US and the Middle East remain quite competitive. By turning from an importer to an exporter, China has shifted global product flows. That, coupled with logistics constraints, will drive more regionalization, with producers playing more in their own backyards. ■

> Producers are not making large investments, but they are looking at ways to modify their plants to make products with better yields.

Ubolrat Wiwattanakul

Vice President, Southeast Asia
LUMMUS TECHNOLOGY

Could you introduce Lummus Technology and the company's presence in Southeast Asia?
Our history in Southeast Asia dates back to about 40 years with the start of the petrochemical industry, following a surge of oil and gas discoveries in the Gulf of Thailand in the 1970s. We grew with the market to provide solutions to the petrochemical complexes, first on gas-to-ethane processing, and then naphtha and mix-grade/ feed (naphtha and LPG) technologies, before moving downstream to butadiene extraction, C3 olefin conversion and all the intermediates. Besides conventional process licensing from gas/oil to petrochemicals, we now also have a wide variety of technologies in the polymer and clean energy space.

Lummus was at the forefront of transitioning to a technology licensing business model. Before that, most technologies came from EPC contractors, but as producers became more sophisticated, you could see a growing trend from the year 2000 onwards of plant owners preferring to select the technology first. Lummus saw an opportunity and brought in the concept of "master licensing." We have worked on some of the largest and most modern complexes, from Petronas' RAPID, which is now called PREFChem, in Malaysia to Thai Oil's clean fuel project in Thailand, where we supplied a hydrocracker and LC-Max integration unit. Our EverGreen™ ethanol-to-ethylene process technology, a Braskem based technology license, was also introduced in this region with Braskem and SCG's new JV in Thailand, called Braskem Siam.

What are the current demand trends in the Southeast Asian market?
Most of the crackers in the region are naphtha-based, so elevated oil prices have meant very narrow conversions for the players in SEA. Last year some of our customers turned off their plants, and some even preferred to sell the naphtha feedstock in the spot markets rather than converting it to olefins. Polyolefin oversupply from China has reduced prices to such an extent that some clients say it is cheaper to import from China than to produce in-country. Years after the pandemic, plants in the region are yet to return to full capacity. The investment and feedstocks have shifted to the Middle East and India, while Southeast Asia has turned into more of a "dumping ground" for imports. So currently the market is in a state of survival. Producers are not making large investments, but they are looking at ways to modify their plants to make products with better yields. This situation has also challenged us to be more creative and work harder to help our customers re-position themselves and upgrade their products. For instance, if the C3 market is doing very poorly, we can deploy our olefins conversion technology to produce other products.

The petrochemical sector is busy surviving today, yet there is a longer-lasting force driving this market and that is the energy transition. Lummus has been busy developing and expanding our energy transition portfolio. In 2023 alone, we added 16 new technologies to our portfolio, either through acquisitions, partnerships, or in-house development. These include ethanol to ethylene, plastics pyrolysis, carbon capture, ethanol to jet fuel, digitalization solutions, and many more to come.

Our customers are also thinking about sustainable solutions; for example, some producers are looking at pyrolysis. Lummus offers a pyrolysis process that can integrate pyrolysis oil into crackers and refineries. Lummus recently invested in Resynergi, a plastic recycling technology to convert plastic waste into reusable materials much faster than traditional pyrolysis methods.

Do you see scope for more crude-to-chemical refinery scale-ups?
The EV revolution and the impending plateauing in gasoline and fuels will drive more crude-to-chemical conversions. And companies are looking at it, but the question is one of scale and competitiveness. It will be difficult for the Southeast Asian players, who fall more on the medium size, to compete at a good conversion-per-ton rate. Though customers are assessing these possibilities, right now gasoline prices are quite good while olefin prices are not. As a feedstock net importer with a lower scale compared to its global competitors, Southeast Asia will have to diversify to more specialty or value-added products.

Do you have a final message for our international audience?
Networking, collaborations, and repositioning to more advanced materials will be key. ■

> A big focus of our work has been in the low-carbon methanol market, advising some of the world's leading players in both the methanol and shipping industries.

Mark Berggren

Founder & Managing Director
METHANOL MARKET SERVICES ASIA (MMSA)

MMSA is an independent analysis provider for the global methanol industry. How is this industry faring in 2024?
In order to put what is happening in today's markets into context, it helps to look back a few years, which have been loaded with external market influences. 2021 was a strong year for methanol demand despite COVID, as increased production in the olefins business for personal protective equipment and a still-strong China economy pulled methanol demand and reflected positively on prices. In 2022, we started seeing the combined impacts of the lockdown in China and the invasion of Ukraine, as high energy and coal prices eventually stunted methanol consumption in Europe and elevated costs of methanol production in China to unprecedented levels. 2022 marked the worst methanol margins on China coal production we have ever seen. Even though things improved in 2023, the war in Ukraine, a slowdown in US economic growth, and the real estate bubble burst in China continued to cast a shadow on the industry. Today, the methanol industry is hitting stride once again. Chinese demand is getting better. Consumers are returning to the methanol-to-olefins (MTO) space, which is the largest market for methanol globally; meanwhile, coal prices have eased, depressurizing both energy and feedstock prices. New methanol capacity in the US Gulf has been delayed, and a loss in production in Iran and Europe has helped tighten markets.

MMSA is also working with the low-carbon methanol sector. What have been the latest strides in this sector?
The low-carbon methanol space (or making methanol with a lower greenhouse gas emissions profile) has taken off in recent years. Large ship owners have ordered literally hundreds of dual-fuel vessels that can run on methanol. This is triggered by new regulations, especially coming from the EU, to decarbonize the shipping industry. It is still early days, and low carbon methanol remains more expensive than conventional (or fossil fuel) derived methanol. MMSA has developed several analytical tools and is helping various players to figure out this space and how to best position it for the future.

Are the economics of green methanol as a bunker fuel improving?
The economics have only modestly improved. Only e-methanol, made from renewable hydrogen via hydrolysis, and methanol made from captured CO_2, meet the FuelEU maritime regulation; both of these are very expensive. That leaves the low-carbon methanol in a place of uncertainty but with great promise. Meanwhile, more methanol-ready vessels are ordered, and Singapore is running a huge project to look at methanol as a marine bunker fuel. Regulators could also advance to allow lower-cost (but higher-carbon) versions of methanol. The outlook is generally positive on this front, with a lot more work to be done.

In the current context, how competitive is methanol as a feedstock for olefins?
The MTO sector takes almost 20% of the olefins supply to China. It is a strategic industry for China and olefin producers from methanol are currently making small but positive cash margins. Globally, the olefin market has had a really tough time in the last year. Unlike naphtha-based olefin products, which depend on a refinery, MTO producers have much greater flexibility, able to buy methanol and manufacture polymers and olefin derivatives on-purpose, whenever needed. This gives the MTO "machine" a significant advantage. Right now, naphtha prices have lowered, which means we should see naphtha-based olefins producers doing a little bit better. Contract net transaction prices are in the US$300 range and could possibly go up to US$350 by the end of the year.

MMSA is turning 20 years since it was founded this April. Do you have a concluding message for our readers?
A big focus of our work for the past two years has been in the low-carbon methanol market, advising some of the world's leading players in both the methanol and shipping industries, so we will keep supporting these markets. With more people diversifying away from China, investments are landing in low-cost and geographically favorable Southeast Asia, where we see a great opportunity for further growth. Twenty years from now it is highly possible that methanol will play a major role in the carbon efficiency in our planet. ■

Regulations

Carbon disclosure

"In Asia, and particularly in Singapore, carbon disclosure is becoming an increasingly important topic. SGX-listed companies will be subject to carbon disclosure agreements from 2024 onwards, and those requirements are going to cascade down to neighboring countries, since organizations listed in Singapore have many counterparts in the rest of the region. Globally, there are multiple GHG reporting standards, including the GHG Protocol, CDP, GRI, or ISSB/IFRS, all of which are becoming more and more central as this region moves to align more closely with these international standards."

Jared Thng, Account Manager, EcoVadis

Carbon taxation

"The carbon tax has augmented the pressure that falls onto heavy emitters. For the industries that can pass on the carbon tax to the customer, by adding it to the total cost of the product they sell, the impact is less severe, the carbon tax becoming, in a sense, an inflationary item carried down the value chain. However, the industries that do not have the ability to pass on the cost must work internally, potentially changing their business model and repurposing some of their current assets into less-carbon-intensive areas. Sooner or later, everyone will have to join and take part in decarbonization efforts."

Fandy H. Suradji, Partner, Environmental Resources Management (ERM)

The ban of certain chemicals and plastics

"One of the key drivers of PLA (Polylactic acid) adoption is a regulatory change. Where there is a ban on non-biodegradable plastics, for instance, customers look for bioplastics such as PLA, PHA and PBAT as alternatives. In Southeast Asia, regulations are fragmented. It is relatively easier for a country like Singapore to enforce regulations in a uniform way than for a geographically diverse country. However, in general, across the region and the world, we are seeing a tightening of regulations, particularly around single use plastics and carbon reporting. And it is trend we expect to grow."

Chow Pin Tan, VP Asia TotalEnergies Corbion

Maritime fuels

"With the FuelEU Maritime regulations coming into place in January 2025, the GHG intensity of marine fuels will need to be reduced by 2%; and then, stepwise, by 7.5% (2030), 13% (2035), all the way to 75% (2050). Currently, no fuel alternative meets that kind of scale. The FuelEU regulations may only be applicable to Europe, but new IMO regulations will also come in place from 2027, albeit less aggressive compared to the EU, which means it is inevitable that the shipping industry faces the reality of impending decarbonization."

Sudheer Vijapurapu, Managing Director, New Asia Shipbrokers (NAS)

Aviation fuels

"While the US, the EU, and Australia have policies in place, for instance by mandating that by 2030 all airlines should run on a specific share of SAF, Southeast Asia lacks that kind of regulatory impetus. The region is large and diverse, without a central forum to come up with firm policies around commitments to net zero on a regional level. Regulations are essential to drive customers, licenses, and technology providers. Without regulations, customers become the biggest driving force."

Bhaskar Patel, Senior VP, Sustainable Fuels, Chemicals and Circularity, Technip Energies

*A note that Singapore has recently mandated the use of 1% SAF for flights leaving its Changi Airport beginning in 2026.

Image courtesy of Henkel Thailand

The Downstream - Specialty Chemicals

Complex chemistry is getting more complex

There have always been at least three things to consider in making a complex formulation: what the customer wants, what the regulator demands, and what market forces allow. Each of these is becoming increasingly more complicated, tugging at the very nature of the business. The chemical industry is a B2B platform, sitting at the basis of virtually all value chains, but it is starting to get much closer to the end-consumer: performance chemical and ingredient suppliers are now routinely co-designing with their customers end-products in a trend that has been described "chemistry as a service."

Furthermore, stricter health and environmental regulations challenge the essence of the chemical industry, pushing for a redefinition of what chemicals are – a fossil fuel-derived sector providing fossil fuel-derived puzzle-pieces to make everything around us. New chemistry crosses over with biology, as hydrocarbon feedstocks are replaced with greener ones. Biochemistry is born.

Lastly, the industry is doing some of the hardest market calculations it has done in years – possibly ever – as demand, supply, and everything that links the two in the convoluted global value chain has not followed any "normal" pattern since the start of the pandemic.

To avoid making this article overly complicated too, we will break down these three considerations.

The market: Focused portfolios better positioned at the end of destocking cycle

Unprecedented events led to an unprecedented destocking cycle that particularly impacted the specialty chemicals sector, a sector typically more involved in the production of durable goods as opposed to plastics or other chemicals used on an everyday basis (like packaging) and therefore absorbed more rapidly. Miscalculations were unavoidable. From Covid-era supply disruptions and stock-outs in 2020-2021, the industry slipped quickly into a period of overstimulated, fast demand, and record profits, warranting over-confident buying and over-stocking in 2022. But, with the Russo-Ukrainian war driving up energy prices, inflation and interest rates in a spiraling way, manufacturers started reviewing their working capital and reducing their borrowing. By the end of 2022, demand had declined, chemical prices declined too, and everyone from chemical producers to their distributors and end-manufacturers was left with very high inventory-to-sales ratios in the midst of a severely weakened demand and against the ticking clock of their products' shelf lives.

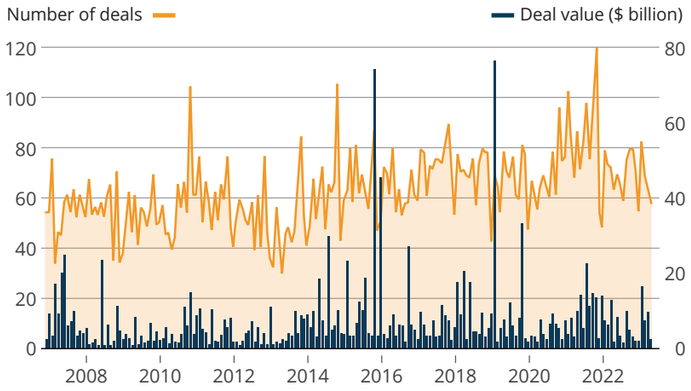
Since then, one of the longest destocking exercises in the sector's history began. Fidelity International wrote that the destocking following the global financial crisis in 2007 only lasted about nine months. This time, it has taken over a year. Over this long waiting period, demand was severed since manufacturers were relying on existing inventories without making more purchase orders. As a result, profits, let alone premiums, became incredibly difficult, just as did planning and performance projections. Some of the largest specialty chemical players reported massive drops in sales, BASF closing 2023 with -21.1% year-on-year in total sales; Evonik, with -17%.

After hitting rock bottom, most of the stock has been now digested in the markets, not without leaving the industry scarred. Raj Kaushik, director for Japanese specialty composites supplier, FRP Services, told GBR that end-customers are now holding less stock than they used to, buying patterns shifting from a quarterly basis to more frequent, local pur-

Image courtesy of Lanxess

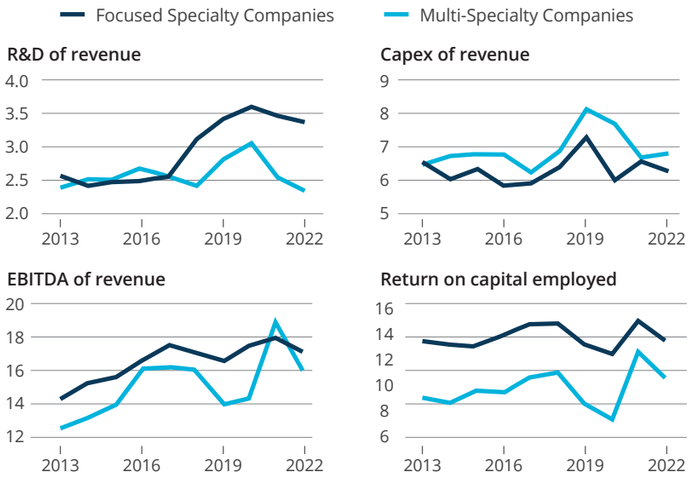
GLOBAL M&A DEALS IN THE CHEMICAL INDUSTRY

Source: Refinitiv, BCG Analysis



FOCUSED SPECIALTIES OUTPERFORM MULTI-SPECIALTY COMPANIES

Source: Company reports, S&P Capital IQ, BCG analysis



chases as a result of uncertainty and currency fluctuations.

Prices for specialty chemicals, including surfactants, remain relatively high, due to ongoing raw material shortages, explained Johnson Lai, vice president for Singapore-based toll manufacturer Chemical Specialties Limited (CSL): "It is a curious contradiction to see the price of raw materials for specialty chemicals escalating due to throughput cutdowns at a time when commodity basket prices are trending low. There are occasions that we know of when some specialty chemicals customers have faced a situation where they could not make their products because of a lack of securing sufficient feedstocks."

Lai gathers from discussions with others in the industry that inventory should rebalance by the second half of this year, with some markets, like glycols, still dealing with large surpluses in China.

Demand is expected to kick back stronger in emerging markets, especially in India, but also in China, despite China's lower-than-expected and rather delayed bounce-back. Southeast Asia is also expected to deliver growth, with the automotive, electronics, construction, transportation, agriculture, and consumer markets fuelling the uptake of chemicals from specialty polymers to water treatment, food additives, flavor and fragrance ingredients, as well as surfactants, electronic chemicals, and oil field chemicals. According to S&P Global, the most in-demand chemicals are electronic chemicals, specialty polymers, cleaning chemicals, surfactants, and flavors and fragrances.

André Nothomb, executive VP and head of government & public affairs for APAC at Syensqo, the specialty spin-off from Solvay, gave a general overview of the state of key verticals across its diversified portfolio: "For the automotive sector, the EV market is on the rise, although 2023 sales were tempered off by the removal of government subsidies as it is expected that consumers are prepared to make EV purchases without additional incentives. Aerospace, on the other hand, is having a big turnaround moment, after suffering terribly during the pandemic. The agro sector is going through a low cycle, with disruptions emanating from Ukraine putting pressure on global markets, but food production is always poised to grow long-term. Finally, the personal care and home care markets are a big focus, especially for bio-based solutions produced through nature replicating processes such as fermentation with unedible agriculture wastes and other by-products."

The market size for the global specialty industry is expected to rise to $914.4 billion in 2030, up from $616.2 billion in 2022, according to S&P figures. The chemical industry will always be there, so demand is typically seen in a broader sense of long-term projections. Smart and timely positioning with current trends is also key for quicker gains. According to a BCG report looking at total shareholder returns (TSR) for the period 2018-2022, the capital markets have generally punished multispecialty businesses (chemical conglomerates with multiple unrelated businesses), favoring instead leaders in focused, high-growth segments, especially in life sciences, high-performance materials and chemicals related to green energy and the environment. Better TSRs were also seen in large-cap companies and in emerging geographies.

Recent M&A activity certainly reflects these trends with segment consolidation emerging as the main motivator

Martin Overgaard Hansen
CEO
JJ-LURGI ENGINEERING

"The focus on hygiene was brought to a whole new level by the pandemic and, even as we overcame that period, the learnings stay, and demand for all hygiene-related continues to soar."

Vinod Agnihotri
Managing Director, ASEAN
& VP and Head of MPP APAC
LANXESS

"We see a slight upturn in the first quarter this year compared to the fourth quarter of 2023. The positive trend is expected to continue in the second quarter, leading to a slight increase in demand for the rest of the year."

for mergers and acquisitions, according to BCG. In the past few years, there have been multiple large-scale spin-offs and "split-ups" of large conglomerates along the broad distinction of specialties and commodities. There is a need in the market for the higher-margin, lower-volume businesses to be treated separately and independently from the volume-driven commodities. The most recent such split was completed at Solvay, with the original brand-name retaining the 40% essentials business, and the remaining 60% of revenue of the business was spun off as an independent public company, Syensqo. Syensqo covers specialty polymers, composites, surfactants, and others, serving the automotive, consumer goods, aerospace, food, and electronics sectors.

Similar historic splits include the DuPont and Dow US$150 billion mega-merger in 2015, only to be later split into three more focused companies (Dow, DuPont, and Corteva). More recently, specialty chemicals company Nouryon separated its essential base chemicals business, rebranded to Nobian. Leading distributor Brenntag also made the decision to bifurcate into two companeis, Brenntag Essentials and Brenntag Specialties. Besides these broad reshuffles, we also see a trend to narrow in on specific growth areas through both strategic asset acquisitions and mergers of entire companies. In the first category, Lanxess acquired the microbial control business of International Flavors and Fragrances (IFF) in 2022, consolidating its Material Protection Business, while divesting its polyurethane (PU) business.

The specialty chemicals industry is becoming more specialized, with mergers giving way to absolute leaders in their fields. The DSM and Firmenich $20.7 billion merger resulted in dsm-firmenich, a "category of one" company in the nutrition, health, and beauty ingredients space. To reinforce its focus, dsm-firmenich carved out its animal nutrition business and acquired Adare Biome, a postbiotics company, which allows it to develop its (human) gut health portfolio. At the same time, DSM Engineering Materials unit and Lanxess' High Performance Materials combined to form new entity Envalior, now the world's largest engineering materials player. Other new, more specialist companies include Arlanxeo, a synthetic rubber leader, formed through the merger of Lanxess and Saudi Aramco, who later bought all shares, or Avient, following the acquisition of Clariant Masterbatches by PolyOne. In parallel, the distribution space is following suit, with vigorous M&A from players like Azelis (50 acquisitions in the specialty chemicals and food ingredients since 2016), IMCD (40 acquisitions), and Brenntag (30), many in APAC, consolidating in the most in-demand sectors.

Traditionally, specialty chemicals used to seek vertical integration back to intermediates and raw materials, but this is less popular today, the industry preferring to avoid the cyclicity associated with commodities and also the bigger burden of oil and gas exposure and higher emissions resulting from large-volume production. In fact, petrochemical companies, many of which are state-based and many from Southeast Asia and the Middle East, are now eagerly entering the specialties space (think Sabic's investment in Clariant, Thailand state-owned PTT acquisition of Allnex, or Malaysia's Petronas buy-out of Swedish specialty company Perstrop, as well as ADNOC's bidding in Covestro). So the M&A landscape for performance materials is also shifting towards nicher markets, where companies can reap the maximum rewards of consolidation.

Destocking pressures had decelerated M&A activity, not just because of less available cash, but also because it was difficult for buyers to know what they were buying – the cash flows and EBITDA performances of potential targets had been distorted by inventory imbalances and low sales. As these pressures ease and companies fall back into balanced inventory-sales ratios, it is possible to see more carve-outs, acquisitions, and mergers, driven by the need to build sharper yet more consolidated portfolios in high-growth segments and territories.

Regulators: The phase-out of toxic and "forever" chemicals brings forth new chemistries

Bayer's US$63 billion acquisition of Monsanto in 2018 was the company's largest acquisition. In retrospect, it was also probably its worst and generally considered one of the worst deals in history. Not long following the acquisition, Bayer lost multiple lawsuits against Monsanto's Roundup, a herbicide, which contained carcinogenic chemicals, namely polychlorinated biphenyls (PCBs). The use of PCBs has been restricted by many countries since the 1970s. The trials and multi-billion settlements helped bring back into question the regulation of potentially harmful chemicals. The current focus is on limiting the use of per- and polyfluoroalkyl substances (PFAs), which have been loosely regulated. New studies showed PFAs are accumulating in the environment, impacting human health.

About 10,000 chemicals are listed in the EU's latest ban of harmful chemicals, including PFAs and other so-called "forever chemicals" because they do not break down fully in the environment, leading to prolonged toxicity. Expected to be implemented by 2026, it would take the chemical world by storm. Under previous regulations, such as the establishment of Registration, Evaluation, Authorisation and Restriction of Chemicals (known worldwide as REACH) in 2007, or the US Toxic Substances Control Act active since 1976, certain chemicals have been marked out for their potentially harmful effects on health and the environment, but these typically included a phase-out of these chemicals, with the specification "where possible." Today, we see a stricter emphasis on cutting out PFAs, bisphenols, flame retardants, and phthalates, and, more than that, a regulatory preference for natural substitutes in new formulations.

Throughout his past academic and industry roles, Amit Kumar Khan, now a co-founder and CEO of Singapore-based start-up Greenitio, was faced with a situation that is becoming more commonplace: "Multiple regulatory bodies such as the US Food and Drug Administration (FDA) often recommended replacing petrochemical molecules in formulations with safer, yet natural origin alternatives. I explored multiple natural alternatives earlier but failed to find existing bio-alternatives with equivalent performance to petrochemicals. I identified a clear market gap: there are many first-generation natural alternatives are there in the market but they fail to meet performance and cost expectation. This issue was not isolated to one industry I worked at or the pharma industry; other global regulatory bodies gave similar feedback, and pharma, cosmetics, and home care product makers struggled to find natural alternatives for petrochemical ingredients," he told us.

The EU ban on PFAs generated over 5,600 comments and requests for change from industry representatives and other specialists, according to German consultancy 5-HT Chemistry & Health. That exemplifies the laborious task of replacing old chemistries with new ones. The most impacted sectors are electronics, cosmetics, and medical devices. For MacDermid Enthone Industrial Solutions, a leader in surface finishing applications across the automotive, electronics, household, medical, and aerospace industries, innovative and sustainable technologies are a priority for both its decorative and functional portfolios. For instance, the company has introduced to the market a chrome-free etch technology for plating on plastics and trivalent chrome plating solutions. It takes time, however, for new solutions to be adopted by the market, and sometimes, alternatives are not yet available.

"The chemical industry carries an unfortunate load from the past and continues to be subjected to scrutiny, sometimes necessary, other times undeserved. (...) What fewer people understand is the crucial role that the chemical industry has in helping multiple industries decarbonize, through innovative solutions, for which chemicals, including PFAs, provide indispensable functional properties," said André Nothomb, executive VP, head of government & public affairs APAC and Singapore country director for Syensqo.

The specialty chemicals sector has a huge task ahead to reinvent chemistries or to prove the negatives are outweighed by the positives of using certain controversial substances.

Consumers: sustainability, functionality, desirability... and affordability

The enemy of differentiation - a core principle by which the specialty chemicals industry exists - is commoditization. Molecules that once were innovative soon become mainstream when the offer grows too large. Those chemicals that fall in the middle of the spectrum between a basic molecule and a specialty one, such as surfactants, synthetic rubbers, or certain fuel additives, have lower entry barriers and invite production en-masse. To stave off commoditization, the specialty chemicals industry has gradually become more entrenched in the end-to-end value chain, working closer with both raw material suppliers and manufacturing customers in the design of the right chemistry for the right product, something that has become known as chemistry as a service.

"Customers in materials engineering are looking for more than a supplier – they seek a development partner. Getting it right on the first try is critical, so we walk with them from concept and design to implementation, taking into account the boundary conditions and functional requirements of end products, be these automotive, electronics and electrical, consumer goods, industrial, medical, or food packaging," said Milan Vignjevic, APAC regional commercial director at Envalior, a leading engineering materials company.

Alex Soeriyadi
General Manager Commercial
SALIM AGROCHEMICAL

> "Around the globe and especially in Europe, regulators are banning products left, right and center. We must be cognizant of these changes, anticipate what may happen in the next 5-10 years, and find new products."

The intensification of the co-design and co-development trend between specialty chemicals companies and manufacturers is an embodiment not only of regulations, with SsBD (safe and sustainable by design) requirements impacting the pre-market approach, but also of consumer trends at the other end of the value chain. Consumers are asking for more from their products. "End consumers like you, me, and anyone else reading this article, are at the center of everything we do at IFF, so we spend a lot of time and resources understanding consumers," explained Ramon Brentan, VP for scent, Greater Asia at IFF.

The main consumer megatrend that IFF, along with other specialty formulators, identifies is sustainability (in the forms of wellness, eco-consciousness, and transparency). But sustainability cannot come at the cost of functionality. "(Consumers) want the same things: high-quality products that are good for them, that they can take delight in, and that are also sustainable – but only if affordable," Jun Saplad, regional president for APAC at dsm-firmenich, told GBR.

A PwC survey found APAC consumers, including Southeast Asians, are more eco-conscious compared to the global average, possibly due to the age profile of this population, with a large share of millennials, whom PwC also separately identified to be the top market for eco-friendly products. "Holistic well-being," or "looking at beauty from inside to outside with a comprehensive and integrated approach," as Ramon Brentan defined it, is also more prevalent, particularly in the food and care markets.

Transparency is another sub-focus of sustainability. In 2019, the Michelle Pfeifer perfume line set a precedent in the fragrance industry by disclosing all ingredients on the bottle. Brandowners are now expected to disclose the ingredient lists on packaging, which consumers read more diligently, in search for more bio-based origins, another trend in itself. Sustainable packaging, both as a more eco-friendly choice and as a way to communicate sustainable content, is also more sought-after.

These consumer trends bring a third dimension for specialty chemicals innovation, beyond regulations and financial performance. Consumers are the final jury in the manufacturing court, influencing the guidelines by which a performance molecule stands out from the rest. Specialty chemicals and ingredient makers are reacting by offering products that meet multiple consumer requirements in a single package. For instance, a dsm-firmenich algae-based Omega 3 is more sustainable than its standard fish oil origin, offers twice the potency, and it has a fun and convenient delivery form, as a gummy, rather than a typical gel capsule. Sophisticated science, including chemosensory science to decode the emotions that taste and smell elicit, using MRI-backed data to test reactions to specific stimuli, and AI to generate new formulations, become necessary tools in the R&D lab.

In the largest global sustainability survey called "Who Cares? Who Does?" released in 2023 by Kantar, a marketing insights company, it was found that consumer spending for FMCG categories will double from US$500 billion per year currently to US$1 trillion by 2027. However, other analysts point to the "intention-action" gap, or what people say versus what they do. Harvard Business Review said about 65% of respondents in a recent survey said they want to buy more purpose-driven brands and advocate sustainability, but only 26% do so.

In the performance materials space, which supplies predominantly into durable markets like automotive, electronics, or aerospace, sustainable-by-design innovations fall more on improved functionality leading to lower emissions, as well as replacing fossil fuel raw materials with bio-based or recycled ones. For example, Envalior offers a repurposed grade made from abandoned recycled fishing nets, promising carbon reductions of up to 82% in end products like the Samsung Galaxy S22, Schneider Electric's Merten recycled ocean material product range, and the Ford Bronco. Syensqo's lightweight composite materials allow airplanes to save fuel by up to 20%. Here, whether the greener solution flies or not depends more on the OEM and the price tag it wants to pay for sustainability. Generally, consumers are more concerned with products that directly impact their health and wellbeing, rather than the impact of their purchases on the environment, PwC found.

In a perpetually more complex world of chemistry, sustainability provides a common thread between regulations, consumers, and market forces. This will make sustainability-driven innovations the principal arena for differentiation in the competitive specialty chemicals industry. ■

> Our customers can benefit from relying on a single supplier for multiple products, especially in an inflationary and disruptive supply environment.

Jun Saplad

Regional President APAC
DSM-FIRMENICH

One year after the merger, could you share some of the synergies created within dsm-firmenich?
In early 2023, two iconic companies, DSM and Firmenich, merged to become the leading innovators in the nutrition, health, and beauty space. dsm-firmenich's vision is to be a category-of-one by combining the essential, the desirable and the sustainable. I will share an example to explain. Last year, we launched an algae-based Omega 3, which is not only more sustainable than standard fish oil, but also twice as potent. Our innovative capabilities also allow us to deliver Omega-3 in the form of a gummy, as opposed to a typical gel capsule, which makes it more convenient and delicious too. This innovative product ticks the sustainable, essential, and desirable qualities to make a product that is special. By tapping on our extensive portfolio and capabilities, we want to create similar experiences across health, nutrition and beauty.

What are some notable developments in 2023?
We operated in a tough environment - a weaker economy in China, a lingering destocking cycle since the end of 2022, and unprecedentedly low vitamin prices have impacted our performance, both short-term and longer-term. In 2023, dsm-firmenich embarked on decisive actions to address this challenging environment. In the short term, we have implemented a vitamin transformation program. We also focused on cash and delivery, paid more attention to capital expenditure and inventory management to maintain a steady cash flow. At the same time, we pressed forward to accelerate the integration synergies from the merger. Longer-term, we are undertaking a strategic review of our portfolio, and took the difficult decision to separate the Animal Nutrition and Health division, so that it can realize its full potential under a separate ownership. For the rest of the year, we remain cautiously optimistic that the macroeconomics will improve.

Could you elaborate on how you use innovation to differentiate yourselves?
dsm-firmenich has very strong science and research capabilities that we continue to enhance both organically and through acquisitions. For instance, we recently acquired Adare Biome, a pioneer in postbiotics, as part of our strategy to build a gut health portfolio. In Asia, we not only host an R&D facility in Shanghai, but we also conduct on-the-ground applied research to test how our flavors, fragrances, or other ingredients interact with other ingredients and to cater to local preferences. For instance, dsm-firmenich uses tribology to test for mouthfeel and ensure the best sensory experience for end-consumers. Other areas of innovation where dsm-firmenich is particularly strong are biotechnology and chemosensory science, where we used receptor-based technology in both taste and smell to decode the emotions they may elicit. Under our EmotiOn program, we help our customers in the perfumery and beauty space to imbue their fragrances with certain emotion-triggering ingredients that are scientifically validated and regionally relevant.

Southeast Asia is seen as the source of the next wave of fast-paced, consumer-driven growth, alongside India. What opportunities and challenges do you identify for dsm-firmenich in this region?
Southeast Asia is full of opportunities. To focus on three specific ones, I would name the rising middle classes, an accelerating aging population (or what we call the "silver" generation with higher purchasing power), and the growth of the conscious consumer. These segments want the same things: high-quality products that are good for them, that they can take delight in, and that are also sustainable – but only if affordable. I say "if" because there continues to be a trade-off, affordability still plays a big role, especially in Southeast Asia.

Challenging, on the other hand, is the ever-changing and ever-more-complex regulatory landscape, both within Southeast Asia and at a global scale.

Do you have a final message for our readers?
I would like to go back to the essence of dsm-firmenich: We are a category-of-one company with a clear purpose to bring progress to life by combining the essential, the desirable, and the sustainable, as co-creators together with our customers in nutrition, health, and beauty. This mission is made possible by merging two legacy companies with highly complementary product offerings. Our customers can benefit from relying on a single supplier for multiple products (the flavor, the hydrocolloids, sugar-reduction solutions, the active ingredient, etc.), especially in an inflationary and disruptive supply environment. ■

> Scent design is a blend of art and science; they are inseparable. It involves a high level of creativity and understanding the preferences of consumers.

Ramon Brentan

VP for Scent, Greater Asia
IFF

Could you tell us more about IFF's Scent business unit in Southeast Asia and your recent investment in the region?
We are present in five Southeast Asian countries, with a mix of creative and sales teams in Singapore, Jakarta, Bangkok, Ho Chi Minh, and Manila. Singapore is not only home to one of our largest production facilities in the world, but also our biggest and newest scent creative center in the world, covering roughly 4,000 m2 and equipped with state-of-the-art evaluation booths across all categories, from fine fragrances to personal wash, fabric care, home care, or beauty care. Creating the right smells is one part of the work; the other to evaluate and recreate how consumers use our products. Our experts lead in specific scent categories, providing technical expertise, capabilities, and information to our creative centers globally, as well as gathering findings to support multinational customers. The Singapore Innovation Center, for example, serves as a global center of excellence for powder detergents.

What drove the decision to invest in Singapore, specifically?
Southeast Asia has one of the fastest growing and affluent middle-class populations in very large markets such as Indonesia, Thailand, and the Philippines. In Singapore, IFF traces back its roots to 1969 and we are very well-entrenched in the local ecosystem. Many MNCs are well established here, and the pool of talent is truly impressive. On top of these qualities, the government has been supportive of innovation, while ensuring top-notch infrastructure; Biopolis, where we are located, is an R&D cluster for the life sciences industries. Singapore has built an ecosystem conducive to cutting-edge innovation, which is at the heart of what we do.

Could you familiarize our audience with the process of scent design and innovation?
Scent design is a blend of art and science; they are inseparable. It involves a high level of creativity and understanding the preferences of consumers. End consumers like you, me, and anyone else reading this article, are at the center of everything we do at IFF, so we spend a lot of time and resources understanding consumers. When designing a scent, there are 2 critical roles: the perfumer, who is the creator or the main artist, and the scent design manager who understands the consumer and the customer, being able to support the process using data and knowledge to translate and work closely with the perfumer to bring the works of art to life. Lastly, it is about respecting the environment for every creation, which includes the non-negotiable regulatory side and voluntary initiatives. At IFF, we go beyond the obligatory compliance and have our own "Do More Good" pledge.

What are the most prominent consumer trends today?
One is holistic well-being. Some may call it differently, but this is about looking at beauty from inside to outside with a comprehensive and integrated approach. Though we have been working on this element for many years, the pandemic had a deep impact on how people perceive and desire well-being, which drove more interest in this notion. At IFF we have a program called "Science of Wellness" which draws from over 40 years of research and more than 5 billion data points into how our brains react to different raw materials to make science-based recommendations. Whether it is a fine fragrance, a fabric conditioner or a shampoo, everything we smell has the power to make us feel different, happier, more relaxed, and so on.

Another megatrend, increasingly more prominent with Southeast Asia's young demographic, is eco-consciousness. Consumers want more sustainable products, and on top of that, seek products that are highly functional and appealing.

How important is Southeast Asia to IFF's growth strategy going forward?
Already, Asia represents a large share of our sales, but the near-future projections show this part of the world has the biggest growth potential. Southeast Asia has also seen a transformation over the past couple of decades, with rising living standards as well as a young and wealthier population becoming more environmentally aware. The region remains a key investment focus for us.

Do you have a final message for our international readers today?
Sustainability is in our DNA at IFF. We have recently launched our 2023 Do More Good Report. We believe we can all do more good for people and planet, and we invite everyone to join us in our #DoMoreGood pledge. ■

> Syensqo inherited the specialties business of Solvay, which represented about 60% of revenue.

André Nothomb

Executive VP, Head of Government & Public Affairs APAC, Singapore Country Director
SYENSQO

At the end of 2023, Syensqo started trading as an independent company, following the spin-off from Solvay. What businesses did Syensqo inherit?
Syensqo inherited the specialties business of Solvay, which represented about 60% of revenue. While Solvay retained the soda ash, peroxides, silica, and solvents businesses, everything else moved to Syensqo – including specialty polymers, composite materials, solutions for the oil and gas industry, as well as surfactants for the home and personal care markets.

With a diverse portfolio across multiple verticals, what are the dominant demand trends you observe in 2024?
Syensqo has five key verticals, each with a life of its own, so we are directly impacted by the dynamics pertaining to these segments. Automotive is the biggest industry we support, followed by consumer goods, aerospace, food, and electronics. On top of this, we offer intermediate products for industrial applications, which represent almost a third of our global sales. Performance is mixed across the board. For the automotive sector, we supply the EV market, which is on the rise, although 2023 sales were tempered off by the removal of government subsidies. Aerospace is having a big turnaround moment, after suffering terribly during the pandemic. The agro sector is going through a low cycle, with disruptions emanating from Ukraine putting pressure on global markets, but food production is always poised to grow long-term. Finally, the personal care and home care markets are a big focus, especially for bio-based solutions produced through nature replicating processes such as fermentation.

Could you comment on the chemical industry's legitimization journey and the public & regulatory pressures it faces today, especially when it comes to sustainability?
The chemical industry carries an unfortunate load from the past and continues to be subjected to scrutiny, sometimes necessary, other times undeserved. It is essential to work together with the authorities to alter the industry's perspective. Public opinion can sway to the extreme and the irrational, so we need to have open conversations with both the public and the regulators to address existing issues.

One of the areas that the public pays the most attention to is the use of carcinogenic products or other substances of concern, such as PFAs (Per- and polyfluoroalkyl substances), identified as environmental pollutants and potentially harmful to human health. Regulators are restricting the use of some of these products and the industry is working hard to replace those few proven to be harmful. Global warming is another area that everyone is aware of. What fewer people understand is the crucial role that the chemical industry has in helping multiple industries decarbonize, through innovative solutions.

We can compare the current multi-folded challenge of global warming with the ozone layer destruction that came into foresight in the 1970s and 1980s. Albeit global warming is a much greater issue in terms of the volume of GHG that needs to be cut down to reach neutrality, the ozone layer hole was an imminent threat to humankind; it has now been proven that the ozone layer is recovering. The Protocol of Montreal identified over 100 individual ODPs (ozone-depleting materials), some of which also have a global warming impact. If history is to show us something, is that humanity is capable of tackling serious challenges as long as we become conscious of the threat and act upon it.

How is Syensqo aligning with global net-zero goals?
Since 2007, Solvay has established a methodology to assess the sustainability profile of our products, taking into account everything from raw materials to end-users. By 2018, all our products, whether brought in through M&A or developed in-house, were measured following this cradle-to-grave guide. As Syensqo, we continue with this legacy. Syensqo has also revised its targets, committing to become carbon-neutral by 2040, rather than 2050, and to achieve 18% of our sales from fully circular solutions by 2030.

Could you exemplify how Syensqo's products can have a positive impact on value chain emission reductions?
Our products play a huge role in helping our customers decarbonize. For example, our high-tech lightweight composite materials for the aerospace industry allow the next generation of airplanes to be much lighter and more durable, leading to fuel consumption savings of as high as 20%. Innovations in the transport sector would not be possible without innovations in high-tech polymers. The same is applicable for many other sectors. Our Singapore office serves as an R&D lab for solutions applicable to the oil and gas sector for all of APAC and the Middle East. ■

> The two main ways to differentiate ourselves in this space are a unique portfolio and superior development capabilities.

Milan Vignjevic

APAC Regional Commercial Director
ENVALIOR

Could you introduce the newly created Envalior to our international audience?
Envalior was created last year as a merger between two highly complementary businesses: DSM Engineering Materials (DEM) and LANXESS High Performance Materials (HPM), each a leader in their field with a combined heritage of over a century. This makes Envalior one of the world's leading engineering materials companies. We have a turnover of over 4 billion euros, 4,000 employees worldwide, and a global footprint across the Americas, Europe, and APAC. We are structured in three divisions (performance materials, specialty materials, and intermediates).

How is Envalior leveraging the portfolio synergies to differentiate in the engineering materials market?
The two main ways to differentiate in this space are a unique portfolio and superior development capabilities. Envalior brings together an unmatched portfolio from the DEM and HPM divisions, on the polyamides chain, like PA6 and PA66, as well as specialty polyamides like PA46, PA410, PA4T PPA, and engineering materials such as PBT and PPS. Additionally, we have extensive design, simulation, and application experience, compounded by a long track record in high-performance and innovative solutions. Customers in materials engineering are looking for more than a supplier – they seek a development partner. Getting it right on the first try is critical, so we walk with them from concept and design to implementation, taking into account the boundary conditions and functional requirements of end products, be these automotive, electronics and electrical, consumer goods, industrial, medical, or food packaging. Having a truly global reach, with R&D and production centers in all regions, also positions us close to our customers.

Could you elaborate on Envalior's R&D capabilities?
Envalior has in-house capabilities across all the relevant phases of our customers' product development. We offer tailor-made compounds to meet application requirements (material development), and then work on the right design (concept development) to offer our customers a competitive edge in terms of productivity and function integration; we then use world-class software to run simulations, identify, and rectify potential problems (computer-aided engineering), before we provide prototyping (processing support) and material & part testing at our centers.

What are the advantages of a pure-play, backward-integrated business?
Envalior is backward integrated into intermediates for relevant products like PA6 (nylon 6) or PA46 (nylon 46) and even into glass fibers. We also have various polymerization units like PA4, PA46, PBT and TPC (thermoplastic copolyesters). At the same time, we do not play in big commodity markets like polyethylene (PE) or polypropylene (PP). Envalior is less vulnerable to swinging commodity prices, while having the flexibility to adjust to prevailing market conditions and focus on markets where we can take leading positions.

How is Envalior's portfolio responding to the decarbonization journey that many players within the manufacturing sectors have embarked on?
Sustainability and a low-carbon footprint are no longer a trend, but a license to operate, and hence it must be embedded across all processes within your internal value chain.

As a frontrunner in mechanical and chemical recycling technologies, our portfolio counts over 150 recycled or bio-based grades. We are striving to expand this. Some of our products that contain recycled content include Durethan PA6 & PA66 ECO and Pocan PBT ECO grades, all containing postindustrial recycled glass fibers; Pocan ECO T is a PBT that uses recycled post-consumer waste from PET. On the renewable materials side, Envalior offers a mass-balance solutions approach across our EcoPaXX, Stanyl, Akulon, Arnitel, and Durethan range. Very uniquely, Akulon PA6 repurposed grade is made from abandoned recycled fishing nets, with a reduced carbon footprint of up to 82%. This has attracted a lot of attention from leading brands, finding applications like the Samsung Galaxy S22, Schneider Electric's Merten recycled ocean material product range, and recently, Ford Bronco, a first in a commercial vehicle containing repurposed grades.

Envalior has realized also Scope 2 GHG emission reductions by switching to renewable energy sources in most of its compounding sites.

What is your outlook for 2024-2025 in Southeast Asia?
Rapid upgrades in the manufacturing industries in Southeast Asia will trickle down to all downstream sectors, while demand for EVs and electronics is only going up. The market is resilient and fast-adaptive, and its advent up the value chain is the perfect fit for Envalior as the partner of choice for engineering materials. ■

The Upstream - Oil and Gas

Investors advocate for the lesser "evil"

Humans seem to be programmed to prioritize the present over the future, at least when it comes to dealing with crises. Between struggling with access to energy today and imagining the adverse impacts of climate change in the all-so-vague tomorrow, most would say 'Let's tackle one thing at a time.' Twenty years from now, our older selves and new generations will likely be blaming us for not doing more to combat global warming, but in 2024, the energy crisis was a hard-to-digest reminder that the world is still hooked on fossil fuels. The oil and gas industry climbed out of an era of downturn, emerging stronger than ever.

Surprisingly or not, the world's supposedly dying industry is currently the most profitable one. The oil and gas (O&G) exploration and production (EP) sector cashed in US$5.3 trillion between 2018-2023, more than any other sector. The global energy crisis that started in 2022 bumped up revenues to a 10-year high that year, a record that was broken again in 2023. Emissions grew too, reaching 12.1 billion tpa in 2023 – about a third of all industrial emissions - according to the Global Carbon Project.

The geopolitical train of events culminating in worries around energy security saw investors paddling back on climate worries and forward on petro-gas dollars. Within this global re-awakening to oil and gas, investment in Southeast Asia's O&G development is booming, from US$9.5 billion in 2022-2023 to US$30 billion in the 2024-2025 period, informs intelligence company Rystad Energy. That would set the industry growing by 4% for the next five years, according to Energy Council. Another source, EcoBusiness News, estimated that China and Southeast Asia are leading global O&G developments in Asia, the continent accounting for two-thirds of the world's total.

High GDP growth, industrialization and a slower electrification pace compared to the rest of the world explain why the region emerges as a very large and growing energy user. In a "stated policy scenario," IEA anticipates total consumption in Southeast Asia will rise by 80% by 2050. That trend contrasts with the rest of the world: "Energy demand in Southeast Asia is set to nearly double over the coming few decades, while in the rest of the world energy demand is getting close to the peak and will flatten, as GDP growth and energy demand start decoupling due to greater energy efficiencies. Unlike other regions, Southeast Asian countries will not only have to decarbonize existing energy supply but also find a way to meet this huge growth in energy demand," explained James Laybourn, APAC regional sales director for DNV Energy Systems, an energy advisory.

What also attracts investment to Southeast Asia is the region's legacy and maturity in oil and gas. Outputs in the largest producing countries for oil (Indonesia, Malaysia, and Vietnam) and gas (Indonesia, Malaysia, and Thailand) had been declining, mostly on account of a low-price environment in fields that are generally offshore and more costly to develop and operate. Climate pressures also put off investors. Across the region, 4.861 million boed of crude, condensate, and natural gas were produced in 2023, according to GlobalData. That number is expected to spike, with CapEx doubling by 2027. Over the last five years, 7 billion barrels of oil were discovered in the region, 2 billion of which just last year, writes Upstream Online.

Mahesh Swaminathan
Executive Committee Member and Senior Vice President Subsea and Floating Facilities
MCDERMOTT

> "Current geopolitical tensions, together with high demand for energy, especially from fast-growing Asian economies, have multiple Asian nations seeking energy self-sufficiency. There is a huge drive to monetize existing assets, with upstream spending picking up across the region."

A flurry of major discoveries lit up investors' interest in Southeast Asia, driving exploration and development work. One of them is Mubadala Energy's Layaran and Tangkulo gas discovery at the South Andaman Block, which stoked enthusiasm for the broader acreage on the island of Sumatra, Indonesia. Italian energy group Eni also announced last year a big gas discovery from a well in North Ganal PSC, off the coast of East Kalimantan, Indonesia, with preliminary estimates of 5 trillion cubic feet (tcf) of gas and estimated condensate of up to 400 million barrels. In Malaysia, the country's national energy company, Petronas, is preparing to bring Kasawari to production this year, a gas field discovered in 2011, while Shell's Rosmari-Marjoram has also reached a final investment decision in 2022, eight years after being discovered. These last two make the largest gas fields in the country.

The offshore Serawak basin, where both of these projects are located, is a focal exploration area, with more projects in the pipeline: Petronas Carigali, the upstream company of state-owned Petronas, is to appraise its 2023 Singsing discovery in the Western Luconia, while PTTEP, the upstream business of Thai national energy company PTT, is looking to drill an appraisal well on the Chenda oil and gas discovery offshore Sarawak, made in 2023, as part of a cluster development with two other discoveries. Shell is also active, with extensive exploration and development drilling on the MLNG block, offshore Sarawak.

The region's O&G sector is led by state-owned, upstream-to-downstream integrated companies: Petronas in Malaysia; PTT in Thailand; Pertamina in Indonesia; PetroVietnam; and PNOC in the Philippines. They work across borders and often together, despite being competitors in the petrochemical space. For instance, PTT is heavily invested in Malaysia, while Malaysia's Petronas is active in Indonesia. Some companies are operating in shared waters, like Malaysian-listed Hibiscus Petroleum, which recently made a second discovery on oil Block PM3 CAA in the Malaysia-Vietnam commercial agreement area. But the big dollars are sought out from large foreign investors.

Petronas has recently awarded production-sharing agreements for six exploration blocks in the 2023 bidding round, as well as launching a new round for another 10 blocks this year. Malaysia has recently signed multiple MoUs with China's Sinopec to explore crude oil, LNG, and petrochemical opportunities in the region, and has engaged Japanese companies on CCS. French major TotalEnergies has recently bought the full shares of SapuraOMV, a gas producer with a 40% stake in Block SK408 and a 30% stake in Block SK310, both in offshore Sarawak, Malaysia. American supermajor Chevron has acquired Hess, with assets in Malaysia. According to Petronas public documents, Malaysia's goal of maintaining 2 million barrels of oil equivalent per day by 2025 will be supported through a pipeline of projects including Kasawari, Jerun, Rosmari-Marjoram and Lang Lebah in Sarawak, Gumusut-Kakap Redev and Belud Clusters in Sabah, and Bekok Oil Redev, Tabu Redev and Seligi Redev in Peninsular Malaysia. 25 wells are forecast to be drilled every year in the shallow waters of Malaysia and 45 upstream projects to be executed, together with four Central Processing Platforms (CPPs), three onshore facilities, and 1,130 km of pipelines to be fabricated.

On its side, Indonesia will auction 10 blocks this year in the North Sumatra basin, where Mubadala has recently made its discovery. One of the companies taking up acreage from Indonesia's 2023 bidding round was Petronas, awarded with the Bobora production sharing contract offshore in Papua Barat province in the east of the country. Indonesia is leveraging recent discoveries as well as reformed fiscal policies to attract new investment in the North Sumatra basin. Last year, Indonesia drilled only 20 wells, but plans to double that number this year, writes Energy Council. Over the past decade, exploration plunged by about 23%, and the number of wells also fell from 64 in 2014 to 30 in 2022. Pertamina has teamed up with Italian energy company Eni in a new MoU to explore the potential of several blocks and signed another MoU with UK company Conrad to look together at the potential commercialization of two offshore licenses that Conrad has in the Aceh region. Eni has acquired Neptune's entire portfolio minus Norway, including Eni-operated Geng North-1 gas discovery, offshore Indonesia. Indonesia has a goal to lift 1 million bpd and 12 billion cf/d of gas by 2030.

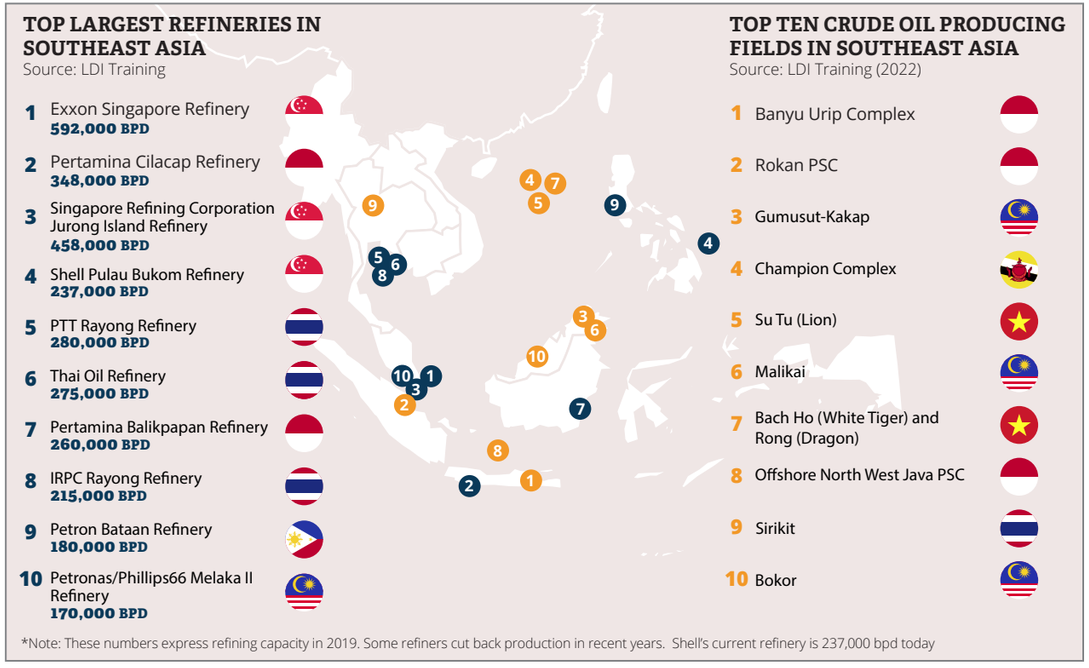
Image courtesy of Anoop VS at Pexels

With the rises in oil prices, projects became more economic, but the other catalyst to new development is carbon economics, especially for gas fields. Typically, gas fields with high CO_2 content have a lower chance of being brought to production. A solution was found in carbon capture and storage (CCS), which changes project credentials. For instance, Petronas' Kasawari can be said to not only produce 900 million standard cubic feet per day of gas and 3.5 million barrels of condensate per day but also to capture up to 3.3 million tons of carbon dioxide. Petronas Carigali and JX Nippon Oil and Gas have also committed to an integrated offshore gas plus carbon capture and storage solution in the BIGST project, Malaysia's next largest gas development after Kasawari, covering 4 trillion cubic feet of gas with a high CO_2 content, the reason why it was never developed. A project's flaw turns into an opportunity to store its own emissions, and, with potential scale-ups, emissions not of its making.

Because it burns more cleanly compared to oil and coal, gas is considered the lesser evil in the fossil fuel club. CCS is meant to make it even cleaner. By making use of saline aquifers and depleted oil and gas reservoirs for storage, CCS also provides a "reuse" opportunity in the context of circularity, which gives it extra credit. In Indonesia, the Ministry of energy and Natural Resources reported the country has a storage potential of 572 gigatons of CO_2 in saline aquifers and an additional 4.85 gigatons of CO_2 in depleted oil and gas reservoirs for CCS initiatives, as reported by S&P Global.

However, the compression of CO_2 into a liquid pumped underground resembles an awful lot to brushing the trash under the carpet, some skeptics will say, which makes the technology controversial. It is feared that CCS will be treated as a quick fix that gives a free pass on more fossil fuel reliance and exploitation. That said, deploying CCS in a package with gas projects could be a starting point for self-standing CCS. James Laybourn, regional sales director for APAC at DNV Energy, explained: "The costs of the capture and sequestration are covered by the project. Whilst not directly contributing to global decarbonization efforts, an advantage of such projects is that they are already economically viable and once developed, they can potentially be used to support storage for other sources of CO_2."

Whereas Vietnam and Indonesia are focusing more on renewables, Malaysia is becoming one of the frontier appliers of CCS technology. Petronas is up to spending US$450 million on CCUS projects between 2023 and 2026, according to Rystad Energy. Regulators are also moving in that direction, requesting new developments to come with a carbon abatement strategy in place. "In many cases, investment approvals are contingent on CCS facilities built in parallel or as the next phase of a project. Gas projects are prioritized over oil, and those gas projects with a lower sulfur content are prioritized over those with a higher one. Yes, we see higher spending in the industry, which I believe is here to stay for the next five or so years, but with it, we also see a focus on leveraging low-carbon technologies for sustainable project



delivery," said Mahesh Swaminathan, Mahesh Swaminathan, EXCOM member and Senior VP Subsea and Floating Facilities, McDermott, a global EPC with regional headquarters in Kuala Lumpur, Malaysia.

Engineering, construction and procurement (EPC) as well as oilfield service (OFS) companies are very busy these days in Southeast Asia, not only on the traditional projects in the lifecycle of the oil and gas space – exploration, development, production, and decommissioning – but also on CCS, renewables, battery storage, hydrogen, and other low-carbon or carbon-abatement technologies. Service providers are bullish on both old and new types of projects. McDermott anticipates that up to 80% of demand will come from Australasia over the next 3-5 years. ABL sees a high increase in green-type projects, along with the usual ones: "2030 is only six years away, leaving a short timeframe to invest and execute projects that will allow Malaysia to meet its carbon commitments. Projects in carbon capture, floating solar, green hydrogen, and battery energy storage systems (BESS) are expected to grow in number and generate demand," said Mohd Saifuddin Md Salleh, country manager for ABL Malaysia.

The service provider industry is putting its feet in both camps: the traditional development of oil and gas projects and related facilities, as well as new areas like hydrogen, CCS, or decommissioning and repurposing work on abandoned assets. In Malaysia alone, there are 130 wells and 50 facilities that need to be plugged out, according to Petronas. To serve both categories, the sector has seen some major re-restructuring. A good example is TechnipFMC, which spun off Technip Energies, the first dealing more with traditional LNG and ethylene business, and the latter taking up green hydrogen, plastic pyrolysis, sustainable chemistries, biofuels, waste, and carbon management, with flagship projects such as the Neste refinery in Singapore, among others. McDermott reorganized two years ago from a regional to a vertical-by-vertical structure, across multiple business lines; with that, Malaysia turned into a major global hub serving Australasia, West Africa, and the Americas. Global management consultancy firm Bain & Company has brought together its oil and gas, chemicals, mining, utilities, and agriculture under one practice called Energy and Natural Resources, one of the firm's top three globally.

This diversification in the service sector is a reflection of what their customers, the oil and gas companies, have done. Some of the largest oil and gas companies are also the largest investors in renewables. They are advocates of both traditional and new energies. As a result of this cross-pollination, it is harder to distinguish the different businesses, once more siloed.

The discovery of oil and gas (O&G) triggered the development of the Southeast Asian petrochemical industry. What happens in this space has direct and indirect consequences for the rest of the value chain, be it through energy availability, feedstock availability, or national economic performance. The energy sector remaining a linchpin of local economies; in Malaysia, for instance, it accounts for about a fifth of annual GDP. Another impact of the growth of the O&G sector in Southeast Asia is that it promotes energy hubs in the region, particularly in Kuala Lumpur. Top-level expertise concentrated in the city may stem from an oil and gas legacy, but it is spreading in cutting-edge decarbonization knowledge replicable at multiple levels in the hydrocarbon value chain. "A person who has worked on a platform can easily switch to working on a carbon capture project," said Charles Pfauwadel, senior vice president for Asia at Airswift, a global recruitment firm.■

> We anticipate that up to 80% of demand will come from Australasia in the next three to five years.

Mahesh Swaminathan

Executive Committee Member
and Senior VP, Subsea and Floating Facilities
MCDERMOTT

McDermott is a global provider of engineering and construction solutions. Could you give us a sense of your presence in Southeast Asia and the role that Malaysia plays within your global network?
McDermott is one of the most experienced players in the offshore oil and gas (O&G) sector, with over 100 years in the market. We have been present in Southeast Asia for about 50 years, predominantly serving the upstream business, but we also do fabrication and modularization work for LNG and petrochemical companies. For many years, Singapore served as our Asian hub, but a strong client pipeline matched with attractive business incentives and a very strong talent pool drew us to Malaysia. Therefore, Kuala Lumpur became our regional hub in 2016.

Two years ago, McDermott reorganized from a regional into a vertical business line structure to synergized our competencies in key locations for better results and increased efficiencies. With this change, Malaysia became one of our major global hubs, with almost 1,000 people working here today. From Malaysia, we serve the rest of Australasia, as well as do work for projects in West Africa and the Americas. McDermott is probably one of the only companies to do everything in-house – from engineering to procurement, construction, and installation (EPCI) – and that is a key differentiator. This integrated EPCI model is our core competency and competitive advantage.

What have been some of the flagship projects executed out of Malaysia that you're particularly proud of?
One of our current notable projects is the Scarborough Energy Project for Woodside in Australia. At 30,000 tons for the topside and a large floating hull, this will be one of the largest projects we have ever done. The structure is being fabricated at Qingdao McDermott Wuchuan (QMW), our joint venture fabrication yard in China, before being shipped, installed, and commissioned in Australia. Scarborough demonstrates our global supply chain capabilities with at least three countries involved, all coordinated from Malaysia, whereas, typically, projects of this size and scale, run by other EPC companies, tend to get done out of Houston, London, or their Paris offices.

Another example of McDermott's breadth of work is in India's largest subsea developments. McDermott was a later entrant to the subsea/deepwater business, with the first project just about 14 years ago. Yet, in a short time, McDermott has executed very large contracts, totaling close to US$ 2 billion, for ONGC, and Reliance on the east coast of India, as well as others across the Asia Pacific region from our KL office – which serves a center of excellence for large subsea projects and large platform projects for the company.

What are the main trends in the upstream sector in Southeast Asia?
When we undertook the business line reorganization, it became apparent that Australasia would likely represent 50% of our portfolio. Today, we are even more bullish on this part of the world, anticipating that up to 80% of demand will come from Australasia in the next three to five years. Current geopolitical tensions and their impact on gas prices, together with high demand for energy, especially from fast-growing Asian economies, has multiple Asian nations seeking energy self-sufficiency. Malaysia has a seen an increase in new projects because these have suddenly become economical in the context of global trends; India is keen to reduce energy imports; Vietnam, which has been very quiet for the past 10 years, has many projects taking off now; and Indonesia is moving a step up with a large LNG project. Energy demand is on the rise, and there is a huge drive to monetize existing assets, with upstream spending picking up across the region.

Investments in the oil and gas sector are no longer guided solely by exploiting natural resources but come in tandem with carbon emission monitoring and offsetting. In many cases, investment approvals are contingent on carbon, capture and storage (CCS) facilities built in parallel or as the next phase of a project.

How is McDermott aligning with the demands of the global energy transition?
McDermott has established environmental, social, and governance (ESG) targets. To get there, we are tackling our ambitions from three angles: The first is about reducing the carbon footprint of the facilities we build for our customers. Second is reducing the carbon footprint of our own operations, especially from our manufacturing facilities and marine vessels. For instance, our Batam fabrication yard in Indonesia is largely solar-powered. The third angle is engaging in energy transition projects, such as the Kasawari CCS project. Besides building projects to help with decarbonization, we also found a niche in decommissioning work. As regulations evolve, more assets will become obsolete and need to be decommissioned, so McDermott is keen to become a first choice in this part of the circular economy.

What are McDermott's priorities moving forward?
We work every day to be the preferred partner of our customers and join them in their journeys of developing energy projects responsibly and safely here in Asia, but also in Africa, both with rising populations driving energy demand. Our aim is that most projects will have a carbon abatement plan by 2030. ■

> Demand is growing every year. This is driven by the fact that most Southeast Asian countries struggle to meet annual production targets, creating a gap for improvements.

Quach Anh Vu

Southeast Asia Area Director, Oilfield Services and Equipment (OFSE)
BAKER HUGHES

How will the recently built chemical plant in Singapore add to your regional capabilities?
Baker Hughes, an energy technology company, has a strong presence across the area, including Malaysia, Thailand, Vietnam, Brunei, and Singapore. We concentrate our direct footprint to a number of locations, synergizing our capacities in key hubs and relying more strongly on collaborations. One of these hubs is Singapore. This new chemicals manufacturing facility allows us to better serve the entire Asia-Pacific region and drive our localization closer to key demand hubs.

What has demand for oilfield services been like over the past few years in this region?
Demand is growing every year. This is driven by the fact that most Southeast Asian countries struggle to meet annual production targets, creating a gap for improvements and therefore needing the solutions we have to offer. We are creating technologies and solutions for the upstream segment, from drilling to well management through to processing and transport. Using the right chemicals in the upstream is similar to taking vitamins – they both keep the entire organism healthy but need to be taken proactively rather than waiting for something to go wrong.

Could you introduce us to Baker Hughes' offer in CCUS and geothermal projects?
OFSE is expanding its capabilities and technology portfolio to meet the challenges of a net-zero future. These efforts include expanding into new energy areas such as geothermal and CCUS. OFSE also provides integrated well services and solutions to plan and execute projects ranging from well construction and production through to well abandonment, in addition to integrated services and solutions for the subsea environment.

Baker Hughes has been working with major geothermal operators, and we have a comprehensive portfolio covering everything from well planning to construction and production to tackle various formations, high temperatures, and other harsh and supercritical well conditions. To give one example, our JewelSuite™ portfolio of applications for differentiated subsurface workflows allows our customers to manage the heat source while producing. At the well construction stage, we recently commercialized a Vulcanix geothermal PDC drill bit with strategically placed cutters fit for geothermal applications. Then, in the drilling application, we delivered 300 Celsius-fit drilling tools for the hottest well in Iceland. At the production phase, we have acidizing systems to eliminate corrosion to deal with hot temperatures in geothermal wells.

Carbon capture, utilization, and storage (CCUS) is also in high demand in Southeast Asia, particularly in Malaysia and Thailand. Baker Hughes has a huge portfolio tailored to such projects, focusing particularly on planning the wells for CO_2 storage deep underground.

How do you look at the co-existence of traditional energies with alternative or "transitional" energies?
Energy transition is here, with its trilemma of sustainability, affordability, and security. I see three key energy transition pillars. First, the world would not be able to meet net-zero targets without a major acceleration of both current technology utilization and investments in new technologies, like carbon abatement technologies or technologies for the better valorization of renewables, including geothermal. The second pillar – and one less acknowledged – is that the reliance on hydrocarbons will not go away in the next three decades. Once this is accepted, bringing out efficiencies in the O&G industry is paramount to meet both energy security and sustainability (by reducing emissions of current assets). The third pillar is collaboration. The pathway to net zero is going to be very challenging without collaborations. It will take energy producers, technology service providers, energy buyers, policymakers, and the community at large working closely together to achieve collective targets.

Baker Hughes has launched Leucipa™, an automated field production solution. Could you tell us more about Leucipa?
Leucipa was successfully commercialized in 2023 with a mission to deliver high-grade production rates with the lowest carbon emissions. Using this software solution, our customers can proactively manage production themselves day by day. Combining AWS cloud capabilities with Baker Hughes's O&G expertise, Leucipa is very much a plug-and-play solution, very easy to operate. We have already introduced Leucipa to one of the majors in Southeast Asia. Moving on, we will continue to further advance the technology. In the mid to long term, digital transformation is a high priority for us. Leucipa is only a part of this larger pathway. ■

> We believe that there is significant potential to reduce the cost of the energy transition in Southeast Asia through greater regional energy cooperation and planning.

James Laybourn

Regional Sales Director, APAC
DNV ENERGY SYSTEMS

Could you introduce DNV and the Energy Systems business to our readers?
About three years ago, we brought together our oil and gas (O&G), power, and renewables business areas under a single vertical called Energy Systems, as the lines between these traditionally separate customer groups have become more blurred. Beyond the Maritime and Energy Systems, which are our two largest business areas, we also have Digital Solutions, Supply Chain, and Business Assurance.

The Energy Systems business area comprises a team of more than 5,000 people globally, 500 of which are spread across 12 offices in strategic markets across Asia and Australia. Our primary focus is supporting the energy transition, supporting our customers with their decarbonization challenges.

We have seen more investments in CCS recently. What drives these?
The primary focus in Southeast Asia has been to support new natural gas projects with relatively high CO2 content. Governments and regulators are now requesting developers to come up with solutions to significantly reduce the impact of such projects.

What are the main challenges for low-carbon hydrogen?
The greatest challenge for the adoption of low carbon hydrogen is reducing the cost of the value chain to a competitive point where either people are willing to utilize it, or governments provide incentives to offset the additional cost (such as through carbon tax or carbon credits).

Another big issue is regulation. How do you define low-carbon hydrogen? Europe has defined the amount of CO2 per Kg of hydrogen as an acceptable limit, but there is no globally accepted standard.

The third challenge is infrastructure: Importing high volumes of low-carbon hydrogen and ammonia requires extensive new infrastructure. This infrastructure presents new challenges from a safety perspective due to the different behaviours of hydrogen and ammonia relative to traditional hydrocarbons.

DNV has been doing significant work in the region, mapping out the potential future markets for hydrogen, supporting optimization of the production process, developing the infrastructure requirements, safety implications, and investment mechanisms. At DNV's major testing facility at Spadeadam in the UK, we are conducting full-scale testing of hydrogen and ammonia at the world's first full scale dedicated hydrogen test site. This is enabling us to better understand the behaviour of hydrogen in many new use cases to support the development of better design guidelines and regulations and where possible enable the repurposing on existing infrastructure.

What are the main obstacles in Singapore's energy transition journey?
Singapore cannot achieve decarbonization on its own. Even by going full-scale on floating solar and localized PV across the island state, Singapore can only achieve ~10% of its energy demand from renewables directly. The remaining 90% is currently generated from natural gas via highly efficient combined-cycle gas turbines (CCGT). Singapore is beginning to import renewable power from neighboring countries via electricity interconnectors, however there are limits on the capacity that can be achieved. Therefore, importing low carbon hydrogen in some form (e.g. as ammonia) can be an effective way to reduce Singapore's carbon emissions.

What are the main drivers for DNV in the region?
Demand in Southeast Asia is set to nearly double over the coming few decades, while in the rest of the world, energy demand is getting close to peak and will flatten. Unlike other regions, Southeast Asian countries will not only have to decarbonize existing energy supply but also find a way to meet this huge growth in energy demand. This highlights the severe limitations of the current regional electricity grids at a time of increasing focus on energy security and energy independence. The new renewable projects coming into the grid will be additive rather than replacing existing power generation. This helps explain why countries in the region also continue to add coal-fired plants.

What is the case for more grid interconnection across Southeast Asia?
We believe that there is significant potential to reduce the cost of the energy transition in Southeast Asia through greater regional energy cooperation and planning, instead of each country coming up with its own independent energy strategy. DNV has worked on a white paper on the potential of developing energy interconnectors (through power sharing or renewable power flows) between ASEAN countries, showing how this could save approximately US$800 billion over the coming decades and accelerate the region's decarbonization progress. ■

> Being close to the feedstock and then close to the final market are huge advantages for the region.

Bhaskar Patel

Senior VP, Sustainable Fuels, Chemicals and Circularity
TECHNIP ENERGIES

Could you introduce Technip Energies to our international audience?
Technip Energies is a leading technology and EPC company which has a history of over 60 years, but formed in 2021 through a spin-off from TechnipFMC. Our traditional business has been in LNG and ethylene, but we are increasingly more present in net zero projects like green hydrogen, plastic pyrolysis, sustainable chemistries, biofuels, waste, and carbon management, supporting clients in their net-zero goals. Technip Energies' legacy stems from consultancy and engineering, yet our expertise has evolved into a fully-fledged EPC contractor and technology licensor. We have over 65 technologies, both proprietary and third-party, and many of these are used in the energy transition. We have offices across the region and an Asian HQ in Kuala Lumpur.

Technip Energies worked on the Neste biorefinery expansion in Singapore. Could you elaborate on your expertise in sustainable aviation fuel (SAF) projects?
Technip Energies has a strong presence in the alcohol-to-jet route through our proprietary ethanol to ethylene technology called "Hummingbird," as well as providing EPC project delivery services, like we did with Neste for their projects based on their own technology that turns renewable fats and oils into renewable fuels such as SAF. Currently, there is only one SAF ATJ project at the EPC phase, and this is the Freedom Pines Biorefinery in Georgia, USA, where Technip Energies was selected by LanzaJet to provide the Hummingbird® technology. The plant was inaugurated at the beginning of the year, marking the world's first ethanol-to-SAF commercial-scale facility. Technip Energies is currently working on multiple other alcohol-to-jet fuel projects and we are glad to be enablers of these cleaner fuels that will help decarbonize the aviation industry.

What are some of the specific opportunities that Southeast Asia provides when it comes to the energy transition?
Southeast Asia has a growing and young population, which makes it an ideal market for consumer goods. As the middle class expands and consumers become more and more preoccupied with climate change, they demand sustainable products. This will drive the energy transition in the region, perhaps before legislation kicks in. But beyond demand, the region can also play a big role in supply because it is home to one of the largest sugar producers and therefore can provide critical bio-feedstocks for new chemistries. Being close to the feedstock and then close to the final market are huge advantages for the region. Linking consumer and producing markets, we can also draw the argument that Southeast Asia provides feedstocks for circular solutions – a lot of plastic waste, which becomes the feedstock for recycled plastics, can be found in the region. The challenge will be to make the technologies affordable because the region remains price-sensitive.

How do you observe regulations on the energy transition progressing in Southeast Asia compared to the rest of the world?
While the US, the EU, and Australia have policies in place, for instance by mandating that by 2030 all airlines should run on a specific share of SAF, Southeast Asia lacks that kind of regulatory impetus. The region is large and diverse, without a central forum to come up with firm policies around commitments to net zero on a regional level. That leaves it up to individual countries, and, in the lack of these national policies, it is ultimately left up to individual companies to define how their net-zero trajectory should look. Regulations are essential to drive customers, licenses, and technology providers. Without regulations, customers become the biggest driving force.

Do you have a concluding message for our readers?
Technip Energies is committed to supporting customers in Southeast Asia and around the world to reach their net zero goals. We recognize that this is a transition – not one big jump, but a series of gradual steps that we are ready to walk with them. The lowest hanging fruit and the most doable first step is to decarbonize existing complexes. For example, we just signed a contract to help reduce CO_2 emissions at a US customer's site. By modernizing and optimizing their ethylene furnace, we can cut emissions by up to 30% on that site. We are excited to bring such solutions to Asia. ■

Supply Chains and Logistics

> The global supply chain is led into a strategic architecture reset. Global imbalances, trade flow disruptions, taxation and logistics have changed the cost regime for different countries, and companies now need to update their supply chain network.

Atul Chandna
Asia-Pacific Supply Chain Leader
EY

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Image courtesy of Maersk

Supply Chains

Reroutes and resets

Hundreds of thousands of ships cross the world's oceans and seas daily. On the water canvas, their wakes draw a moving picture of the global supply chain across major shipping lanes. In the last few years, the architecture of this sketch has changed, from a rather linear structure, into a more warped and fragmented one, with multiple poles. One of these is Southeast Asia.

Based primarily on the lowest-cost principle, trade has historically developed between two poles – the sending side, usually developing countries with cost-effective manufacturing - and the receiving side, or the per-capita rich developed countries. However, developing countries are developing fast, turning into big consumers themselves. This was the first jolt that started repolarizing world trade. Then, in the gravitational battle between the world's largest economies, new fences are erected between the American Chinese orbits. Geopolitical tensions, including China's bullying of its neighbors in the South China Sea, and new geopolitical alliances, like the Sino-Russian one, together with full-blown wars and fears of potential other conflicts, have driven further apart the trading system.

During the pandemic, heated discussions over how localization and regionalization may dilute or replace globalization started to emerge. Globalization is not dead. Rather than the prescient signs of de-globalization, localized and regionalized trade help to create stronger links within global trade and to reduce dependencies on one or few partners. According to McKinsey, every country relies on at least a fifth of imports by value from three or fewer trading partners.

The world's manufacturing capacity remains tilted to the Eastern hemisphere, especially China. Sudheer Vijapurapu, managing director for New Asia Shipbrokers (NAS), explained why: "Whereas the West is limited by greater environmental restrictions to add capacities, the East has the manpower, feedstocks, land availability, and demand - over 70% of which resides in this part of the world, for more capacity additions. It is unlikely that supply chains can become completely localized, as these inter-dependencies will continue to exist, regardless of the disruptions unfolding."

China's world factory is not easily replaceable and few are those who try to. However, to protect themselves from the perverse effects of protectionist measures, the manufacturing sector has started to diversify from its reliance on China, replacing the "made in China" strategy with "made around China." Some spoke too early about decoupling from China, but it is rather a recoupling of the manufacturing footprint to other places, in a twinning model whereby assets are spread out at multiple locations (twins) instead of being plugged into a single one, in order to derisk production and supply chains.

Indonesia, Malaysia, the Philippines, Thailand, and Vietnam were found by a BCG study to rank among the most cost-competitive countries in the world. In other words, ideal twinning destinations, perfectly located between Northeast Asia and South Asian markets, as well as having a very attractive market of their own. Higher-cost Singapore also benefited from the post-China-relationship-rebound, but not so much in manufacturing as it did in the financial sector, with investors fleeing Hong Kong due to a national security law that is said to criminalize dissent. In other ways, the growth of Singapore as a leading financial hub speaks of the fragmentation in the global financial sector, which has moved away from a dependence on Western capital with the emergence of the Asian financial stalwarts – Singapore, Hong Kong, and Tokyo.

The manufacturing sector in Southeast Asia has developed as a hub-and-spoke model: trade is coordinated from major hubs to the rest of the region and the rest of the world. Thailand is nicknamed "the Detroit of the East" thanks to its lively automotive sector, Vietnam is a leading force in textiles, Malaysia has a booming electronics industry, Indonesia is positioning strongly in electric batteries; in the renewables industry, Malaysia and Indonesia's palm oil industry and Thailand's sugar cane industry are also leaders in the world, driving exports of biodiesels and other products to Europe. Singapore helps tie the region together with the largest trans-shipping port, a burgeoning financial sector, and as a hub for multinationals operating across the region. Geopolitical-driven investments are many in the region, with record levels of FDI in recent years for most Southeast Asian countries.

Though countries in the region have benefited from the rife between the US and China as preferred "friend-shoring" partners, they maintain neutrality towards both spheres of influence. China retains its status as the region's top trading partner, but the US has also started to pivot more in the region at a diplomatic and trade level, launching the Indo-Pacific Economic Framework for Prosperity (IPEF) with 14 countries, including seven ASEAN members. Expansionist Chinese naval exercises in the South China sea have also triggered more engagement from the US. ASEAN's neutrality is a precious and vulnerable thing to protect, especially when the world's biggest powers are becoming more assertive in the area. Other countries are also making inroads in Southeast Asia; for example, Canada is currently negotiating a free trade agreement with ASEAN, committed to be complete by 2025.

The other driver for the re-coupling of supply chains is logistics, also impacted by geopolitical tensions and wars. There has been no shortage of logistics shocks in recent years. From pandemic-induced imbalances to the "Texas freeze," the impacts of sanctions and trade disruptions following the Russia-Ukraine war, as well as supply-demand fluctuations as economies try to rebalance and deflate, the logistics sector has hardly had a moment of peace.

The most severe impacts came from the choking of key connecting points, the Panama Canal and the Suez Canal, those thin connections between the world's oceans showing the fragilities of maritime trade. Currently, the Red Sea crossing is the biggest obstacle in global trade. Yemeni Houthi rebels started launching missile strikes against vessels crossing the Red Sea, which carries about 20% of the world's maritime trade, as reported by the BBC. At first, military ships linked to Israel were targeted, but soon enough merchant vessels also became the vic-

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Image courtesy of ShipMap Project by KILN

> Supply chains are now shifting from the traditional linear, horizontal structure to a multi-polar one.

Atul Chandna

Asia-Pacific Supply Chain Leader
EY

How have supply chains evolved in recent years?
Today, we see that supply chain has a permanent seat in the boardroom. The importance – and the risks – of supply chains have become undeniably evident, to the extent that the supply chain is a part of almost every decision, be it about growth, optimization, resilience or sustainability.

Supply chains are now shifting from the traditional linear, horizontal structure to a multi-polar one.

Where global supply chains were traditionally designed into two main "poles" for cost efficiency – with the developing and cost-effective producing markets at one end and developed markets at the receiving end – that is no longer effective today.

Global geopolitics are more complex now, as some countries raise barriers to trade and others seek to stand out as alternatives. The global imbalances, trade flow disruptions, taxation and logistics have changed the cost regime for different countries, and companies now need to update their supply chain network. As a result, the global supply chain is led into a strategic architecture reset.

At the same time, companies are less asset-intensive and consider working with partners than owning everything from manufacturing to transportation and sales. Such an ecosystem-centric approach through multiple partners allows companies to create more resilient supply chains through alternative sourcing and ensuring an agile operating model and workforce.

How competitive does Southeast Asia remain as a manufacturing base within the global supply chain?
Many businesses have leveraged a hub-and-spoke model for their operations in Southeast Asia.

Singapore, with its well-educated talent pool, stable government, clear regulations and ease of doing business, is an attractive location for companies to set up their regional headquarters. Thailand has established itself as an automotive hub in the region, while Indonesia and Vietnam are strong manufacturing bases for consumer goods companies.

How is AI playing a part in supply chain optimization and decision-making?
AI has become very user-friendly and widely accessible, allowing businesses to explore AI-assisted decision-making. Research has found that around 40% of supply chain organizations are investing in GenAI, focusing on knowledge management applications.

Businesses can integrate AI into four building blocks of supply chain operations: plan, source, make, move.

Plan: GenAI adds simplicity to interactions throughout tech-enabled planning efforts. For example, companies can run what-if scenarios on what might happen if certain global shocks disrupt daily operations. The GenAI tools can even suggest several courses of action if things go awry. Risk management may be a promising area for GenAI's input in preparing for risks that supply chain planners have yet considered.

Source: Companies can tap on GenAI-powered bots to negotiate cost and purchasing terms with vendors in a shorter time frame, reducing costs by bringing structure to complex tender processes. GenAI is also useful in extracting information from large contract, allowing companies to better prepare for renewal discussions.

Make: GenAI in supply chain helps companies accelerate from design to commercialization much faster. Companies are training models on their own data sets and asking AI to find ways to improve productivity and efficiency. Predictive maintenance is another area where GenAI can help determine the specific machines or lines that are most likely to fail in the next few hours or days, improving overall equipment effectiveness.

Move: Some companies are already using GenAI to optimize picking routes within their warehouses and boost workforce productivity while slashing operational costs. The tool can also help companies understand if its trade network was optimized and identify areas for improvement.

How can organizations achieve a sustainable supply chain?
Supply chains account for a significant proportion of an organization's greenhouse gas emissions and operating costs, however, many organizations struggle to embark on a sustainability journey due to a lack of visibility of their supply chain and emissions data, and comprehensive ways to measure sustainability progress. The key barriers for businesses in implementing a sustainable supply chain include technological limitations, a lack of visibility, regulatory complexities and scalability concerns.

At EY, we have a strong supply chain practice with a team of over 6,000 professionals globally. The EY team works with clients to help them address the complex issues – from sustainability through disruptions and digitalization – and opportunities to grow, protect their operations and redefine their end-to-end supply chain to support their enterprise objectives. ■

> Besides our ocean shipping, we must be able to offer holistic solutions and build our multi-modal capabilities in a 'one-stop shop' concept.

Elaine Low

Managing Director Southeast Asia,
MAERSK

Container demand has been slow in 2023. Do you believe volatility will continue into 2024?
This year is likely to remain very challenging for the shipping industry as we come out of an extremely volatile 2023, when the container markets saw a big decline, and are headed into 2024 on an even more tumultuous footing given the many variables beyond our control, from serious geopolitical issues like what we see in the Middle East or Houthi attacks on Red Sea merchant ships that are diverting us away from the Suez Canal. Such non-controllables impact not only how we re-route our vessels but also how we drive our business forward. This year started with extreme volatility, and we project continued - and concerning - headwinds ahead.

Maersk has announced half a billion US$ in infrastructure investments in Southeast Asia. What motivated this?
Our investments are, in a sense, a response to marketplace volatility. Maersk is committed to building resilience and protecting our customers from the unpredictability in the supply chain by creating more country-specific logistics capacity. Moreover, Southeast Asia is one of the most dynamic and expanding regions, which makes this region ideal for long-term investments. Our investments in the region also support our cross-sector diversification strategy so as to avoid over-dependence on one or two verticals. Ultimately, Maersk has a strategic vision to be the global integrator of container logistics, and these investments in hubs, land facilities, or airfreight, fall under this vision. Besides our ocean shipping, we must be able to offer holistic solutions and build our multi-modal capabilities in a "one-stop shop" concept.

Could you elaborate on the focus of your planned investments in the region?
One focus is on the ocean side, where Maersk is investing in terminals towards a new ocean network to be complete by 2025. For example, we are investing in upgrading the infrastructure at the Port of Tanjung Pelepas (TPP) in Malaysia, which is poised to become a key, integrated, and multi-modal logistics hub within Maersk's new ocean network.

The second focus is inland logistics where we are building mega distribution centers, such as TPP in Malaysia, the most recently announced World Gateway 2 in Singapore, and a Kuala Lumpur (KL) warehouse expected to be ready by 2025. By 2026, we expect to add almost 480,000 sqm of capacity between Malaysia, Indonesia, Singapore and the Philippines.

Maersk inaugurated the first methanol vessel in Europe. What kind of lower-carbon solutions is Maersk bringing to Southeast Asia?
Maersk has a goal to become net-zero by 2040. One of the first steps we have taken was to invest in green-methanol vessels. In February this year, we launched our first such ship, becoming a pioneer in the industry. Moreover, being a first-mover in this field also made us the enabler for the green maritime fuel value chain, with Singapore becoming the first port to pilot ship-to-ship green methanol bunkering for Laura Maersk, our first green methanol-powered vessel.

The next thing we did was to invest in the fuel source – the demand for green methanol will increase as more vessels are making the switch. Thirdly, on land, most of our existing warehouses have been retrofitted with solar panels, while all new facilities are designed to rely solely on solar, as part of our mandate. In terms of EVs, not all countries in Southeast Asia provide the same infrastructure maturity to make the switch on our fleet, but we continue to invest in electrification wherever possible where we are able to tap into the renewable/clean energy sources.

What opportunities do you identify in the chemical vertical?
Chemicals is our fastest growing vertical. Singapore's energy and chemicals sector ranks among the top 10 globally and remains positioned for high growth. Maersk has opportunities to expand in both directions - the buy-and-sell upstream markets and the downstream supply of raw materials for manufacturers.

Do you have a final message for our audience?
With a history of well over 100 years, Maersk will be well positioned to continue the integrator journey with investments in the right places. We will then be able provide maximum flexibility and adaptability, bringing resilience in our customer's supply chain and delivering the value as an integrator. Our mission is to make life better for everyone. ■

> We have evolved our business by diversifying into the decarbonization aspect, having consultancy services, developing carbon tools for the specialized tanker sector, and hosting the first-of-its-kind seminar specifically dedicated to this sector.

Sudheer Vijapurapu

Managing Director
NEW ASIA SHIPBROKERS (NAS)

How has New Asia Shipbrokers (NAS) evolved in its 11 years of existence?
I started NAS with a vision to provide a level of service that goes above and beyond that of a typical broker and from that we have created a name for ourselves as a knowledge based professional boutique shop. We have evolved our business by diversifying into the decarbonization aspect, having consultancy services, developing carbon tools for the specialized tanker sector, and hosting the first-of-its-kind seminar specifically dedicated to this sector. We now work much more in the biofuels and renewables market, which represent about 50-60% of our revenue, whereas a decade ago, it was the majority (90%) chemicals and 10% vegetable oils.

Could you elaborate on the seminars and tools offered to the specialized tanker industry?
Our inaugural seminar took place on 29th February 2024, with attendees from Europe, India, and Southeast Asia. The idea behind organizing these knowledge-sharing platforms is to create an awareness of decarbonization: regulations change fast and cannot be kept on the back burner for long. Specialized tankers are probably one of the most complex ships and can have the highest amount of carbon emissions in proportion to the deadweight of the ship. Measuring the exact consumption and emissions for a specialized tanker is complicated because of the multiplicity of load ports, discharge ports due to the cargo grades, and several operations like heating or cleaning involved – as opposed to other sector ships.

Understanding these challenges, NAS has developed a tool to give an estimate of the carbon footprint (and associated costs) regardless of the size of the cargo. It allows Charterers to ensure they are charged fairly by the shipowner. We are constantly updating the tool and will be launching it once the market is ready. With the FuelEU Maritime regulations coming into place in January 2025, the GHG intensity of marine fuels will need to be reduced by 2%; and then, stepwise, by 7.5% (2030), 13% (2035), all the way to 75% (2050). Currently, no fuel alternative meets that kind of scale.

We will be having the seminar on a yearly basis to stay and keep others updated with the new regulations

Where is the industry leaning to in terms of alternative fuels?
There are many questions on scale and availability when it comes to alternative fuels and is too early to say what could be a viable alternative. The most obvious choice seems to be the blending of biofuels, but it is not so straightforward when you account for the carbon footprint associated with the transportation of biofuels to blending facilities (or the "well-to-tank" factor). Some bunker suppliers in Singapore already have an infrastructure set-up with bio-blended bunkers up to B24 grade, but sales of these bunkers have been disappointing since January this year due to pricing and owners wanting to test out whether the engines are compatible or not.

The shipping sector is more of a reactive than proactive industry. A potential solution discussed at our seminar was for companies that do not want to risk their capital on trying bio-blended fuels to obtain carbon credits: Alcom Carbon Markets (ACM) has developed a methodology in collaboration with the Gold Standard (the most accepted certifying body for issuing carbon credits and carbon offsets), which can help projects reduce their footprint by voluntarily blending bunkers with alternative fuels, the credits generated can either be used to offset or sold to Singapore's carbon exchange (Climate Impact X).

How are continuous disruptions, like the current security challenges at the Red Sea, impacting global trade?
If these challenges continue, we may see people looking more locally rather than globally. Already, fewer chemicals are shipped from Asia to Europe because of the restrictions in the Red Sea, yet this is temporary. A larger issue is that China, once the world's biggest importer of chemicals, is now a big exporter. Whereas the West is limited by greater environmental restrictions to add capacities, the East has the manpower, feedstocks, land availability, and demand - over 70% of which resides in this part of the world, for more capacity additions. It's unlikely that supply chains can become completely localized, as these inter-dependencies will continue to exist, regardless of the disruptions unfolding. ■

Zaidi Mohd

General Manager
Asia
ODFJELL TANKERS

Boon Joon Chua

General Manager
Southeast Asia
NEWPORT TANK CONTAINERS

Pradeep Nair

Head - Chemical Logistics & ISO Tank Operations
GOODRICH MARITIME

Could you give us an overview of Odfjell Tankers' business in Asia?
Celebrating 110 years in the market, Odfjell is a pioneer in chemical tankers. Our Singapore office was set up in 1975 and grew regionally in the late 1990s with small tankers. Today, the smallest tanker in our fleet, 25,000 t, is typically trading in and out of Asia to the Middle East, the West Coast of India, and South America markets, while our bigger (30,000-49,000 t) ships typically trade long-hauls.

How is Odfjell approaching decarbonization?
I am very proud to say Odfjell has been one of the pioneers in decarbonization of our owned fleet, having worked on reducing emissions for over a decade now. However, rather than investing in one technology, we prefer to stay fuel-agnostic. It is still unclear what the fuels of the future will pan out to be and we cannot jump on the newest trend or speculate. Our R&D team in Bergen, our Norway headquarters, prefers to look at different fuel technologies; for instance, Odfjell has been working with other third parties on a fuel cell technology project for about five years. We are also exploring wACS technology (wireless Airborne Communication System). In parallel with researching and testing novel technology, we have concentrated our efforts on improvements we can make on the current ships by testing different air lubrication systems or installing suction sails to reduce emissions, as well as looking at vessel life extension programs. Chemical tankers have a lifespan of 15-20 years, but you will see many of Odfjell's tankers that are 15 to 20 years old look as new, as a result of the attention we pay to high standards of maintenance. ■

How important is Southeast Asia for Newport's growth?
The entire Asian continent remains a key growth region for NewPort. While China's economy has slowed down, it has never stopped. At the same time, we continue to focus our energies on India and Southeast Asia, the other two big mega-markets. India elicits plenty of interest in its potential and this potential is progressively being realized through the development of their economy. In Southeast Asia, business has been consistently strong for us ever since we started operating in the region.

What's the health of the ISO tank market today?
The market is in a state of flux. 2023 is not exactly a year for celebration in the chemical sector, with sentiments dampened by lower demand and plunging prices. The threat of low equipment utilization rate continues to weigh on shipping lines and tank container operators. Fortunately, our global footprint and capabilities allow us to plan with a longer horizon and spread the risk across a broader base. This is an undeniable advantage in a competitive market where supply currently exceeds demand in certain regions. I will say that the tank container market remains healthy for the big players, while smaller ones may find it harder to sustain their business. We expect to see consolidation within the market.

How is NewPort implementing AI and digital tools to stay ahead of the curve?
In 2022, NewPort implemented an entirely new global integrated logistics system to be able to respond faster and more holistically to the changes around us. NewPort is also using AI and evolving software applications to better service our customers. ■

Why did Goodrich move the base of its tank operations from Dubai to Singapore and change its name?
Since last year, we have been transforming to become a more end-to-end solution-centric company with a clear goal to expand into Southeast Asia. We moved the operating base for our tank company from Dubai to Singapore, creating Goodrich Supply Chain Solutions Pte Limited. The change in the name reflects our shift from a tank operator, into a more integrated solutions provider, providing not only liquid tanks, but also gas tanks, lined tanks, and specialized tanks (T14, T20, T22, T50 & T75) to carry dangerous goods both in liquid, gas & cryogenic form.

Southeast Asia is one of the key regions we operate in, for both chemical (bulk liquid) and NVOCC (dry container) businesses, contributing to more than half of the revenue in both divisions.

What are the main challenges facing the ISO tank market in Southeast Asia?
The most challenging aspect for the ISO industry is the infrastructure to connect the repair and cleaning depots, which has not kept up with the expansion of ISO tank use globally.

What would be your main goals moving forward?
Southeast Asia remains a focus point where we will continue to expand by adding more equipment. We have also diversified in the food-grade business, with a dedicated a fleet of food-grade ISO tanks, to capture the growth in the food markets (including kosher and halal) within the region. Also, Goodrich wants to support infrastructure and safety standards development in the region through suitable collaborations. ■

EDITORIAL

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tims of attacks. These attacks have diverted ships, forcing an expensive re-route via the Cape of Good Hope in South Africa. Freight costs from Asia to Europe tripled, wrote the Economist. Unable to pass through the Red Sea, ships added anywhere between 20 to 50 days to their voyages, noted many of our interviewees.

To protect themselves from potential disruptions, the chemical sector in the region has prioritized localizing intermediates and end-products. Chevron Oronite, operating one of the region's largest additive manufacturing facilities out of Singapore, has recently expanded its Jurong Island plant to bring in packaging technology otherwise imported from the US and Europe. Its focus on regional resilience has helped the company maintain reliable supply throughout the logistics challenges of the last few years: "On the back of our four plants in APAC, we were able to withstand the successive supply chain shocks and disruptions, from the pandemic to the Texas Freeze, which forced a sizeable number of our competitors to declare force majeure, leaving Chevron Oronite as the one of the few additive producers continuing operations. This has further demonstrated our supply chain reliability and allowed us to navigate further global disruptions like the recent Panama Canal and Red Sea issues, which impacted shipping times and logistics reliability," said Eugene Ng, general manager for sales & marketing for APAC at Chevron Oronite.

The logistics sector follows a similar logic of multi-pole modus operandi, and Southeast Asia is in focus as a key access point into the APAC region, especially through the Straits of Malacca, one of the busiest water crossings in the world, probably equally as important as the Panama or Suez canals. Maersk has announced half a billion US$ in infrastructure investments in Southeast Asia. These are predominantly focused on shipping infrastructure, including new terminals at the Port of Tanjung Pelepas (TPP) in Malaysia. Maerk is also looking to connect ocean logistics more closely with inland logistics. The company is building mega-distribution centers, one in TPP, serving as an import-export hub, and another in Singapore called World Gateway 2 for both local and regional distributorship. In total, the company is adding 480,000 sqm of capacity between Malaysia, Indonesia, Singapore and the Philippines, by 2026. Elaine Low, managing director for Maersk Southeast Asia said: "Our investments are, in a sense, a response to marketplace volatility. (...) Non-controllables, like what we see in the Middle East or Houthi attacks on Red Sea merchant ships, impact not only how we re-route our vessels but also how we drive our business forward. This year started with extreme volatility, and we project continued - and concerning - headwinds ahead."

Besides the headwinds, there are also tailwinds that are actually pushing forward shippers, particularly in the long-haul business. According to ClarkSea, average daily earnings for the world's shipping fleets was 33% above its 10-year trend at the start of this year. Disruptions at key crossing points, like Panama or Suez, are causing ships to take longer routes, tightening the vessel space available. This bumps up freight rates. Interestingly, the pre-Covid period may have been a golden period of globalization, but it was also probably the worst time for shipping. "Very flat rates prevailed, to the extent that some owners were on the brink of folding up just before the pandemic," explained Sudheer Vijapurapu, managing director for Singaporean shipbroker New Asia Shipbrokers (NAS).

His industry peer, Mark Mirosevic-Sorgo, managing director for global shipbroker Quincannon Asia, shared a similar view. In a scenario where disruptions ceased, there would be an immediate free-up of ships ready to carry more cargo, faster, essentially weakening the shipping industry and driving shipowners to undercut each other with the lowest cost: "The balance of shipping would completely change should the transits of the Red Sea and the Panama Canal return to normal. Since ships would require fewer ton-miles, there would be an immediate free-up of ships able to carry more cargo, faster. When the largest ships on these longer-haul routes have free space, they start looking at carrying smaller cargoes, which has a knock-on effect on the smaller ships."

At the time of writing, there is no amelioration to what is referred to as "the Red Sea situation." The US and the UK navies are striking back, which resurrects warfighting at sea, something that has not happened since the Falklands War. The volume of chemicals, LPG, and ethane shipped from Asia to Europe has been affected by the blockage across vital routes linking the two continents. Houston to Far East movements have also been impacted. Some ships still pass through, at their own risk. Our sources told us that more Asian shipowners, after dealing with low volumes at home, have ventured into the long-haul business and found a gap in making the dangerous Red Sea trip where others would not go. These companies have invested in ships as a wealth-creation strategy, crowding the market, and now are starting to play a bigger role in international shipping.

In an era of low-priced commodities and an uncertain geopolitical landscape, logistics companies are prioritizing the long-haul business, not just because it is probably the most profitable, but also because their customers are searching for new markets out to sea. With China becoming more self-sufficient in key chemicals, chemical producers see their main export market shrinking and must find others. At the same time, intra-Asian trade is also on the rise, regional economies consuming more final product, according to the Brookings Institue. That can serve as a buffer against uncertainties in global trade.

Turning more global sounds like a contradiction to what we have discussed so far about regionalization; in reality, the two trends coexist. Supply chains are both shortening and lengthening. The short ends are part of the longer and wider network. While manufacturers want to be closer to the market, they rely extensively on partners – especially logistics and distribution partners – to stay global. Logistics companies, on their end, must play in both fields. To react to temporary situations, such as the Red Sea conflict, and to prepare for longer-lasting shifts, like China's self-sufficiency, they need strong local footprints and even stronger global networks.

The key is to be in the right place at the right time, and the bigger companies with large fleets and supporting infrastructure are best positioned to do so. The number of ships available in the market today is enough, if not too high already, but there are imbalances. In the ISO tank market, low utilization rates are haunting the industry, but it is the smaller guys that get squeezed out, fighting to sustain the business. "Our global footprint and capabilities allow us to plan with a longer horizon and spread the risk across a broader base. This is an undeniable advantage in a competitive market where supply currently exceeds demand in certain regions. I will say that the tank container market remains healthy for the big players, while smaller ones may find it harder to sustain their business. We expect to see a consolidation within the market," said Boon Joon Chua, general manager for NewPort Tank Containers Southeast Asia, one of the largest tank container operators in the world (by fleet).

Knowing where to look is also important. Den Hartogh, a Dutch logistics company that has expanded significantly in APAC primarily through acquisitions in recent years, is eyeing five growth pillars, which Andy Ang, managing director for Asia Pacific calls "product market combinations:" electrolytes used in EVs, isocyanates used in the production of polyurethane, food-grade products, dry bulk containerization of polymers, and biofuels like used cooking oil and tallow used in the production of sustainable aviation fuels in APAC.

Despite the many uncertainties rocking its boats, the ASEAN logistics industry is seeing growing demand, projected to rise from US$325 billion in 2023 to US$476 billion by 2029, estimates GAC, a shipping and marine service provider. Logistics players in the region are preparing to respond to the demand by becoming more multi-modal integrated, more digital, more local, and more global, at the same time. ■

Image courtesy of Ouray

BUSINESS INSIGHTS

The Hubs

"Rhenus selected Thailand as its new regional base since mid-2023, taking in mind business-friendly considerations such as a tax regime which is on par with what one would find in Singapore or Hong Kong, but with less challenges in terms of labor costs and availability. Thailand delivers a good pool of talented labor force, geographical accessibility, and a better time zone – factors that can help us achieve our growth vision."

Joachim Hanssen, CEO of Southeast Asia & Oceania, Rhenus Air & Ocean

"Manila hosts our largest engineering platform for Southeast Asia, with 100 engineers currently delivering projects across the region. Why the Philippines? First, most of our work in the region is actually in the country, so we need to stick close to our main customers; besides, the Philippines provides an attractive talent pool of young and experienced engineers who speak perfect English, are adaptable and ready to travel."

Farchad Kaviani, Managing Director Southeast Asia, Suez

"The Malaysia office has a 30-year operating history in the country. With a team of twenty full-time employees and dedicated freelancers, ABL Malaysia is a market leader in the marine and energy space. Regardless of location, the ABL Group acts as one, leveraging our regional network and intra-connectivity. From Malaysia, we offer our services in every APAC nation."

Mohd Saifuddin Md Salleh, Country Manager, ABL

"Vietnam recognizes the importance of peace and stability due to past conflicts. Investing in manufacturing here is attractive due to our strategic location and low production costs. To enhance our oil and gas industry, we should focus on manufacturing high-quality, high-tech products domestically rather than relying on imports."

Nguyen Thanh Nghia, Director, Vietnam Hydrocarbon Instruments (VHI)

"BASF has been in Singapore since 1978. In August 2022 we launched our fourth production facility in Tuas, Singapore. Singapore's strategic location, excellent port facilities, and well-developed logistics network have made it a preferred hub for petrochemical and specialty chemical companies. The government's support through various initiatives has further attracted investments in the sector."

Marcelo Lu, President Asia Pacific (excl. China), BASF

"You may not notice the huge developments in the country if you go to Jakarta, but if you go to rural areas, the changes are stark – the government invested in ports, airports, toll roads, and so on. Otherwise, transport outside of Indonesia is quite easy. Jakarta is well connected to Singapore, with many shipping lines linking the two. Then, from Singapore, you can easily get anywhere in the world."

Alex Soeriyadi, General Manager Commercial, Salim Agrochemical

Andy Ang

Managing Director Asia Pacific
ROYAL DEN HARTOGH

Joachim Hanssen

CEO Southeast Asia & Oceania
RHENUS AIR & OCEAN

Alexander Donau

Regional Head Asia Pacific
LESCHACO

Could you walk us through Den Hartogh's expansion into APAC?
Den Hartogh started expanding outside of Europe about a decade ago. The acquisition of the InterBulk group of companies in 2016 gave us a truly global presence, including offices in Singapore and Shanghai. Three years later, the company's ambitions in APAC went beyond these two cities, as we recognized the region to be an epicenter for chemicals growth. Our footprint has since expanded both organically and inorganically.

The 2021 acquisition and integration of the MUTO group of companies, a market leader in Korea and one of the biggest players in both Thailand and Malaysia, granted us three new offices in Seoul, Bangkok and Klang. During the same period, we also acquired and merged a Chinese domestic trucking company, Shanghai Xintao Dangerous Cargo Transportation (XT Logistics), which positioned us to provide first and last-mile services in China.

On the organic side in 2023, we set up our Indonesian base with offices in Jakarta and Surabaya primarily for the dry bulk business and we also recently signed a strategic partnership with Daelim's tank container division to explore potential synergies as we jointly increase market outreach. ■

How is Rhenus positioned to capture the opportunities in the region?
We need to transform ourselves into a global integrated matrix organization and leverage our network structure, corporate functions, technical expertise, and customer base across our product divisions & geographical areas, which will allow us to better scale and extend our reach.

Do you see a decoupling in the global value chains that favors more localized or regionalized markets?
With the strategy of diversifying trade relations and shifting production closer to target markets, governments and businesses alike strive to fortify supply chains. However, we do not see a decoupling from China. Rather a boosting of ties with other regional players will be more likely.

On a global level, Rhenus acquired the freight forwarding company BLU Logistics, currently handling 180,000 TEUs per annum. The acquisition propelled us to become a market leader in terms of west-bound containerized volumes from China into Latin America. Our new set-up gives us access from China and Southeast Asia into Latam, and, from Latam into the US market – which itself is a market that is decoupling from China and looking at alternatives in Asia. ■

Could you describe the current environment for global logistics?
A series of global disruptions, most recently in the Gulf of Aden as well as the recent closure of the Port of Baltimore, have lengthened shipping routes, putting pressure on vessel availability. Nearshoring and onshoring have been a hot topic for the past few years and are now becoming a reality. A big factor is the underwhelming recovery of the Chinese economy, with more products being shipped out of China into export markets than before. The government is taking measures to stimulate the economy, and things could change moving forward. China's economic health and underwriting policy will impact the outlook for the rest of the markets. I believe there will be a shift in the wind again by the end of the year.

What role does Southeast Asia play within Leschaco's Big Picture 2030 strategy?
Leschaco aims to unite all our employees, customers, and business partners under the same values, purpose, and vision. Our journey is also business-oriented, ultimately benefiting our customers using geographic reach, technology, and customer engagement, including in Southeast Asia and the greater APAC. ■

Sertaç Sürür

CEO Asia Pacific
AZELIS

Azelis has positioned itself as a frontrunner in the industry in terms of digitalization. Are you also implementing the latest generative AI technologies?
We regularly evaluate the use of AI capabilities across our organization. We believe that AI can help us achieve our strategic goals of growth, efficiency, and differentiation. For instance, we have enabled the native AI functionality in the Microsoft CRM & ERP stack related to Copilot; we also use AI in our purchase order automation and have rolled out sales order automation with embedded AI to improve efficiency and reduce errors associated with manual activities; and we utilize a custom AI tool for extracting data from structured and unstructured documents to enhance our product catalog.

By using AI in these areas, we have seen significant benefits in terms of cost savings, revenue growth, customer loyalty, and competitive advantage. This has also helped foster a culture of innovation and collaboration. However, even as AI streamlines our work processes, personal interface remains key. I see digital tools and AI as enablers for a better human connection rather than a replacement for it.

Does the trend to localize or regionalize businesses cause concern?
On the contrary, Azelis is a global company with a strong local footprint, so we think globally and act locally. Our customers benefit from access to local technical sales, a product portfolio with a continuously growing list of sustainable alternatives, and customized solutions based on a deep understanding of customer needs and challenges.

Do you have a final message?
We have brought our one-stop shop for chemistries to the digital era and place a strong focus on sustainable solutions and services, providing ideas and technical expertise that contribute to a more sustainable future for our customers, principals, and our planet. ■

Victor Liew & Robert Puschmann

VL: Director, Performance Materials Indonesia, Malaysia & Singapore
RP: Managing Director, Technology, Singapore, Malaysia and Vietnam
DKSH

DKSH has recently acquired Elite Organic in Malaysia. Could you comment on the significance of the acquisition?
VL: Elite Organic is a pharmaceutical and nutraceutical company, with a strong footprint in health supplements, whereas DKSH Malaysia has a stronger presence in specialty industrial chemicals. This complementary match enables us to expand strategically in these key areas.

What are the driving demand trends pertaining to the Technology BU?
RP: A general trend that is relevant to the chemical industry is the integration of laboratory workflows and analytical processes either through more sophisticated equipment, but also through digitalization, such as switching to a LIMS (Laboratory Information Management System), a type of ERP system for the lab. Similar to a digital-twin, a LIMS set-up allows for tracking tests and results, connected to the ERP. Digitalization is more common in the bigger labs, whereas the smaller ones remain quite cost-conscious. That creates a gap between the MNCs, who have more firepower to invest in digital tools and digital integration, and the SMEs, for whom "good" can be "good enough." Sustainability is also getting more on the radar, so DKSH plays a role in providing high-end solutions that offer better yields, as well as improved quality controls of specific chemicals.

What is your outlook for 2024-2025 on both the industrial and specialty ingredients sides?
VL: The first to experience the impact of a recession or depressed market conditions are industrial chemicals used in durable products across construction, automotive, or electronics sectors. This holds true in today's market, where our personal care, pharmaceutical, and food ingredients perform strongest. However, one cannot take that for granted or rely solely on the state of the market: the specialty chemicals space requires strong differentiators through innovation and co-development. At our Innovation Centers, we work closely with customers to develop together the solutions with the highest market potential. Recently, these tend to be sustainable solutions such as bio-based polymers, recyclable materials, or products designed to reduce the environmental impact. ■

AI and digital solutions are applied at every step of the value chain

In upstream production:

"Baker Hughes has launched Leucipa™, an automated field production solution. Using this software solution, our customers can proactively manage production themselves day by day. This is very much a plug-and-play solution, very easy to operate. In the mid to long term, digital transformation is a high priority for us. Leucipa is only a part of this larger pathway."

Quach Anh Vu, Southeast Asia Area Director, Oilfield Services and Equipment, Baker Hughes

In downstream production:

"As an early adopter of the Industry 4.0 program, Henkel Thailand has implemented Smart Factory System since 2015. The smart factory system provides real-time data updates and higher traceability in manufacturing process as well as improves productivity, thereby lowering downtime process and reducing footprint."

Andrianto Jayapurna, President, Henkel Thailand

In R&D for new formulations:

"Using AI and high-throughput experimentation, Xinterra is a materials IP factory, coming up with many materials in a fast and competitive way. Our vision is to have 100 new materials or formulations in the next 10 years, something that even the largest and best-financed companies in the materials space could hardly match."

Patrick Teyssonneyre, CEO & Co-Founder, Xinterra

In shipbroking:

"At NAS, we have invested avidly in digitalization and one of the reasons why we can run the company as a band of only six people is because we digitized our operations extensively; however, the personal element, especially on a deal that costs a lot, will always be preferred over a computer calculation. Today, there are about 60,000 ships transporting goods all over the world at any given point in time, with trillions of US$ on board, and technology alone is not sufficient to monitor that."

Sudheer Vijapurapu, Managing Director, New Asia Shipbrokers (NAS)

In indirect procurement:

"AI is quickly disrupting the way we are buying and selling. At SourceSage, we are looking to develop AI and a Sustainability Index as core features into our platform this year. For example, if a company wants to spend 20% of its budget on 'green' suppliers, tracking the supplier is the easy part, but getting them to formulate analytics is not, so we want to be the benchmark for green buying when it comes to indirect spend. Our mandate as a business is to facilitate how companies conduct business in a more efficient and streamlined manner, cutting down unnecessary costs by making the most of the data visibility and analytical tools built within our platform."

Jian Min (Edmund) Sim, Founder, SourceSage

Image courtesy of Siemens

Andreas Kappler

Head - Vertical Management Chemical & Pharma ASEAN
SIEMENS

Marcelo Tarkieltaub

Regional Director, Southeast Asia
ROCKWELL AUTOMATION

Jonas Berge

Senior Director, Applied Technology
EMERSON

Could you remind us of Siemens' capabilities in the chemical and pharma markets in Southeast Asia?
Singapore serves as a regional HQ for our digital industries, smart infrastructure and Siemens mobility business. We also have local offices in Indonesia, Thailand, Vietnam, Malaysia, and the Philippines where we have a strong presence for our chemical and pharma verticals. Within that vertical, we draw from a diverse talent pool across the region, with our head for measurement intelligence (smart instrumentation like positioners, valves, flow meters, temperature transmitter) based in Vietnam, while the head for digital connectivity and power (so everything industrial communication, identification and locating, 5G, cybersecurity) is in Thailand. From this robust regional network, we can support our customers with software and hardware solutions to address their current challenges.

What drove the investment in a new advanced factory in Singapore?
The driver of this investment was to be closer to our customers in Southeast Asia, India, and Australia. Siemens will produce a range of industrial and automation products here, things like PLCs (Programmable Logic Controllers) and HMIs (human-machine interfaces). ■

Could you provide an overview of Rockwell Automation's presence in Southeast Asia?
Our APAC headquarters is based in Singapore, which is home to a manufacturing plant, and we have offices in the six main Southeast Asian countries, as well as manufacturing capabilities in China and India, with a new plant recently inaugurated in Chennai.

How has the notion of digital transformation evolved, and where are we now?
We see a leap from digital manufacturing to fully autonomous manufacturing. This is where we are moving towards: operations where the system can make its own decisions using AI and predictive analysis and whereby humans shift into different tasks. Rockwell has recently acquired a company called Clearpath Robotics, which is a leader in autonomous mobile robots (AMR) technology. Robots can be deployed at the manufacturing site to run transports autonomously.

What do you think makes Rockwell Automation the automation partner of choice for the chemical industry?
Everything we do is around manufacturing – this is our biggest differentiator. Every one of our employees in this region is dedicated to helping the industry be more efficient. ■

How has Emerson's portfolio of solutions evolved?
With the commercial and residential solutions business divested, we are now more deeply focused on industrial solutions. Our portfolio has also turned more towards software; the acquisition of 55% of AspenTech solidified our position as a leading industrial engineering and technology company, where the automation component cuts through all process and manufacturing industries. Our combined software and hardware portfolio can be best understood across this axis: see, decide, act, optimize. The "seeing" part includes a broad portfolio of measurement solutions like analyzers and sensors, whereas to "decide" you need control systems of both DCS and PLC types to cover processes. "Act" is about the solutions you need for physical movement, such as isolation and control valves. Finally, the "optimize" covers the end-to-end optimization in production, sustainability, and maintenance. While the "decide" and "optimize" parts of our portfolio are mostly software-based, the "see" and "act" include primarily hardware solutions.

Do you have a final message?
One of the most important decisions you can make when building a plant or modernizing an old one is automation – this is the nervous system of your plant. Finding the right automation partner is critical. ■

Institutions and Associations	
A*STAR (ISCE2)	Enterprise Singapore
ASPRI	MIDA
CICM	MITI
EDB	
Chemical Producers	
ARLANXEO	Ineos Aromatics
BASF	Infineum
Borouge	LANXESS
Braskem	Lhoist
Chevron Oronite	Lubrizol
dsm-firmenich	MacDermid Enthone
Envalior	NutriSource
FRP Services	Sika
Henkel	Syensqo
IFF	
Olechemical Producers	
AGC Vinythai (AVT)	Salim Agrochemical
Golden Agri Resources	TotalEnergies Corbion
Neste	
Distribution, Logistics and Shipping	
Axis Petrochem	New Asia Shipbrokers
Azelis	NewPort Tank Containers
DKSH	Odfjell Tankers
Goodrich Maritime	Quincannon
Leschaco	Rhenus Air and Ocean
Maersk	Royal Den Hartogh Logistics
Consultancies	
Airswift	EY
Bain &Company	MMSA
ERM	YCP Solidiance
Start-up, AI, and Financing	
Greenitio	UOB
Hafnium Hafaway	Xinterra
Sourcesage	
EPCs, Equipment and Technology Providers	
ABL	McDermott
Baker Hughes	OURAY
Bureau Veritas	Rockwell Automation
Chemical Specialties Limited	Satake Technologies
DNV	Siemens
EcoVadis	SUEZ
Emerson	Technip Energies
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Thank you!

We would like to thank the honorable ministers, executives, and authorities who took the time to meet with us.

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