

COALBED METHANE

EXPLORATION – DISCOVERY

AUSTRALIA: Assets sale - **UG 76-1**

Dart buys Arrow LNG NSW permit

The \$20 billion Arrow LNG project joint-owned by Shell and PetroChina has sold its **coal seam gas exploration** interests in northern NSW to Dart Energy, for a nominal sum, as it focuses on its Queensland interests. Dart announced recently it had acquired the 7100 square kilometre PEL445 licence, in the Clarence Moreton Basin, from Arrow.

Arrow has so far drilled 15 exploration wells and it is understood the licence area - which spreads inland from Byron Bay and Lismore - could have as much as **18 trillion cubic feet of gas** in place (although a much smaller amount of gas is likely to be economically recoverable). (February 6, 2013)

INDIA: Planned project – Tender :- **UG 76-2**

India to offer seven CBM blocks in fifth round auction

India's Directorate General of Hydrocarbons (DGH) will soon offer seven coal bed methane blocks under the fifth round of bidding with the Central Mine and Planning & Design Institute (CMPDI) finalising the data dossier. A DGH official told that the blocks would be offered in Singrauli, Sohagpur and Cambay basin areas, which mainly have lignite and bituminous coal.

The DGH has offered 33 blocks covering 17,000 km in four rounds of bidding, but only four blocks have come to production so far. The petroleum and natural gas ministry got the maximum response in the third round of bidding, when it received 54 bids against 10 blocks on offer. But **with explorations not getting enough results, the demand for CBM blocks has come down.** The DGH offered 8 blocks in the first round, 9 in the second round, 10 in the third round and 7 in the fourth round. (February 5, 2013)

PRODUCTION

AUSTRALIA: Planned project – Environmental assessment :- **UG 76-3**

CSG development threatens environment

The revelations in Courier Mail raise serious questions about whether coal seam gas development approvals in Queensland are made in a transparent and accountable manner, according to the Australian Marine Conservation Society (AMCS). Felicity Wishart, Campaign Director at the AMCS said **the fast-track of approvals for coal seam gas developments increased the likelihood of inadequate assessment of environmental impacts and their risk.**

These developments are being built in sensitive coastal areas, requiring dredging of seabed and seagrass, the breeding and feeding grounds for threatened species such as dugongs and turtles, to accommodate massive new LNG tankers. "Mining approvals are being processed at a reckless pace, with less time for environmental assessment leading to a greater chance of mistakes being made in haste. (February 11, 2013)

CHINA: Planned project – Partnership modification - **UG 76-4**

CNOOC hikes stake in China CBM

CNOOC has said that it will hike its stake in China United Coalbed Methane Co (China CBM). CNOOC will buy **20%** of China CBM's shares from the China National Coal Group Corporation (ChinaCoal), as per a statement by CNOOC. This move will result in CNOOC's share rising to 70%. The remaining 30 per cent will remain with ChinaCoal. In 2010, CNOOC bought a 50-percent stake in China CBM.

At present, China CBM, owns exploration and mining rights to areas adding up to a total of 18,200 square km, China Economic Net said. CNOOC signed a 30-year deal last year with China CBM to explore coal bed methane in nine provinces.

By the end of 2011, China CBM's proven coalbed methane reserves had hit 107 billion cubic meters and its **annual output capacity had reached 1.1 billion cubic meters**, the new report said. China's **coalbed methane reserves are estimated to be 36.8 trillion cubic meters**, ranking third largest in the world after Russia and Canada. (February 22, 2013)

ENVIRONMENT

AUSTRALIA: Domestic supply - UG 76-5

Community concerns halt Australian CBM project

Australian utility and upstream firm AGL Energy has suspended the expansion of its Camden gas project on the outskirts of Sydney because of community concerns about coal-bed methane (CBM) extraction. AGL Energy has requested that the New South Wales (NSW) planning and infrastructure department suspend its assessment of the proposed northern expansion of the Camden gas project. Its decision highlights **community concerns over the impact of CBM development on local water supplies and farmland** through the extraction of saline water that is part of the production process. The NSW government restarted its approvals process for new CBM projects in September after an 18-month freeze on permits while it reviewed its strategic land use policy. The moratorium stalled the state's CBM industry and has left it facing a gas shortage, with gas contracts starting to run out in 2014 and expiring in 2017. The **NSW government considers the CBM industry a "game changer"** for the state that will provide security of supply and deliver huge economic benefits.

AGL is one of many gas producers and consumers that have warned of a large gas shortage in NSW, Australia's most populous state. **AGL has warned it faces a big decline in available gas for long-term domestic supply contracts from 2016**, which it says needs to be filled by CBM from NSW. AGL has around 250 PJ/yr (6.7bn m3/yr) of gas tied up in long-term supply contracts until 2016, when this amount sharply drops to below 100 PJ/yr. (February 8, 2013)

SHALE GAS

EXPLORATION – DISCOVERY

AUSTRALIA: Agreement framework - UG 76-6

Chevron enters Australian shale gas industry with Beach deal

Chevron Corp. agreed to pay as much as \$349 million to join Beach Energy Ltd. (BPT) in an Australian natural gas exploration campaign in its first shale investment in the country. Chevron will acquire as much as 60% of a permit in South Australia and 36% of a block in Queensland, Adelaide-based Beach said recently in a statement. The blocks cover about 810,000 acres in the Cooper Basin, the outback region that straddles the border of the two states, San Ramon, California- based Chevron said in a separate statement. The agreement follows shale investments by ConocoPhillips, Statoil ASA, BG Group Plc and Hess Corp. Wilson HTM Investment Group says the accord is the biggest shale gas deal in Australia, which the government estimates may hold almost **400 trillion cubic feet of resources**. (February 25, 2013)

CHINA: Forecast – Domestic supply - UG 76-7

China slow to start fracking for natural gas in shale

After more than a decade of spectacular growth fuelled by coal, China finds itself sitting on a bonanza of shale gas. Its reserves are the world's largest, beating even those of the United States. But developing this vast resource won't be easy, as a bidding last month for shale-gas leases made clear. "**The resource is huge**", says Jane Nakano, a fellow of the Energy and National Security Program at the Center for Strategic and International Studies in Washington DC. "But the shale deposits are more complex than ours, and the above-ground challenges are probably even larger" than the geological ones. Julio Friedmann, chief energy technologist at the US energy department's Lawrence Livermore National Laboratory in California says, "**many of the Chinese shale formations have a high clay content, for instance, which makes them more pliable and less apt to fracture. Many are also deeper. We simply have no idea about whether or not the geology is going to produce**".

To offset some of the coal use that contributes to its status as the world's largest greenhouse-gas emitter, **China wants to boost natural gas from around 4% of the country's energy mix to 10% by 2020**. Much of that gas will be imported. But in March 2012, the Chinese government estimated the country's reserves at 25 trillion cubic meters, and an earlier estimate from the US Energy Information Administration was even larger. China's leaders resolved to boost annual shale-gas production from near zero today to at least 60 billion cubic meters by 2020. The United States, by comparison, produced more than 150 billion cubic meters in 2010.

But its **shale-gas auction - only the second so far - has bolstered skepticism**. China's Ministry of Land and Resources awarded leases in 19 areas, mostly in the nation's central Sichuan Basin. Analysts were

surprised to see national oil and gas companies, such as PetroChina and Sinopec, lose out to state-owned coal and utility companies, as well as to local government entities that have no expertise in the oil and gas arena. Nakano says that the national oil firms may be playing it safe and did not truly compete to win. Price controls on natural gas may have reduced their appetite for risk, she says, and they have little experience with the hydraulic fracturing needed to release gas from shale. Shu Jiang, a petroleum engineer from the University of Utah, is more optimistic, pointing out that major oil and gas companies are investing in shale-gas wells in areas already leased for conventional oil and gas development.

This Year China's Ministry of Land and Resources (MLR) has said that the country is expected to commence the **third round of shale gas auction** this year, a report in China Scope Financial said. The number of blocks for the new auction will equal to that in the second auction, but shale gas resources would be richer, the report said. The ministry is likely to ease entry threshold for the third round and may encourage more state-owned companies, private companies, and other qualified firms to participate in the auction, China Scope said. (February 20, 2013)

IRELAND: Reserves estimates - UG 76-8

Irish shale gas potential emerges

Independent energy explorer Enegi Oil said it submitted a petition to the Irish government (Petroleum Affairs Department - PAD) to **explore the potential in the Clare Basin for shale natural gas**. The company in 2011 started examining geological data related to the reserve potential in the basin. In November, the company said it determined that geological characteristics of the Clare Basin meant it was a prospective shale natural gas reserve. "We believe the acreage covered by the Clare Basin option is highly prospective," Enegi Chief Executive Officer Alan Minty said in a statement. "With this in mind and with the need to carry out further exploration work over the area, we have applied to the PAD to convert our option into an Exploration license" Enegi said it believes the area may contain between **1.49 trillion cubic feet and 3.86 trillion cubic feet of natural gas**. The company didn't provide an estimate on when it expected a decision from the Irish government. (February 22, 2013)

LITHUANIA: Regulation - UG 76-9

Call for moratorium on Lithuanian shale gas

Lithuania's Environmental Protection Committee is calling for a moratorium on shale gas drilling and an investigation into the local unit of US energy major Chevron - the only company to bid in a tender in January offering exploration rights. In a recent statement the committee stated: "The government should halt shale-gas exploration and production until competent European Union institutions give an opinion" on the safety of related technologies. The parliamentary panel also called for the government to **check**

agreements with landowners made by Investicijos UAB.

The call is one of the first hints of a potential change in Vilnius' approach to Russia, which dominates the Lithuanian gas market. While some will see it as capitulation to gas giant Gazprom, others will note that Brussels **remains very unsure of the environmental impact of extracting shale gas**, and many EU states have a moratorium in place while the issue is researched. Still, the news suggests a debate on Lithuania's energy policy is being reopened by the recently-appointed government. (February 8, 2013)

POLAND: Regulation - UG 76-10

Fracking boom delayed by kites as Poland seeks gas independence

Poland's path to energy independence through shale gas is being delayed by skylarks, red kites and local farmers hesitant to grant access to their land. The nation is sitting on the European Union's biggest reserves of the fuel, enough to last at least 50 years and free it from dependence on Russia, according to the Polish Geological Institute. Exploiting the deposits will require the government to allay the concerns of the Kashubian ethnic minority, farmers, environmentalists and the tourism industry that hydraulic fracturing, will pollute their water.

Last year, about 25 percent fewer wells were completed than forecast by the Environment Ministry as some projects were delayed. The ministry expects companies to drill 39 wells this year, more than double the annual average over the previous 30 months, as **the government moves to simplify environmental rules**. After exploration slowed last year, the government decided to simplify rules aimed at protecting rare species, which require investors to seek new permits any time they want to drill deeper or in a different direction than originally planned. (February 8, 2013)

ROMANIA: Planned project – Drilling campaign - UG 76-11

Romania gives Chevron shale gas go-ahead

US energy major Chevron can begin shale gas exploration in Romania after the authorities have said the multinational can now go ahead with work in the east of the country. Romanian news agencies reported that the senate recently rejected a motion banning shale gas exploration. Chevron is now required to obtain a construction permit before it can commence drilling. (February 5, 2013)

RESERVES

TURKEY: Discovery - UG 76-12

Turkey holds its breath for shale gas and syngas

New findings are spurring hopes in Turkey's search for new energy resources, following the energy minister's recent announcement that indications of **possible shale gas resources had been found** in the Central Anatolian provinces of Ankara, Konya and Kirsehir. Turkey is seeking to benefit from the reserve potentials in its southeastern, eastern and western regions, Energy Minister Taner Yildiz said .

Shell has been drilling around the southeastern city of Diyarbakir for shale gas, but Turkey has also accelerated its operations in Central Anatolia. Yildiz said recently that shale gas potential had been indicated in Ankara, Konya and Kirsehir as a result of seismic drillings conducted by the Turkish Petroleum Company (TPAO) and the Mineral Research and Exploration Institute (MTA). He added that they did not yet have any concrete assumptions about how much of Turkey's energy needs would be satisfied by these indications.

More good energy news came from the Aegean region, with officials announcing that another substantial energy source would be **synthetic gas by the gasification of lignite coal**, as they eye the obtainment of **1-1.5 billion cubic meters per year**, equal to almost one ninth of Turkey's entire natural gas needs. There are coal basins worth a total of 13 billion tons in Turkey.

Meanwhile, Turkish Mert Energy has announced that it has discovered natural gas reserves in Istanbul's northern district of Silivri, and that the company has started extensive testing to determine the reserve potential of the well. Energy Minister Yildiz confirmed the discovery, but advised waiting for the examinations to be completed before forming a precise opinion about the importance of the well for Turkey. (February 25, 2013)

SUPPLIES - IMPORTS - EXPORTS

JAPAN-UNITED STATES: Import/export forecast - UG 76-13

Step forward for shale gas imports / Japan-U.S. summit fuels hope for U.S. to grant permission

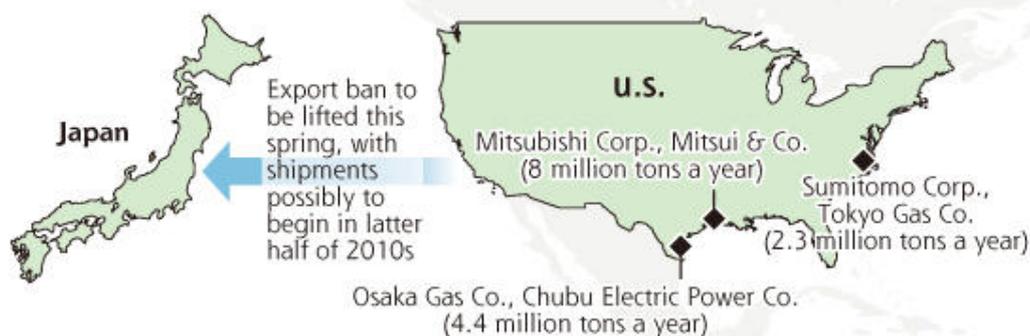
The U.S. government is increasingly expected to approve exports of U.S.-produced shale gas to Japan this spring, as Prime Minister Shinzo Abe asked U.S. President Barack Obama at their recent summit meeting to permit exports soon. If U.S. shale gas is exported to Japan, it is highly likely it will prevent already increased electricity bills from surging further. Because Japan has not concluded a free trade agreement with the United States, it needs Washington's permission to import natural gas produced in that nation. At the summit meeting, Abe asked for early approval for exports, and Obama said his government is taking the importance of Japan as its ally into consideration when considering natural gas exports. An increasing number of officials at Japanese companies concerned saw the exchange as a step forward.

The U.S. Energy Department has so far received 16 applications for permission to export U.S. shale gas. **Japanese companies are involved in three of these applications: one is a project in Texas involving Osaka Gas Co. and Chubu Electric Power Co. Mitsubishi Corp. and Mitsui & Co. are involved in a project in Louisiana, and Sumitomo Corp. and Tokyo Gas Co. participate in a project in Maryland.** The planned annual export volume of the three projects is **about 15 million tons total, equivalent to about 20 percent of Japan's imports of LNG.**

The Texas project was submitted earlier on and will likely receive a decision first among the 16 applications. **Export permission may be granted this spring.** Even if costs to liquefy the shale gas and transport the LNG to Japan are added, the prices are estimated to be about 30 percent lower than current import prices of LNG. The Development Bank of Japan estimates that if shale gas is imported from the United States, Japan's LNG procurement prices in 2020 will fall about 7 percent. However, it is still **uncertain which of the shale gas drilling projects will be allowed to export and how much.** Some in the U.S. industry are skeptical about exporting shale gas, saying that permitting exports may raise domestic gas prices. Thus many believe the quantity of shale gas allowed to be exported will be limited.

Even if permission is granted this spring for exports, Japan will likely not be able to actually import the gas until the latter half of the 2010s, as it will be necessary to construct liquefying and other facilities. (February 25, 2013)

U.S. shale gas projects involving Japanese companies



Source: The Daily Yomiuri

COMPANIES

AUSTRALIA: Partnership agreement - UG 76-14

PetroChina acquires stakes in ConocoPhillips' projects

PetroChina Co Ltd will acquire some of ConocoPhillips' interests in two projects in Western Australia, a move indicating its increasing focus on **natural gas resources**, according to an agreement reached recently. PetroChina will acquire a 20% share in ConocoPhillips' Poseidon project in Browse Basin and 29% equities of the Goldwyer shale gas project in Australia's Canning Basin, according to ConocoPhillips' announcement. The two companies also established a Joint Study Agreement to **co-research unconventional natural gas resources in China's Sichuan Basin**. All the agreements still need to be approved by related governments and business partners.

The new agreements are important parts of PetroChina and ConocoPhillips' global cooperation, which also highlights CNPC's growing efforts to strengthen **offshore LNG and onshore unconventional natural gas resources in Western Australia**. In December, PetroChina agreed to buy BHP Billiton Ltd's shares in liquefied natural gas project in Western Australia at a cost of \$1.63 billion - the biggest overseas acquisition by the company in 2012. PetroChina oil giant will gain an 8.33% interest in the East Browse Joint Venture and a 20% interest in the West Browse Joint Venture, located off Western Australia, from BHP. (February 21, 2013)

CHINA: Partnership modification - UG 76-15

Sinopec to buy stake in Chesapeake assets for \$1.02 billion

Petroleum & Chemical Corp (Sinopec) will buy half of Chesapeake Energy Corp's Mississippi Lime oil and gas properties in Oklahoma for \$1.02 billion to increase its presence in the North American shale gas industry. Companies in China, which has the largest shale reserves in the world, **are keen to get the know-how of drilling in such unconventional fields**. Chesapeake, which closed \$12 billion of asset sales last year, is targeting asset sales of \$4 billion to \$7 billion in 2013, the company said in a presentation earlier this month. (February 25, 2013)

United States: Partnership - UG 76-16

GAIL, EDF Trading sign MoU to acquire energy assets in North America

GAIL India Ltd said recently it has signed a preliminary agreement with French energy trader EDF Trading for jointly acquiring oil and gas assets in North America and trading of US gas/LNG. The **MoU may lead to the two firms jointly acquiring shale gas assets in North America as well as the French firm investing in downstream trading and marketing venture in India**.

GAIL already has a 20 per cent stake in Carrizo Oil's Eagle Shale gas assets in Texas and has also signed to import 3.5 million tons of LNG, from Cheniere Energy's Sabine Pass shale gas project in Louisiana. GAIL is eyeing relaxation in LNG export policy of US before tying up more gas for meeting growing energy demand back home. Sabine Pass is the only one among the seven shale gas projects coming up in the US that has permission to export to nation with which Washington does not have Free Trade Agreement (FTA).

The venture with EDF would not just be for sourcing and trading of gas from US but also outside North America as well. EDF Trading offers a complete range of services including supply and delivery, terminal operations, re-gasification and nominations into networks. (February 1, 2013)

ENVIRONMENT

CANADA: Environmental assessment - UG 76-17 Shale gas industry under study by Quebec

The Quebec government has ordered the province's environment assessment agency – BAPE – to study shale gas development. Environment Minister Yves-Francois Blanchet said the BAPE is best positioned to determine the **potential impact of "fracking" in populated areas** where ground water could be affected. In the meantime, Blanchet said he's bringing in legislation to place a moratorium on fracking and shale gas exploration in central Quebec. The

moratorium will be in effect until new legislation are put in place to regulate the shale gas industry, said Blanchet.

Former Liberal minister Pierre Arcand had ordered a committee of experts to evaluate an environmental strategy. The committee was formed following the publication of a report from BAPE about sustainability and Quebec's shale-gas industry. There have been no fracking or extraction projects authorized since then, except for those completed for scientific reasons. (February 6, 2013)

UNITED STATES: Environmental assessment - UG 76-18

Group to look closely at shale gas drillers

Environmental groups and drilling companies are forming a first-of-its kind organization to **scrutinize shale gas drillers' practices in Appalachia**. The Environmental Defense Fund, PennFuture, The Heinz Endowments, EQT and Shell are among collaborators in an organization to certify which drillers meet the best industry standards. Next month, the group will publicly start the Institute for Gas Drilling Excellence, officials said. How it will be funded isn't clear. The Marcellus Shale Coalition, which represents energy industries, will not participate.

The institute's aim is to **encourage best practices and measure companies' performance**, much like a college accreditation agency or LEED certification for environmentally friendly buildings, organizers said. (February 11, 2013)

GENERAL INFORMATION

UNITED STATES: Investment opportunities - UG 76-19

Reactor's closing spotlights shale

Duke Energy's decision to **dismantle a Florida nuclear power plant** rather than undertake the costliest-ever U.S. atomic repair shows **how rapidly cheap natural gas is remaking the U.S. power industry**, hastening a shift from traditional fuels such as coal and uranium. Duke's Crystal River Unit 3 plant in Florida joins Dominion Resources's Kewaunee reactor in Wisconsin as the first to be shuttered in the United States because of growing shale gas supplies, serving as signposts for utilities from Japan to Belgium also considering decommissioning reactors. At least four other U S reactors are also at risk of early retirement due to new power-market economics,

said Julien Dumoulin-Smith, UBS Securities analyst.

The question for Duke, the largest U.S. utility owner by market value, is whether Florida regulators will allow it to charge the state's consumers \$1.65 billion for its failed investments in the reactor, while boosting the state's already hefty reliance on gas to fuel its electricity plants. Florida's Public Service Commission expects to hold hearings to determine whether Duke's decision to retire the plant is prudent for customers.

A shale-fed plunge in gas prices is tilting the power industry toward that fuel, lowering electricity prices and pressuring profits at coal and nuclear generators. (February 11, 2013)

Tap into Asia's Unconventional Gas Boom

UGAS 2013

Unconventional Gas Asia Summit, India

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TIGHT GAS

PRODUCTION

AUSTRALIA: Planned project –Feasibility study - UG 76-20

AWE Starts Feasibility Study of Perth Basin Tight Gas Accumulation

AWE Limited has commenced a development feasibility study for the commercialisation of the Senecio tight gas accumulation located in the north Perth Basin, Western Australia. "Analysis of pressure tests conducted in November 2012 and other data captured since the fracture stimulation has confirmed permeability of between 0.03 to 0.06mD, which is within the pre-frac estimated range. This analysis, together with the successful flow test in September 2012 that reported a **stabilised gas rate of 1.35 MMscf/d from a 5m perforation interval, demonstrates potentially commercial reservoir flow capacity,**" the company said. The company feels that Senecio tight gas commercialisation program is gaining momentum and that positive subsurface data has given the company considerable confidence that commercial gas production can be achieved from the Senecio discovery. AWE has a 50% stake in Senecio-2 with Origin Energy holding the remaining 50%. (February 5, 2013)

GAS HYDRATES

EXPLORATION – DISCOVERY

JAPAN: Drilling campaign - UG 76-21

Japan to speed up undersea methane hydrate exploration

Japan's government will launch a series of natural gas exploration projects in Japanese waters with the aim of reducing the country's heavy reliance on energy imports, Nikkei Shimbun reported recently. The Ministry of Economy, Trade, and Industry will this summer begin a **project to look for methane hydrate deposits believed to be trapped only tens of meters deep in the sediment under the Sea of Japan.** Japan regards methane hydrate as a promising fuel source because it contains massive amounts of methane. Methane hydrate was discovered just under the seabed in the Sea of Japan in 2003, but the government shelved further studies due to concerns about profitability until the 2011 Fukushima nuclear crisis took place. The government is also conducting a joint test-drilling project on methane hydrate deposits in the Pacific Ocean, the daily said, adding that deposits have been confirmed in deepwater sand sediment in those areas, and test production is set to begin in March. The project will be the world's first to extract methane hydrate from the seabed. The government also plans to test-drill for oil and natural gas in the Sea of Japan between April and June, according to the report. (February 5, 2013)

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1 et 4, avenue de Bois Préau, 92852 Rueil-Malmaison Cedex, France

Tel. +33 1 47 52 60 12 - Fax +33 1 47 52 70 14 – (<http://www.cedigaz.org>)

Editor's contact : constancio.silva@cedigaz.org