

Development and the environment

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began his military career in the Brunei Malay Regiment, rising through the ranks of the Royal Brunei Armed Forces to the rank of Major General, during which time he also studied at the British Army Staff College, Camberley and at the Royal College of Defence Studies. In 1991 he was appointed a privy councillor to HM the Sultan and served as ambassador to Egypt and the Kingdom of Morocco, as well as to the UN in New York. In 2005, he became Minister of Culture & Youth before his appointment as Minister of Energy.

Brunei Darussalam has been producing oil and gas commercial for the past 80 years. Currently the country's oil production is on average 170,000 barrels per day (bbl/d) and gas 33 million cubic metres per day (mn m³/d). In terms of the country's income, it still accounts for 96 per cent of the country's main export.

Like many other countries which have been producing oil and gas for years, Brunei Darussalam is also facing an era where there is no more easy oil. This has some impacts on the country's energy security.

In facing the energy security challenges and its ability to continue extracting oil and gas from fields, technological advances have been embarked on. In the area of smart fields and drilling technologies, smart snake wells have enabled fields once dormant to be produced economically. These wells are able to snake vertically and horizontally to tap into small and thin reservoirs while at the same time allowing the measurement and flow of separate sections. The snake wells have been able to produce what is usually achieved through the drilling of several individual wells, thus reducing cost. An example of this success is the Champion West field owned by Brunei Shell Petroleum (BSP). It lay dormant for 26 years since its discovery in 1975 but this changed when smart field and snake well technology was introduced and production began again in 2006. At the peak of BSP

production, it was able to contribute 50,000 bbl/d. BSP has also developed the northern flank offshore blocks of the Seria field using land-based, uphill fish-hook wells. Smart fields are able to increase total recovery by 10 per cent for oil and 5 per cent for gas. Exploration programmes by companies have now been initiated in much deeper water situated further offshore. This includes the Alap-Alap and Geronggong fields, in waters over 1,000 metres deep by BSP. TOTAL E&P Borneo, which is another operator in the country, in 2008 also began drilling high temperature/high pressure (HTHP) well to a depth of about 5,800 metres.

With most of the fields in their mature stage, the need for secondary and tertiary recovery technologies is now more important than ever to reduce declining production from fields and recover more of what is left in the ground. For secondary recovery, water is injected in the right place and quality to restore pressure that has been lost over the years. For BSP, the Champion Field water flooding project is expected to add additional volumes of 31,000 bbl/d by 2020. Tertiary recovery, through the use of polymers and chemicals is now being studied and is planned to be pilot tested in selected fields shortly. These initiatives can add 10-15 per cent recovery on top of what can be recovered through natural pressure recovery.

Brunei Darussalam continues its excellent record of uninterrupted delivery of liquefied natural gas (LNG) to



BLNG Liquefaction plant/Gas treatment facility at Lumut, Seria, Brunei Darussalam

its customers through the Brunei LNG plant (BLNG) ever since 1972, when Brunei Darussalam pioneered the building of the first LNG plant in the Western Pacific. To ensure that the plant continues to deliver for another 20 more years and beyond, BLNG has embarked on a major Asset Rejuvenation Plan (ARP). This ARP encompasses the replacement of existing power plants, the rejuvenation of cooling water systems and installation of new boil-off gas compressors. Four out of five of the main cryogenic head exchangers (MCHE) were also successfully replaced. These projects have been undertaken while the plant is still in operation. In a 2007 benchmarking by Shell Global Solutions, BLNG was ranked in the top quartile by performance among 10 LNG sites and 12 gas plants producing over 85 per cent of global LNG capacity. Two new 147,000 m³ LNG vessels have also been contracted by Brunei Gas Carriers (BGC) to be built and are planned to be ready in 2011. This is part of the country's fleet renewal plan. These commitments are made to ensure that BLNG continues to be in the top quartile in its industry and a preferred, reliable LNG supplier to its current and potential customers.

Brunei Darussalam is also actively opening up new blocks to potential investors to explore and produce from these areas. In 2003, Blocks J and K situated in the Brunei Exclusive Economic Zone (EEZ) were opened up for bidding and this was followed by Blocks L and M in 2006. These Blocks have been gazetted to the Brunei National Petroleum Company (PetroleumBRUNEI) which is the country's national oil company. For Blocks L and M, seismic activities have been completed and these blocks are expected to commence exploration drilling programmes sometime this year. For Blocks J and K, there are no activities as yet due to the demarcation disputes with Malaysia. However, a significant step was achieved in the first quarter of 2009 when both the governments of Brunei Darussalam and Malaysia signed Letters of Exchange to resolve the matter.

In efforts to promote exploration and production activities to achieve energy security, Brunei Darussalam also places important emphasis on care for the environment and shares concerns on climate change. As is typical of any industry, the business of fossil fuel extraction and its use carries with it carbon emissions, which need to be mitigated through green initiatives and technologies. Brunei Darussalam is committed internationally through the Heart of Borneo (HOB) biodiversity protection initiative to preserve the rainforest, as a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and participation in the recent Copenhagen climate talks in December 2009. Along with the country, BSP, being the major oil and gas operator, has been able to reduce its 2008 volume emissions (in tonnes of CO₂ equivalent) to about 42 per cent less than its emission levels in 1998. This was achieved through

eliminating continuous venting and flaring, as well as partial conversion of instrument gas to instrument air systems. In addition, the conversion of vent stacks to flare was initiated, as the former causes much more harm to the environment. BSP has also simplified and rationalised its facilities to recover and recompress back flash gas from surge vessels and compressors which previously were sent to flare stacks. As a result, BSP has won the prestigious Shell Global Chief Executive's HSE Award 2008 for work in improving environmental performance.

Apart from industry emissions, the drive for energy efficiency and conservation (EEC) in households as well as government and commercial buildings, has also become a top agenda item for Brunei Darussalam in recent years. The government of His Majesty the Sultan and Yang Di-Pertuan of Brunei Darussalam has declared 24th May as Energy Day for the country. This is used as an annual platform to promote the importance of practicing EEC in the everyday life of its citizens and residents. In the electricity sector, 99 per cent of the power plants are gas-fired which is the cleanest source of fuel among the various fossil options. This has been important to ensure that Brunei Darussalam is not polluted with unacceptably high rates of carbon emissions. Also, the first government-owned combined-cycle power plant has just been commissioned, which will increase overall efficiency.

With the country's population growing year on year and the oil and gas industry some eight decades old, sustaining energy security for the country, which is vital for advancing its socio-economic development, will undoubtedly present significant challenges. Brunei Darussalam will adapt to meet these challenges, while at the same time balancing them with the need to care for the environment as well.

BSP, the country's major oil and gas operator, has been able to reduce its CO₂ emissions by around 42 per cent over the past decade

Smart Fields and Snakewells: BSP's Champion West field, offshore Brunei Darussalam

