



ORAL PRESENTATION

Day 2: 8th March 2023

Session 5: DELIVERING THE ENERGY TRANSITION

Co-Chair: Mike Reeder, THREE60 Energy

Co-Chair: Euan Shand, ERCE

08:45	PNOC EC: Navigating the Energy Transition	Jimmy Bacud	PNOC-EC
09:10	Natural Hydrogen in the Pyrenees and Implications for Exploration	Chris Atkinson	Helios Aragon
09:35	Asia-Pacific CCS projects: Assessment and Certification of CO2 Storage Capacity	Bill Billingsley	RISC Advisory
10:00	Geothermal vs Petroleum - a Reservoir's Engineer's Perspective	Elliot Yearsley	Independent



ORAL PRESENTATION

PNOC EC: Navigating the Energy Transition

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Almost 50 years ago, in November 1973, the Philippine National Oil Company (PNOC) was created in the midst of the 1973 oil price shock. Born out of the oil crisis, it was able to grow its family of companies and expand its coverage from upstream and downstream oil and gas to other forms of energy such as coal, geothermal and other alternative and renewable energies.

PNOC Exploration Corporation (PNOC EC) was among the early subsidiaries, plucked from a former department of PNOC. Created in 1976, PNOC EC was mandated by the Government to pursue upstream oil and gas and catalyse the industry in further exploring the country. At that time when the interest of the oil and gas players have been taken by several petroleum discoveries in offshore Palawan, PNOC EC has taken the cudgels in keeping the fires burning in the E&P of onshore basins.

In recent times, PNOC EC's mandate became more corporate, and its coverage limited to its existing acreage. Out of the sixteen (16) sedimentary basins, PNOC EC's current presence had been focused only in two offshore basins in West Palawan and one onshore basin in Cagayan. PNOC EC has substantial acreage in the most prospective offshore areas, and along with its partners, are taking steps to advance their E&P programs. In its onshore block, PNOC EC was able to commercialize a marginal gas field fuelling the first gas-fired power plant in the country. A recent gas discovery will be further assessed for potential commercialization while a new prospect is being considered for drilling by early 2024.

There is a looming energy crisis in the horizon for the Philippines. The Malampaya gas field, its lone giant accumulation, is already on the decline and may not be able to fill the gas demand by 2027. Then there's the energy transition. While PNOC EC is expected to find the replacement reserves, it is faced with the dilemma of pursuing two different paths i.e., following the program of Net Zero by 2050 (an energy economy dominated by renewables) and continuing E&P programs for fossil fuels. The country is still considered largely under-explored for oil and gas. However, petroleum E&P programs have long gestation period and therefore must also consider the long-term direction of the Government. Navigating the energy transition will be a balancing act for PNOC EC, one that may dictate if it will be celebrating 50 years, just like SEAPEX.

SPEAKER BIOGRAPHY

Jaime Bacud ("Jimmy") is currently the Vice President for Upstream Operations of PNOC Exploration Corporation (PNOC EC) which is the oil and gas subsidiary of the state-owned Philippine National Oil Company. He earned his Bachelor of Science degree in Geology from the University of the Philippines and his Master of Science degree from the University of Sydney, Australia.

Mr. Bacud has more than 30 years involvement in the energy sector starting from his previous work at the Philippine Department of Energy which include various technical collaboration with local and international geoscientific and energy-related agencies. Prior to that, he was conducting mineral exploration work in southern Philippines.

Mr. Bacud is currently a Director of the Petroleum Association of the Philippines. He is also a Philippine Section representative of the Association of International Energy Negotiators. Mr. Bacud is a member of the Southeast Asia Petroleum Exploration Society and also represents PNOC EC in the Asia Pacific Scout Check.



ORAL PRESENTATION

Geological Setting of Natural “Gold” Hydrogen in the Pyrenees and Implications for Exploration Worldwide

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Recent studies on both sides of the Pyrenean mountain belt have revealed the presence of natural free hydrogen both seeping at the surface and trapped below ground (Lefevre et al 2021, Atkinson et al, 2022). Lefevre’s paper describes the optimal geological, solubility and temperature requirements for the generation, accumulation, and preservation conditions for hydrogen from studies in the Mauléon Basin near to Sauvete Béarn, France.

In our studies in the Monzón-Barbastro area of northern Spain to the south, similar conditions are also observed, in fact free hydrogen has been recorded in well bores drilled in the 1960’s (e.g., Monzón-1). The location of these hydrogen gases is suggested to be related to serpentinization of oceanic crust or upper mantle, which given the oblique collision of the Iberian and European plates at the time of the Pyrenees formation resulted in mantle obduction rather than subduction below the mountain belt.

Learnings from ongoing studies in the Pyrenees suggest the generation of natural hydrogen is not unique and assuming similar plate collisional settings exist elsewhere they too might be prospective for natural hydrogen exploration.

Lefevre N., L. Truche¹, F-V. Donz, M. Ducoux, G. Barr, R-A. Fakoury, S. Calassou, E. C. Gaucher. (2021), Native H₂ exploration in the western Pyrenean foothills, Research Gate Publication 351795693

Atkinson C.D., C. Matchette-Downes, S. Garcia-Curiel. (2022), Natural hydrogen in the Monzón-1 Well, Ebro Basin, northern Spain. In “Hydrogène et gaz rares” Géologues, Société Géologique de France, Numéro 213, Juin 2022 pp. 96-102

SPEAKER BIOGRAPHY

Chris has over 35 years’ experience in the energy/resource sector working for both major companies (Shell, ARCO) and developing and arranging finance for his own and associates’ ventures. He was the co-founder of *pda* Limited which went on to become Serica Energy plc in 2004 and was also a founding investor in several other successful E&P start-up ventures between 2006-2016. In 2017 he co-founded Helios Aragon which is exploring for natural or “gold” hydrogen/helium gas in Spain and other countries.

Chris currently acts as a non-executive director of Rex International Holdings here in Singapore (SGX "REXI") and as a board member for their subsidiary companies Lime Petroleum in Norway, Masirah Oil in Oman and Pantai Rhu Energy in Malaysia. In 2020 he was elected to the board of Far East Gold (ASX “FEG”) which is an eco-focused miner exploring for gold/copper in Indonesia.

Chris is a life member and past President (2005) of SEAPEX and holds both a BSc and PhD in Geology.



ORAL PRESENTATION

Asia-Pacific CCS projects: Assessment and Certification of CO₂ Storage Capacity

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The assessment and certification of CO₂ storage “capacity”, which is analogous to an oil or gas “reserve”, is an increasing focus area for those stakeholders involved in carbon capture storage (CCS) projects. The Society of Petroleum Engineers (SPE) 2017 CO₂ Storage Resources Management System (SRMS) provides a classification framework to report CO₂ storage quantities, with guidelines available since July 2022. This is likely that the SRMS will become widely adopted worldwide and in the Asia Pacific region (APAC) in particular, where companies seek recognition of their carbon capture storage projects to support their energy transition narrative and engage with financiers.

The growing APAC CCS sector is reviewed and the complexities of the 2017 SRMS and 2022 SRMS guidelines are discussed through theoretical and actual case studies. Specific technical issues with saline aquifer storage and depleted gas field storage differ but can largely be solved. However, the commercial requirements to mature “storage resources” to “capacity” are more complex. The confirmation of long-term containment of the CO₂ in the geologic formation will require a firm understanding of containment issues, a topic commonly overlooked in conventional exploration. The commercialization pathway of CO₂ storage projects will vary significantly between direct air capture (DAC), emissions reduction and third-party CO₂ disposal. In all cases, the legislative framework in each host country or the investors country will have implications on what can be claimed as “capacity”.

Developing the APAC CCS sector will depend in part on understanding current definitions of “capacity” and how future guidance, or investor requirements, may develop. The SRMS provides not only a framework for assessment and certification; it can also be useful to expose successful routes to commercialisation.

SPEAKER BIOGRAPHY

Peter has 38 years' experience in oil and gas with BP, Shell and RISC having worked in the North Sea, Egypt, Oman, Australia and conducting development project reviews globally. He has extensive experience on oil, gas condensate, gas storage and CSG developments. More recently he has developed significant experience in CCS and hydrogen. He is a qualified reserve, resource and storage resource certifier and Chairman of the SPEE Asia-Pacific Chapter.



ORAL PRESENTATION

Geothermal vs Petroleum - A Perspective from Asia-Pacific

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The differences between the geothermal and petroleum industries are greater than their similarities. This observation aside, the geothermal reservoir engineering discipline historically derived its fundamental principles from the rich history of petroleum engineering.

Drawing on 40 years of personal experience, technical literature, and conversations with professionals, this paper is presented as a comparative survey of the two industries, focusing on the Asia-Pacific region. Topics on exploration, reservoir, and production are covered in overview to provide a broad perspective.

Conclusions are presented for estimating reserves and energy equivalents - highlighting the differences in methodologies between the geothermal and petroleum disciplines.

SPEAKER BIOGRAPHY

Elliot Yearsley has 40 years of experience in geothermal and oil & gas projects, across multiple disciplines in exploration, drilling, production, and reservoir engineering. Most of Elliot's career has been spent in the Asia-Pacific region and he has held General Manager positions in Indonesia, Malaysia, and Australia.