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Environment Protection and Biodiversity Conservation Amendment (Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development) Bill 2012

APPEA Comments

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1. Introduction

The Australian Petroleum Production & Exploration Association (APPEA) is the peak national body representing the oil and gas exploration and production industry, including the coal seam gas (CSG) and liquefied natural gas (LNG) industries. Collectively our membership accounts for around 98 per cent of Australia's oil and gas production.

The opportunity presented by CSG for Australia is unmatched by any other commodity. Australia's CSG resource places the nation in a position to maintain long-term, clean energy security domestically and also internationally through LNG exports. CSG makes it possible for Australia to meet growing energy needs over the coming decades while incorporating a strategy to curb greenhouse emissions and address the risk of global climate change.

Like all societies around the world, Australia faces three major, interdependent challenges:

1. to maintain and expand energy supplies to meet growing consumer demand
2. to address the social and ecological risks posed by rising greenhouse gas emissions and the potential for human-induced climate change, and
3. to continue economic growth in line with community expectations.

The development of Australia's CSG resource should be central to government planning aimed at achieving these objectives. In doing so, Australia can reduce its emissions intensity by developing its CSG resource in a way that will drive economic growth in regional areas and reinvigorate regional towns.

2. What is coal seam gas and how it is produced

2.1. What is coal seam gas

CSG is natural gas from coal and is the purest form of natural gas (methane). As an end use product it is identical to natural gas and can be used for the same purposes including electricity generation, domestic heating and cooking, and also as a primary feedstock in fertiliser production. Methane is odourless, colourless, and non-toxic. Other sources of methane include cattle and other animals, garden compost, and decomposing organic matter in swamps and rivers.

In terms of potential resources, there may be in excess of 250 trillion cubic feet of CSG in Australia[1], equivalent in energy content to over 40 billion barrels of oil and enough to run a city of five million people for 1000 years.

[1] *Australian Energy Resources Assessment*, Australian Government, http://www.abare.gov.au/publications_html/energy/energy_10/ga_aera.html

2.2. CSG exploration and production

CSG exploration and production can be divided into four basic stages:

1. Core wells: These take physical samples of rocks which are analysed in the laboratory for properties such as gas content. Core wells may be drilled at a density of approximately one every 30 km^2.

2. Seismic: In some cases more information is required to understand the depth and geology of the resource under the ground and this is provided by seismic.

3. Pilot test wells: Also known as appraisal wells these are drilled to demonstrate that gas can flow to the surface in commercial volumes. Pilot test wells are normally drilled in groups of three to five with each well approximately 750m apart and each pilot test spaced several kilometres apart.

4. Production wells: These are drilled to supply gas to customers and vertical wells may be spaced some 750m apart. Horizontal wells (separate laterals within the coal seams) may be clustered on pads and more widely spaced. One CSG well on a 15m x 15m plot can produce the equivalent energy as 85,000 tonnes of coal.

The above estimates are provided as a guide only as the nature of each CSG project is tailored to suit landholder and environmental requirements in addition to geology. For these reasons there is no one-size-fits-all solution for CSG development.

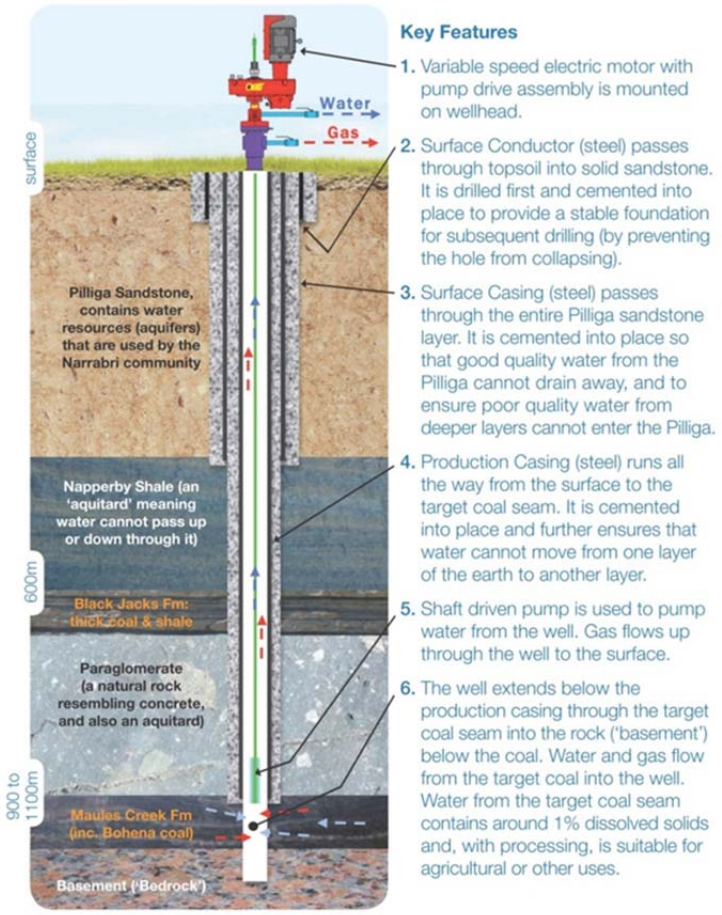
2.3. Well construction

CSG wells are the lifeblood of the CSG industry and represent a major investment by CSG companies. A great deal of effort goes into their construction to ensure that wells are isolated from overlying geological strata, including overlying aquifers. They are designed and constructed using proven procedures and equipment. An unsuccessful well that leaks water or gas will be unproductive and must be sealed and redrilled at great expense.

CSG wells use essentially the same drilling technology as that used by the water bore drilling industry, the geothermal industry, and the mining industry. Relative to water bores CSG wells are constructed and completed to a significantly higher standard to ensure well isolation and control.

A basic schematic of a CSG well is shown in the figure below, however well design varies to account for the geology of the area.

Figure 1 – Basic schematic of a CSG well



2.4. Well completion methods

Coal seams typically consist of a matrix of natural fractures that allow gas and water to move through the rock to a wellbore. However, these may allow only a slow rate of flow. After a well is drilled down to the coal seams and isolated from the overlying strata, work may be undertaken to increase the flow of gas into the wellbore to commercial rates.

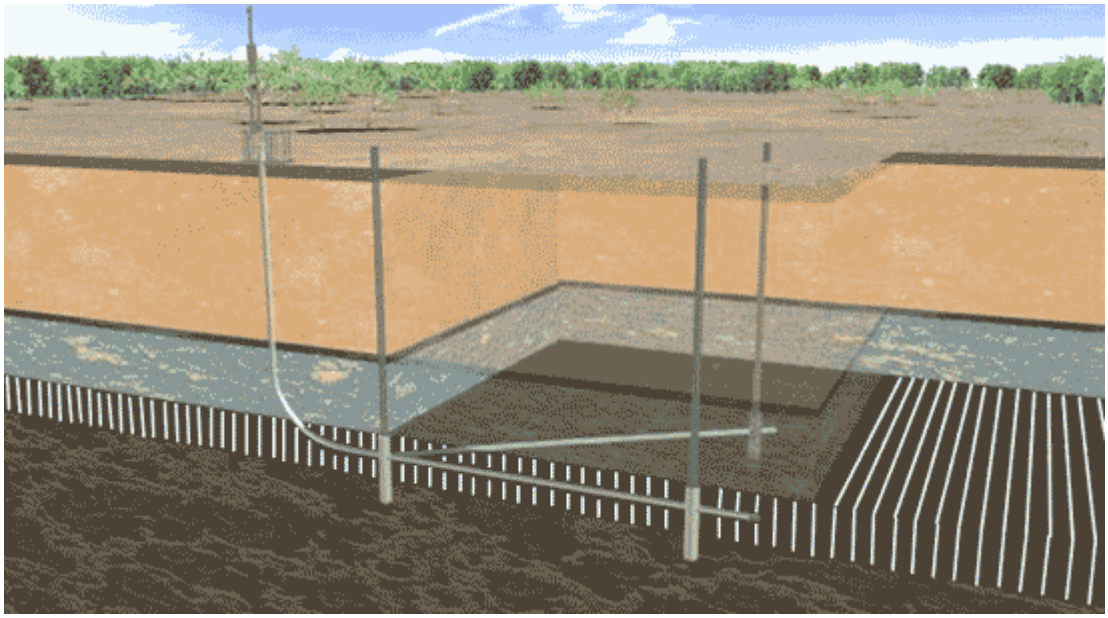
A number of methods have been developed to increase the flow with each one typically suited to different coal characteristics. Two methods that have been employed in NSW are:

- drilling long horizontal wells through the coal seam; or
- fracture stimulation of the coal seam to connect the wellbore to the existing natural fracture network

Horizontal well completions

The figure below shows a horizontal well completion. These are undertaken to increase the surface area of the coal seam that is exposed to the well, which increases the rate of gas flow.

Figure 2 – Horizontal well completion



Fracture stimulation

Fracture stimulation (or 'fraccing') is a process that uses pressure to create an artificial fracture network to allow gas to flow to a well to improve the gas production rate from the well.

Fraccing has been done safely for over 60 years in the United States, where more than one million wells have been fracced, and in Australia since 1968. Government assessments of the facts and science of the process have concluded that it is a safe practice.

For example, the United Kingdom House of Commons released a report on shale gas and fraccing in May 2011[2] which found:

"…no evidence that the hydraulic fracturing process involved in shale gas extraction – known as 'fracking' - poses a direct risk to underground water aquifers provided the drilling well is constructed properly."

[2] *Energy and Climate Change Committee - Fifth Report Shale Gas*, http://www.parliament.uk/business/committees/committees-a-z/commons-select/energy-and-climate-change-committee/news/new-report-shale-gas/

The findings of the House of Common report are consistent with those of the 2004 United States Environmental Protection Agency study[3] which was specific to CSG and concluded that "that the injection of hydraulic fracturing fluids into [coal seam gas] wells poses little or no threat to [underground sources of drinking water]". The EPA is currently updating this study.

Contents of fluids used in fracture stimulation are not secret and can be found on the APPEA website www.appea.com.au/images/stories/mb_files/APPEA_fraccing_chemicals.pdf.

Changing land use

It is notable that the industry continues to refine operating practice to minimise surface disturbance. An example of the changing nature of the industry is illustrated in the images below.

The first image captures the Lauren field in the Surat Basin which was developed the way it was, during the drought years, in a manner that fitted both the landholder and the company at the time.

[3] *Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs Study* (2004), http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells_coalbedmethanestudy.cfm

This is in contrast to the Berwyndale field in the Surat Basin shown below which has been developed more recently, and demonstrates the results of proponents working closely with landholders to optimise the layout of infrastructure and minimise disruption.

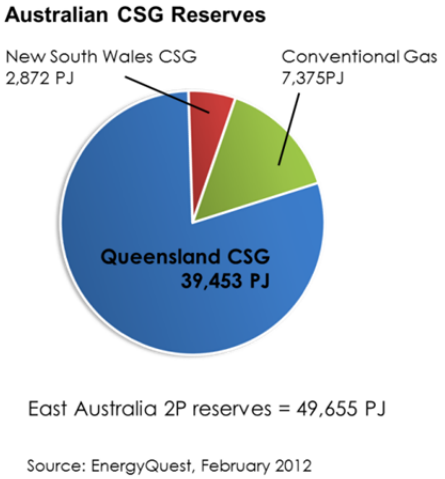
2.5. Key industry data

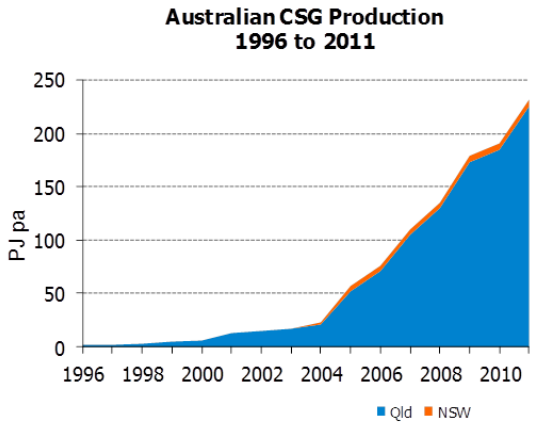
APPEA has recently released key statistics for the CSG industry which are presented below.

		NSW	Queensland
Number of CSG wells	as at end 2011	249	3,261
Water produced (ML)	calendar year 2011	218	15,759
Water monitoring bores	as at end 2011	60	626
Signed land access agreements	as at end 2011	112	2,459
Formal disputes of access agreements	as at end 2011	-	-
Direct employees	as at end 2011	190	4,388
Contractor employees	as at end 2011	59	7,476
Total employees	as at end 2011	249	11,864
Community engagement events	calendar year 2011	177	366
Community contributions	calendar year 2011	$ 305,000	$ 52,781,000

In total, some 7,000 petroleum wells (including all oil and gas wells) have been drilled in the history of Queensland. To put this figure in perspective, the state of Texas where the industry has operated for 146 years has a higher agricultural output than Queensland by value, 40 per cent of the land mass, and has seen 218,556 petroleum wells drilled over the life of the industry.

In terms of reserves, production, and consumption CSG now accounts for 83 per cent of eastern Australia's gas reserves, and the industry supplies all of Queensland's natural gas and around one third of eastern Australia's total gas.





2.6. Water production

The latest industry data for the three approved Surat Basin LNG projects indicates average water production over project life will be 75,000 – 85,000 ML per year. The industry estimate is based on detailed groundwater modelling calibrated using actual water production figures for the projects.

An independent estimate of water production will be forthcoming in the Queensland Water Commission's underground water impact report.

3. APPEA comments on the Bill

3.1. Background

The Bill amends the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) to establish an Independent Expert Scientific Committee (the Committee) on Coal Seam Gas and Large Coal Mining Development.

The Bill creates a new Division under Part 19 of the EPBC Act to establish the Committee as an independent statutory committee with responsibility to:

- advise on research priorities;
- advise on bioregional assessments in areas of high potential impact from coal seam gas and/or large coal mining developments, including providing advice to the Commonwealth Minister for the Environment on the priority areas in which these assessments should be undertaken;
- advise on research and bioregional assessments commissioned by the Commonwealth Minister for the Environment following consideration of the Committee's advice;

- publish information on options for improving the consistency and comparability of research in this area including in relation to the development of leading practice standards in relation to the protection of water resources from the impacts of coal seam gas and large coal mining developments;

- provide the Environment Minister and the appropriate Minister in declared state and territory governments with expert scientific advice relating to coal seam gas and large coal mining development proposals that may have a significant impact on water resources; and

- provide advice outside this scope in certain circumstances.

APPEA notes that the role of the Committee is further defined in the second reading speech made by the Minister for Sustainability, Environment, Water, Population and Communities. We note that:

- the establishment of the committee is intended to build confidence in government assessment processes;

- the environment minister must seek and take account of the committee's advice in certain circumstances;

- the committee will provide scientific advice on proposed coal seam gas developments that are likely to have a significant impact on water resources, and that this advice will be provided within two months of the date of request;

- the committee will be an open committee that will provide regular public updates of its work on a dedicated website and publish its advice and the outcomes of bioregional assessments and commissioned research.

3.2. Key comments

APPEA supports the overriding intent of government in establishing the Committee. In recent years it has been evident that there is a low level of understanding of and, consequently, confidence in government environmental approval processes. Community confidence in the environmental approvals process for resource industry projects is critical not only to the industry's success but to Australia's economic wellbeing and APPEA welcomes moves by government to increase this.

However, at the same time it must be recognised that requirements placed on proponents to obtain environmental approvals in Australia are already extensive. The CSG industry in particular has seen a proliferation of new approvals requirements that have greatly added to the regulatory burden on the industry. APPEA supports a rigorous, outcomes and science based assessment and approvals system, but by going beyond this and applying "tougher" standards to the CSG industry activities than to comparable activities Australia places at risk our future economic growth and our ability to

meaningfully respond to climate change. Similarly, imposing new approvals processes that duplicate what already exists must be avoided.

In this context we note that on 13 April 2012 the Council of Australian Governments (COAG) agreed to fast track the removal of red tape for environmental assessments and approvals. This was in response to calls from the broader business community to address the significant delays in environmental approvals caused by duplicative approvals processes across federal and state systems.

APPEA considers that it is critical that the establishment of the Committee does not add to approvals timeframes or duplicate the approvals processes already established for CSG projects at the state and federal level. It is therefore with concern that we note that Item 1 of the proposed amendments (to be made after subsection 130(4)) would "stop the clock" on the prescribed time in which the minister is required to make a decision on approval until the Minister has received the Committee's advice.

The result of this provision is to add up to two months onto the already lengthy approval processes for major CSG projects as a result of the Committee's deliberations. Should the Committee's advice lead to substantial revisions of pending approvals and/or project requirements there would be an additional and considerable delay to approvals.

It is unclear to us why the advice of the Committee should be treated any differently to other advice considered by Government in granting environmental approvals and therefore why the seeking of advice from the Committee should halt progress on environmental approvals. Further, given that environmental approvals are already comprehensive in our view it is likely that the Committee's advice will duplicate that provided to government under existing processes. While a "second opinion" from the Committee is not unwelcome, APPEA considers there is no justification for extending approvals timeframes.

APPEA instead considers that the Committee should be brought in at an early stage of the approvals process to avoid the potential for Committee advice at a late stage of the process delaying approvals being issued. With respect to major projects undergoing EIS approvals, by seeking the Committee's advice when the terms of reference are set the Minister can ensure the advice is taken into account at an early stage which will reduce the possibility of unnecessary delay in approvals.

In addition, we note that when first announced the apparent intention was that the Committee's role was to provide comments on project applications being assessed by State governments rather than the Commonwealth under the EPBC Act. However, the drafting of the legislation will result in the Committee having a role at both stages meaning where separate State and Commonwealth approvals are required the Committee will be providing advice on the same application twice. This is a direct duplication of assessment.

By way of more detailed explanation, Section 131AB of the Bill provides that the Commonwealth Minister must obtain advice from the Committee for CSG and large coal

mining development – this resides under the controlled action section and relates to EPBC Act approvals. This is in addition to the National Partnership Agreement on the same issue which requires that States seek advice on these types of projects (under Clause 15). The Committee will therefore see the same application twice.

Further, in our view when the Committee is dealing with an EPBC matter their scope should be related to water impacts where it is within the scope of the matters of national environmental significance and should not have unlimited scope to deal with any impacts on water. This would be in line with existing arrangements under which the Commonwealth Minister can only make a determination on matters relating to MNES.

APPEA submits that if COAG is to achieve its aim of reducing red tape for major projects then the parts of the Bill that duplicate approvals processes must be amended.

3.3. Committee focus

APPEA considers that the most benefit from the Committee's work can be gained by focussing on "pre-competitive" assessments in areas that are potential future growth areas rather than the areas where the industry is already operating.

This would recognise the fact that approved and operating projects and those currently seeking environmental approvals are already conducting a major and ongoing research programme in addition to the work undertaken by regulators and third parties.

In a presentation given by APPEA to the interim Committee in February this year, the extensive research programme being undertaken by the CSG industry was outlined. A listing of projects being undertaken either by the industry or by the industry in partnership with third parties is provided below.

Queensland CSG proponent led research

- InSAR ground movement satellite analysis for subsidence assessment
- Gas and water isotope studies
- Low volume deep sampling trials and comparisons
- Aquifer Injection:
    - Detailed geochemistry around Aquifer Injection and development of hydrogeochemical modelling
    - Clogging evaluation
- Irrigation R&D:
    - Water use efficiency

    - Salt fate and transport in the soil and geological profile
    - Options for treatment of SAR issues in CSG water
- Aquifer connectivity studies:
    - Multi-level piezometers, both near and far from fault zones
    - Pumping tests
    - Centrifuge Permeameter testing of aquitards
    - Effective vertical hydraulic conductivity evaluations
- Salt Recovery and Commercialisation opportunities
- Brine Injection opportunities
- Ecological impacts of discharge of treated CSG water to surface water
- Regional soil salt inventory and risks of loss of salt to Murray Darling river system
- Socioeconomic, Biodiversity and Marine
- Application of low volume deep sampling techniques

Gas Industry Social and Environmental Research Alliance (GISERA) research

Agricultural land management

- Shared space - understand how farmers from a range of production systems extensive grazing to intensive cropping) perceive and value CSG developments on their and others' farms.
- Preserving agricultural productivity – understand the impact of landscape change on agricultural productivity at local through to regional scale.
- Gas farm design – understand how to design farms for a new mixed land use.
- Making tracks, treading carefully – understand the direct and indirect impacts of tracks and traffic on invasive species and erosion in agricultural landscapes.
- Without a trace – identify the nature and likely extent of damage to agricultural soils, and methods for avoiding and improving soils.

Socio-economic

- Monitoring regional transition – synthesise existing knowledge on the nature of rural socio-economic transitions occurring as a result of resource developments, and track the social impacts of regional economic change.

- Community functioning and well-being – identify principal indicators of community function and well-being, the resources and strategies necessary for enabling and enhancing community responses, and how communities respond to major developments in their region.

- Planning for socially sustainable communities – predict requirements for social services and infrastructure based on population mobility at local, regional and state-wide scales.

- Exploring sustainable business development in Southern Inland Queensland – identify pathways for economic diversification of the Southern Inland Queensland economy through the development of new industries that will be viable after the resource boom has ended.

- Understanding community aspirations - identify community aspirations and their overlaps/disparities with existing resources, industry, and policy trajectories

Surface and groundwater

- Isotope and geochemical groundwater baseline study - characterise the baseline geochemistry of groundwater and formation water prior to and during initial stages of development to understand groundwater age and origin.

- High performance groundwater modelling – determine the feasibility of large scale re-injection schemes.

- Geochemical responses to re-injection – understand and quantify aquifer reactions occurring due to re-injection of CSG water, and their impacts on water quality.

- Re-injection of CSG water – understand and quantify clogging of injection wells and its management during re-injection of CSG water permeates, brines and blends.

Biodiversity

- Biodiversity knowledge hub for Queensland – develop an online ecological overview of the region, and use it to discover the kinds of biodiversity information that connects with communities' needs and expectations.

- Fire ecology – understand the impact of fire on species and ecosystems in the region.

- Threatened species ecology – understand the threats to vulnerable species

- Landscape planning – evaluate a range of options for increasing the effectiveness of conservation in the region

Marine

- Sustaining turtles and dugongs and their habitat – establish baseline data on distribution and abundance of seagrass within Port Curtis. Understand the movement and feeding habitats of turtles and dugongs in Port Curtis and environs

- Integrated modelling –understand the local and cumulative effects of discharges and dredging on the visual conditions and seagrass ecosystems in Port Curtis.

- Marine offsets – Establish links between water quality, threats to food supply and swimming behaviour of turtle and dugongs and, hence, risks to turtle and dugong populations

Galilee Basin water assessments

- Regional desktop appraisal (whole of Basin study by Galillee Basin Operators Forum)

- Local water assessment (both surface water and groundwater)

- Local (dedicated) monitoring network (WLs & WQ)

- Specialist water quality sampling and isotope analysis

- Numerical modelling

NSW CSG proponent led research

Studies and research completed

- CSIRO study on "A desktop study of the occurrence of Total Petroleum Hydrocarbon (TPH) and partially water-soluble organic compounds in Permian coals and associated coal seam groundwater "

- CSIRO study on "Assessment of hydraulic fracture height growth potential for treatments in the Illawarra Coal Measures"

Partnerships

- University of Newcastle (peer reviews, possible PhD studies)

- University of Wollongong (possible produced water/brine and membrane technology studies):

    - Camden water assessments

  - Sub-regional desktop appraisals
  - Sub-regional detailed groundwater assessment
  - Dedicated monitoring network (water levels (WLs) and water quality (WQ))
  - Specialist water quality sampling and isotope analysis
- Hunter water assessments
  - Regional desktop assessment
  - Dedicated monitoring networks (WLs and WQ)
  - Specialist water quality sampling and isotope analysis
- Gloucester water assessments
  - Sub-regional desktop appraisals
  - Sub-regional detailed water assessment (both surface water and groundwater)
  - Dedicated monitoring network (WLs & WQ)
  - Specialist water quality sampling and isotope analysis
  - Fault zone assessments
- Produced water management
  - Irrigation trials

4. Conclusion

APPEA believes that the Committee can play an important role in bringing science to the debate CSG development. We have consistently argued for decisions made on the industry to be based on science and the Committee is consistent with this position.

APPEA is however concerned that the Committee's work will duplicate existing processes and will significantly add to approvals timeframes at the same time as COAG has committed to reducing duplication and reducing timeframes.

Australia is competing for resource industry investment in a highly competitive global market and the timeliness of approvals has a real and significant impact on the attractiveness of Australia as an investment destination.

APPEA urges the Environment and Communications Legislation Committee to recommend that the Bill be amended to ensure existing timeframes for approvals are not impacted by the work of the Independent Expert Scientific Committee.