Asia Oil & Gas Conference

Session Six: Upstream

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Kuala Lumpur

11 June 2013

Good afternoon everyone and thank you Datuk Anuar for that kind introduction.

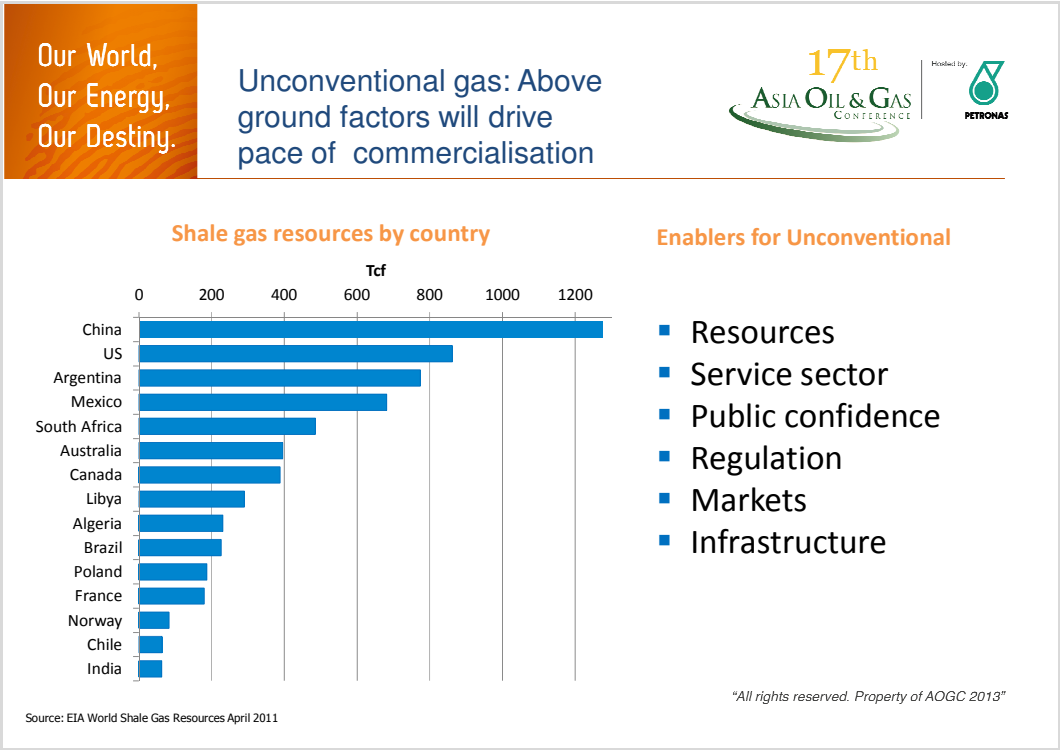
I am delighted to be here today as our panel considers the challenges facing the upstream side of the oil and gas industry.

The topic that I've been asked to focus on today is that of unconventional resources, specifically the challenges and opportunities we are facing today, and will continue to face in developing our unconventional gas resources, both in Asia and for Asia.

I will cover three areas in my address to you today:

- First, I'll outline the key ingredients that I see as necessary to develop unconventional resources no matter what part of the world you are in;
- Second, I'll explore the progress that Australia is making in developing its unconventional gas resources; and
- Third, I'll outline how Santos is utilising their experience in Australia to assist in the development of unconventional resources in Asia.

Ingredients for success: above ground factors and enablers



I'll start with the ingredients for success. These include: resources that are economic to develop, a social licence to operate, a stable regulatory regime, access to markets and the infrastructure to get the gas there.

Resources

Let me start with resources - Of course you have to have the gas in the ground in the first place if you are to commercialise it. And, according to the US Department of Energy, the US has over 2,200 Tcf of gas resources - both conventional and unconventional.

If we are just talking shale, the chart shows that the US is not the only country with access to shale gas. It is in fact China who leads the pack with its shale gas resources estimated at over 1,200 TCF.

Australia is also blessed with an abundance of gas resources, including coal bed methane, which is in the order of 400 Tcf. And, if you include shale gas – we can double that number.

But if having the gas in the ground is the sole determinant of success; then why is it that only the US has to date been so successful? Will the US experience be replicated in other regions? In Australia? In China?

I think the question we should be asking ourselves is not so much will the world's unconventional gas resources be commercialised in regions outside of the US, but at what pace? And I believe, this pace will depend on factors above the ground, not just below.

Service sector

One such factor is the access to technology and know-how; both within those companies seeking to operate and through their service providers, drilling rigs and fracking crews.

The ability to drill successfully and economically is critical to the upstream success of a project. Today it is estimated that the US has more than 35 years of gas supply that could theoretically be produced at around $4/mmbtu. And, it is this low cost base which has underpinned America's success in the rapid development of unconventional resources.

However, it is worth nothing that there are only 50 drilling rigs in Australia, compared with 1800 rigs in the US; this is indicative of the early stage of the developments in Australia.

Public confidence

To successfully deliver these unconventional resources, public confidence and land access must be managed carefully - by both developers and governments.

How this is managed will have an impact on the pace of unconventional gas development. And, so just as this industry is seeking to share knowledge on the technical side, so too must it draw upon the expertise and best practice that exists globally to engage early with communities and build public confidence.

Regulation

Developments can also be stalled or accelerated depending on the maturity of regulation for onshore oil and gas activities.

If appropriate regulatory regimes are in place, ones that are based on sound science, quality data and backed by sufficient resources to allow progress – this will significantly improve the confidence of investors, while balancing the need to minimise environmental and social impacts.

If countries want to reap the benefits of an unconventional gas industry, they must work with industry to get this right, far in advance of the first well being drilled.

Markets

You also need a market for the gas, and one that is sufficient to allow the appropriate investments to be made.

For some countries their domestic demand is sufficient. For example gas demand in the US is around 24Tcf per year creating a large and sustainable market. Domestic demand in Australia by comparison is only 1 Tcf per year and required an export market to create the volume necessary to justify investment at scale.

This is exactly what has happened in Australia, with 3 CBM to LNG projects currently under construction on the east coast – our Santos GLNG project amongst them. The access to export markets created by these developments provided the price incentive, which is a necessary factor in attracting the investment required to unlock more technically challenging resources such as CBM and shale gas.

Infrastructure

If you have the economic resources, and the social and regulatory licence to operate, the final enabler for success is quality infrastructure.

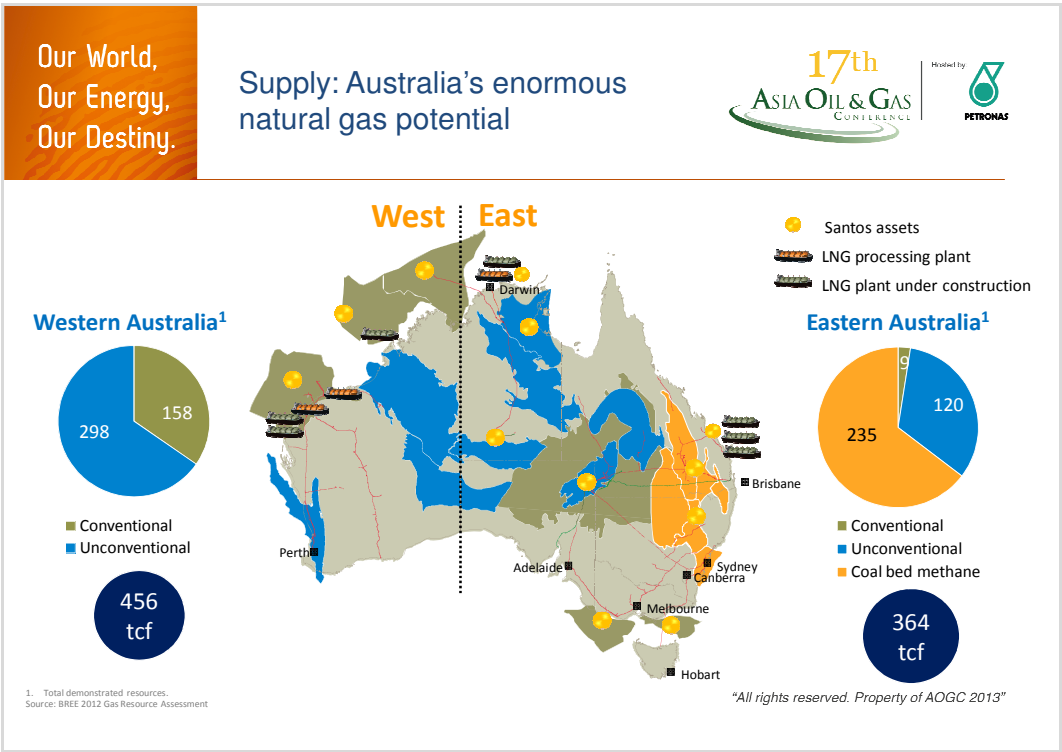
In this respect, all countries are different and some will be more advantaged than others in their ability to bring gas to market.

The US, with 600 gas processing facilities and around 350,000 miles of gas pipelines, was well positioned for rapid development of shale gas resources. They had the right infrastructure in place to bring gas to market, both quickly and economically.

Across Asia Pacific, those regions that have unconventional resources close to pipelines, and close to existing gas hubs, will be advantaged, and will most likely progress more quickly to development.

The alternative is to build infrastructure; which is being done on the east coast of Australia with multiple processing hubs and hundreds of kilometres of pipelines being developed to support the growth of the CBM industry for many decades to come.

Australia's progress



Let me now turn to my second theme, the progress that Australia is making in developing its unconventional gas resources. I refer you to the map on the screen, which highlights in blue and yellow Australia's unconventional resources. As you can see, these present a significant opportunity.

Shale in Australia

Looking at shale first, there is no doubt that we are at a very early stage of development in Australia, with little exploration drilling, so far, to prove up what is hoped to be a significant resource across a number of basins.

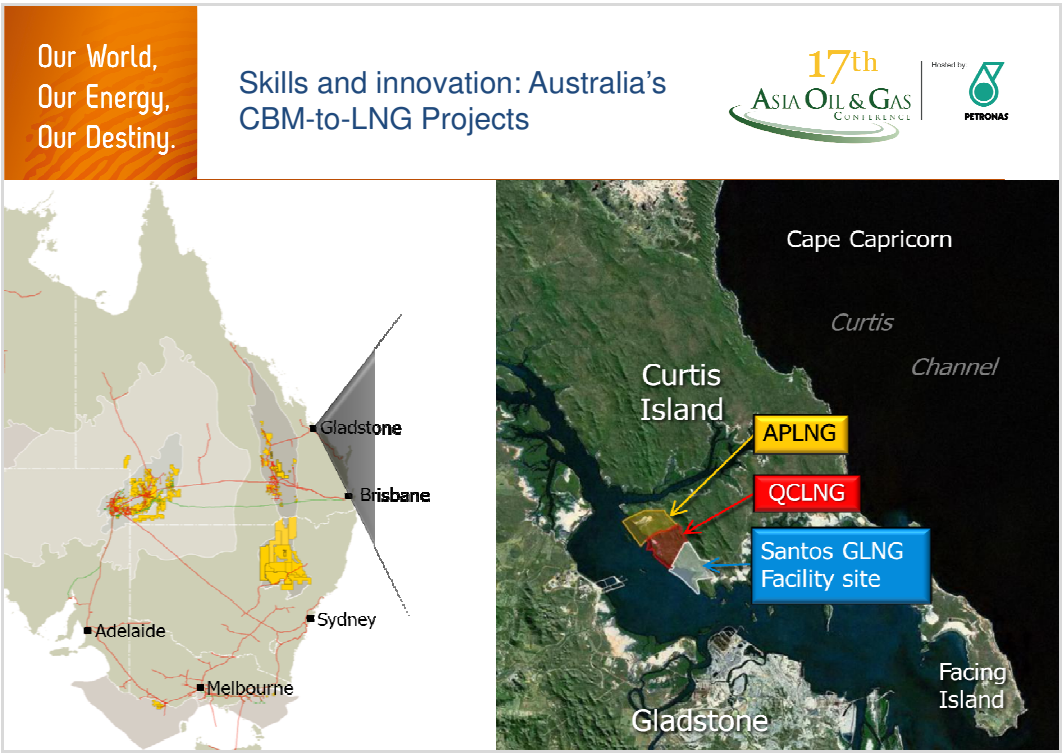
Despite this, it is encouraging that we have seen a number of international companies, in particular the majors, enter Australia's shale basins at an earlier stage than they entered Australia's CBM basins.

It is likely that these early entrants are looking to establish a dominant footprint and resource position before entry prices rise.

And with this investment in Australia also comes expertise. Statoil and Chevron are just two examples of companies looking to leverage their US shale expertise in Australia.

The existence and proximity of demand centres, the continued build-out of LNG infrastructure and strong pricing provide good commercial reasons for the establishment of footprints in this emerging play.

CBM in Australia



Turning now to CBM, and this map shows the location of Australia's three CBM-to-LNG projects which I referred to before. All the plants are located on Curtis Island in the port of Gladstone in Queensland off the east coast of Australia. All projects involve international partnerships and international experience through the joint ventures that have been formed and the suppliers that are engaged.

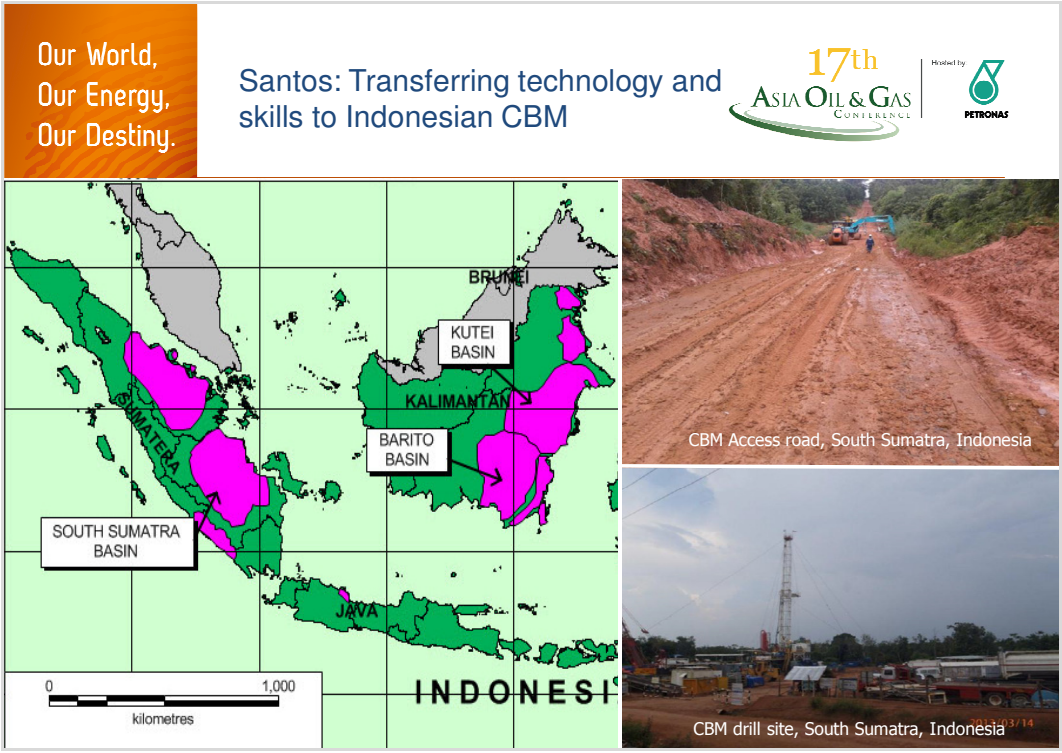
For Santos, through our GLNG project we have partnered with major Asian energy companies PETRONAS, our host today and the world's second largest LNG exporter, and Kogas the world's largest buyer of LNG; as well as TOTAL, a leading international company with vast upstream exploration and production activities in more than 50 countries.

All three of Australia's LNG projects are expected to be shipping cargos to Asia in the next few years, with Santos' two-train plant on track for delivery in 2015.

Across these projects, thousands of wells are being drilled and multiple compressor stations installed, with the added benefit being an industry in Australia that has developed new skills in horizontal and multi-pad drilling, water management and community engagement.

In addition to this, planning authorities and regulators across Australia are working hard to introduce new regulatory frameworks to deal with the environmental and community impact that CBM presents. While this has taken some time, the objective is to create a framework that the industry can confidently operate within for many years to come.

Santos in Asia



I would now like to outline how we are leveraging our experience in Australia to assist in the development of unconventional resources in Asia.

Today, Santos' investments in Asia see us working right across the spectrum from offshore conventional developments to onshore unconventional gas exploration. We are investing in Papua New Guinea, Bangladesh, Vietnam and Indonesia.

Our unconventional activities are focussed on CBM opportunities in Indonesia, where we have a well-established local business.

In 2012 Santos' Asia Pacific business contributed nearly 20% of the company's total production. We are activity looking for more upstream opportunities to continue to grow our businesses in the region.

As Indonesia's conventional oil and gas fields reach maturity and decline, the Indonesian government has high hopes for the transformational potential of its own CBM resources. And as I said earlier, government support is critical for the development of unconventional gas resources.

Towards this end the Indonesian Government has progressed CBM specific regulations ahead of exploration and development. The industry has responded with more than 40 CBM Production Sharing Contracts now awarded, and we understand four licences are on production test.

Again, you first have to have the gas in the ground to be successful, and although resource estimates vary, some estimate that Indonesia's CBM resources could be up to 450 Tcf. The vast majority of these resources are focussed in the three basins shown in purple on this map: Barito, South Sumatra and Kutei. However it is very early days to determine whether these volumes are realistic.

Skills and expertise are the other enables I mentioned in the first part of my discussion, and like the presence of multinationals in Australia bringing their experience to the development of both CBM and shale, in Indonesia we are seeing Exxon Mobil, Total, BP, ENI and my own company Santos forming

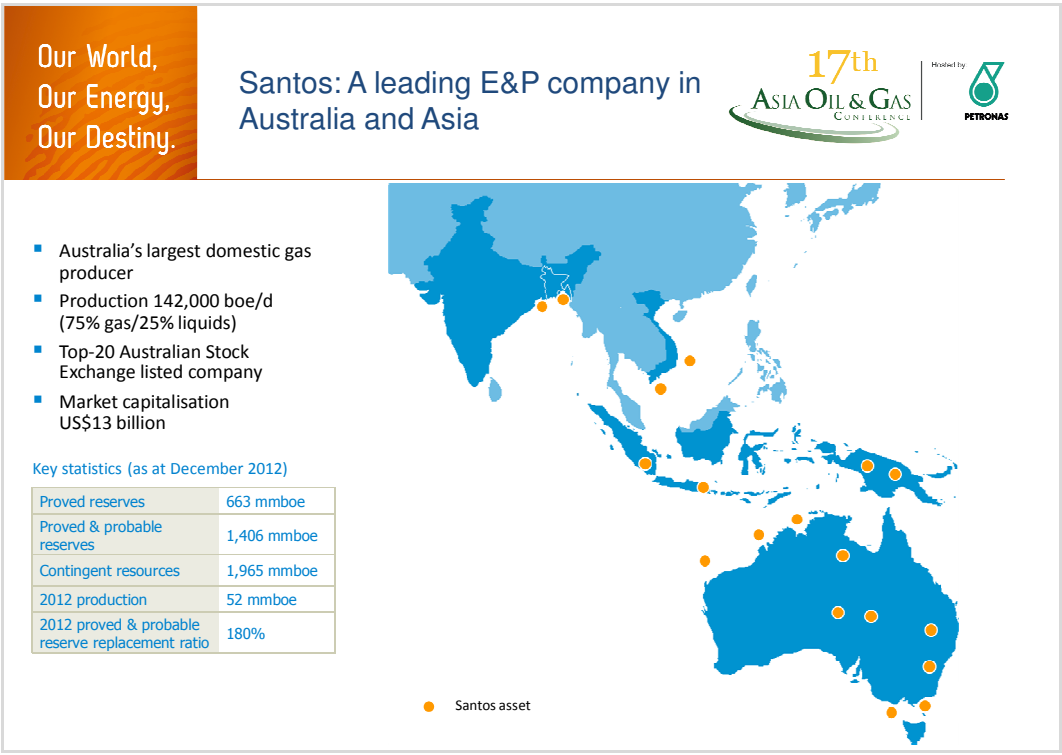
partnerships with local players. I believe this can give Indonesia in some ways a head start with the ability to more rapidly develop an economic upstream CBM program.

And at Santos we are moving ahead quickly. Last year we signed a farm-in agreement in two CBM licenses in South Sumatra with our partner Sugico. This year, Santos extended the partnership and added two further licences. This early move into prospective greenfield acreage fits particularly well with our business model and has added another facet to our Indonesian upstream presence.

As we know, existing infrastructure is critical to the rapid development of unconventionals, as is the access to markets of scale. In line with this, the acreage we are exploring is close to the existing South Sumatra to West Java pipeline, which already connects to the under-supplied West Java market.

We are confident we have the right enablers in place in Indonesia to see successful CBM projects develop, and to do so rapidly once the resource potential is better understood.

Conclusion



In conclusion, I hope I have painted a clear picture of what is required both below and above ground to develop the region's unconventional gas resources; both the challenges and enablers.

The challenges are not insurmountable, and I am confident that where the right conditions are in place that rapid development is possible.

What is needed is the support and forward thinking of governments to put some of the above ground conditions in place to help unlock the enormous natural gas resources in our region.

The boost that developing the world's unconventional gas resources would give to gas supply would bring a number of benefits that the world can't ignore. These include greater energy diversity and security of supply in countries that rely on imports to meet their gas needs.

Thank you.

Our World,
Our Energy,
Our Destiny.

Thank You

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GLNG Project, Curtis Island
Australia


PNG LNG load out jetty
Papua New Guinea


Dua field pipe lay for tieback to
Chim Sáo FPSO, Vietnam


Oyong producing platform, East Java
Indonesia


Maleo producing platform, East Java
Indonesia

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