



ORAL PRESENTATION

Day 1: 7th March 2023

Session 1: KEYNOTES

Co-Chair: Ian Cross, SEAPEX President, Moyes and Co,

Co-Chair: Andy Butler, SEC 2023 Technical Chair, SundaGas

8:30	Introduction and Welcome SEAPEX Ian Cross /	Ian Cross / Andy Butler	SEAPEX
08:40	Energy Super Basins: How the SEAPEX Region's Upstream Oil and Gas Industry Evolves for a More Sustainable Future	Andrew Latham	Wood MacKenzie
09:05	Screening and Developing Viable Carbon Storage Projects – CO2 Transport and Permanent Geological Storage, UK and International	Catherine Witt	Storegga
09:30	50 years of TotalEnergies Exploration in South-East Asia	Thierry Thomas	TotalEnergies
09:55	Thriving in Asia Pacific's E&P Landscape	Clare Barker- White	S&P Global



ORAL PRESENTATION

Energy Super Basins: How the SEAPEX Region's Upstream Oil and Gas Industry Evolves for a More Sustainable Future

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The world's need for sustainable energy is set to change the geography of the oil and gas industry, increasingly entwining it with renewables and CCS. The upstream of the 2030s and beyond must focus on where its synergies with new energies are strongest.

The oil and gas industry across the SEAPEX region (SE Asia, China and Australia) is no longer fully fit for purpose. It has grown over many decades to be resilient through endless price cycles. This long prioritisation of upstream economics and security of supply is writ large in its current form. Production comes mostly from traditional basins, where old fields and infrastructure target the lowest cost of supply.

But the overall footprint was set before new sustainability and carbon goals. Not all SEAPEX region basins hold the low-carbon advantaged resources we need.

Most companies' immediate sustainability priority is to reduce scope 1 and 2 emissions. Such cuts are best enabled using plentiful clean electricity, which is not feasible in every basin of the SEAPEX region. Solar, wind and occasionally hydro are the key renewable technologies.

Longer term, the bigger need will be to sequester scope 3 emissions. Hub-scale CCS is the key technology, again not feasible in every basin of the SEAPEX region. CCS does not need to be in the same location as oil and gas production, but in practice is unlikely in basins remote from upstream operations.

Today's regional CCS industry is in its infancy. All existing, planned and hypothetical projects across the SEAPEX region add up to just under 70 Mtpa CO₂e total capacity. We expect CCS capacity in the region to grow to over 2,000 Mtpa by 2050 under our accelerated energy transition scenario. Such growth will come mainly from countries that will have hub-scale emissions sources available close to subsurface storage options.

The world will need oil and gas for many decades to come. The SEAPEX region's upstream industry can become more sustainable with focus on resources that are co-located with this clean electricity and CCS potential. These are the energy super basins of the future. The region's remaining traditional basins are at a disadvantage and face being left behind.

Companies that reset geographically to energy super basins will be the ones that thrive. Their upstream strategies must become ever more entwined with low-carbon businesses.

Operators across the SEAPEX region do not want to be caught out on the wrong side of this momentous transition. Recognising the long-term direction of travel presents an urgent call to action. It will take many years, even decades, to fundamentally realign upstream portfolios with the new energy super basins. First-mover advantage applies. The sooner the transition starts, the better.

SPEAKER BIOGRAPHY

Andrew is Vice President, Energy Research at Wood Mackenzie where he leads subsurface and advantaged resources research. He joined the company in 1995 and has held a series of upstream research, consulting, and exploration strategy roles.

Andrew began his career in 1990 as an International New Ventures Geologist with Ranger Oil. He holds a BSc in Geology from Imperial College, London and a PhD Geology from University College, Cardiff.



ORAL PRESENTATION

Screening and Developing Viable Carbon Storage Projects – CO₂ Transport and Permanent Geological Storage, UK and International

Catherine Witt¹

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This keynote presentation will review at a high level some of Storegga's projects around the globe, focussing on the business models that are unlocking these, with reference to technical information. Storegga's cornerstone project is the Acorn project in the UK, which focuses on the opportunity to sequester CO₂ from a variety of emissions sources into well understood reservoirs using some existing infrastructure. Building on this experience, Storegga has expanded internationally in the last 1-2 years, and now has projects in the US, Europe and is looking at opportunities in Asia Pacific and elsewhere. The presentation will discuss the various business models employed regionally that allow these projects to go forward.

An understanding of the entire value chain is critical to the success of a storage site – the best storage site in the world is only the best if you can safely access, deliver, store, and monitor the CO₂ in a cost-effective way, that creates a viable business. A critical element of the storage site screening process is completing an early Basis of Design to understand if the project is viable, e.g., how much CO₂ do I want to store and for how long? What is the CO₂ source and delivery mechanism? Is there a regulatory model or framework? How much will it cost? We don't just look for the 'right rocks', we look for the most suitable rocks given the project constraints that we have. This value chain approach needs to encompass technical, regulatory, and commercial factors. The best technical solution clearly needs a commercial and regulatory framework to succeed. Such frameworks are evolving at different rates and in different ways around the world.

The talk will also discuss the relative merits of saline aquifer and depleted field storage opportunities.

SPEAKER BIOGRAPHY

Catherine Witt is Head of Technical at Storegga, an independent company pursuing carbon storage, hydrogen and carbon removal solutions. Catherine joined Storegga in March 2021 after 26 years in BP in a variety of subsurface leadership roles, latterly in BP's global assurance team, focussing on carbon storage. Catherine joined BP as a Reservoir Engineer in 1994 after doing an MEng in Engineering Science at Oxford University.



ORAL PRESENTATION

50 years of TotalEnergies Exploration in South-East Asia

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TotalEnergies and its former companies, Total, Elf, Fina and Maersk, have a long and rich exploration history in the South-east Asia Region, made of both great successes ... and great failures. Out of the former companies, Total was the most active in the region, even though Elf had a brilliant success in Brunei, still producing today. In this talk we will focus on 2 countries and emblematic case studies where both traditional and disruptive concepts contributed to the strong position of our Company in the Region.

Let's start with Indonesia, where everything started for Total the late 60's with the well-known Mahakam PSC. Historical discoveries were made in the early 1900's onshore based on outcropping structural traps. Total farmed-in in 1970 in the offshore domain, where earlier operations led by Japex brought disappointing exploration results. Poor seismic quality data were nevertheless sufficient to discover there the large Bekapai, Handil and Tambora fields, predominantly structural traps in very shallow water, during '72/'74 period. All these multi-layered, deltaic sandy reservoirs were rapidly put in production for oil. At the beginning of the 80's the Asian gas market opened, and a large LNG plant was built in Bontang. This, combined with a revisit of the petroleum system by a small team of skilled geoscientist led to discoveries of major gas fields, predominantly stratigraphic, of Tunu, Sisi-Nubi and Peciko in the 80's and early 90's. The key geoscience achievement was the identification of a complex trapping mechanism including hydrodynamism. Large, connected gas volumes in normal and over-pressured layers were then identified. These fields produced more than 20 Tcf as of today, with a peak production of 560 kboepd in 2000's, a major contributor to Asia, Indonesia (and Total) production. Unfortunately, despite around 300 exploration wells drilled all over Indonesia in the last 50 years no other major discovery was made. A major miss was the Tangguh field, still hiding after 11 dry exploration wells. Arco's stratigraphic trap concept was the good one.

Second example is Brunei with the Maharaja-Lela field deep development. The Maharaja-Lela field was discovered by Elf in 1990 with first gas executed in 1999 to supply gas to the Lumut LNG plant. Following a border agreement with Malaysia, the Maharaja-Lela North field was put onstream in 2003. Nearby exploration in 2007-2010 targeting the deep HP reservoirs was successful thanks to innovative reservoir and trap model below a pressure belly, considering lateral HP fault sealing. This exploration led to fast-tracked production of the Maharajalela deep gas resources, some of the deepest gas produced in the South East Asia region.

Today, TotalEnergies is strong in Asia Pacific, even though major successes in Myanmar, historical on Yadana field and recent on A-6 block with Woodside, had to be left behind. The flagship project is now the Elk/Antelope gas development onshore PNG. Besides the prolific Brunei operated asset, strong positions are also held as non-operator on the major Ichthys and GLNG gas developments in Australia, Sulige acid gas field in China and Bongkot field in Thailand. Material exploration outlook is now in Malaysia, where TotalEnergies opened new O&G carbonate play in the outboard Deep Water Sabah area. We are hoping same story in offshore PNG where a new HC play is chased with the attractive XXL Mailu carbonate prospect.

SPEAKER BIOGRAPHY

Thierry joined TotalEnergies in 1986 after a Master's degree and a diploma from the IFP School. He is currently Geosciences Director in the Asia-Pacific Geographic Division of Exploration-Production. He held a succession of operational positions at Headquarters and in subsidiaries, and more recently as a secondee for a Brazilian operator developing a giant pre-salt field. He has been expatriate for the company in nine countries, exposed to a variety of exploration and development topics and issues, conventional as well as non-conventional.



ORAL PRESENTATION

Thriving in Asia Pacific's E&P Landscape

Antonio Dimabuyu ¹, Clare Barker-White ¹, David Ooi ¹

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Asia Pacific's upstream oil and gas industry is in a mature phase but tapping upside potential is still key to address energy stability and security. Demand targeting the local and export markets is projected to still grow in the long-term resulting in a wider supply gap. Capital in the short term would focus on further phase development of existing assets and green-field projects remain limited. Imports could address this gap but volatility of the market/environment creates a case to develop resources within the region. With a number of key countries introducing improvements in fiscal terms to attract investments in the upstream, this is a good time to assess opportunities.

This presentation will look to provide a deeper perspective on how companies can continue to generate growth in upstream. Understanding and navigating the above-ground aspects will be a key component that will be covered.

Quicker monetization of assets, which is now integral to operators' strategies, will be assessed with particular attention to key drivers like resource growth, M&A, and portfolio priorities. With utilization of key existing facilities lower in the region, what enables quicker development of new discoveries? As more stranded resource opportunities are made available by a few governments, will these find paths to development or will they remain on the ground?

The competitive environment in Asia Pacific has likewise changed with national oil companies playing a bigger role, participation of specialists/domestic focused players encouraged, and regional super-independents emerging. Existing players have also focused on fewer basins, driving capital efficiency within their core areas. Growth strategies of existing companies and new players will be explored focusing on two themes:

- *Adaptive portfolio approach* – With financing proving difficult on pure exploration plays, we will look at different strategies as to how companies have moved forward with their portfolios. With IOCs divesting their lower-ranked producing/developing assets, would acquiring these generate additional value? Do we also see exploration expansion following value generation from developing/producing assets?
- *Partnerships with "basin masters"* – Partnering or strategically investing in these key core areas would be another strategy for new players as this will provide easier access to development tie-ins.

Lastly, we will look at CCUS which could be a new growth opportunity given CO₂ prominence in the region and continued pressure to manage emissions. Some of the bigger IOCs currently engaged in CCUS projects elsewhere could potentially see opportunities to re-enter some of the key APAC countries. CCUS, with the right regulations and incentives, can also move some of the undeveloped resources to production.

SPEAKER BIOGRAPHY

Dr. Clare Barker-White joined IHS Markit (now a part of S&P Global) in 2017 and is currently responsible for APAC-focused basin analysis and research, also leading the wider global basins team based in Malaysia. She has spent 10+ years in Kuala Lumpur, previously leading a reservoir services team providing technical expertise covering geophysical and global reservoir characterization workflows. She holds a Bachelor of Science in Geology from the University of Edinburgh, Scotland, as well as a master's by research and Ph.D. specializing in carbonate sedimentology from Royal Holloway University of London, United Kingdom.