Narrabri Gas Project

Comments on Response to Submissions

Santos' response to submissions on its Narrabri Gas Project does not dispute most of the flaws identified in The Australia Institute's initial submission. The economic assessment of the Narrabri Gas Project continues to be misleading and does not comply with NSW assessment guidelines. The benefit cost analysis by consultants GHD is contradicted by the proponents' financial statements and analysis commissioned by the Australian Energy Market Operator.

Tony Shields
Rod Campbell
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Summary

Santos' Response to Submissions on the Narrabri Gas Project (Project) does not seriously dispute any of the claims made in The Australia Institute's earlier submission:

- There are major discrepancies between the economic and financial values claimed in the assessment and those reported in the owners' financial statements.
- The cost benefit analysis assumes very low operating costs, lower than estimates from an analysis commissioned by the Australian Energy Market Operator.
- The cost benefit analysis is based on data provided by Santos and not verified in any way by consultants GHD.
- The cost benefit analysis is highly likely to be strongly distorted by optimism bias and strategic misrepresentation, which is highly prevalent in Project assessment.
- Santos has a history of optimistic gas price forecasts.
- There is inadequate assessment of environmental costs.
- There is no need for the Project – Australia is producing more gas than ever before.

In addition, the recent bid by Harbour Energy demonstrates the potential for a takeover of Santos by foreign investors. GHD's assessment is based on 87% Australian ownership, a level that is already higher than reported in the media. Further foreign ownership would necessitate a reassessment of benefits to the NSW community to be in line with *NSW Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals* (NSW Guidelines) on economic assessment.

The Project should not be approved by NSW authorities.

Introduction

The NSW Department of Planning and Environment received 23,007 submissions in relation to the Environmental Impact Statement (EIS) that Santos submitted in 2016 for its Project. The Australia Institute wrote a 30 page submission (our submission) which pointed out the inadequacies of the benefit cost analysis which GHD conducted as part of the EIS. Santos' Response to Submissions (Santos' Response) does not substantially dispute these criticisms, instead it either ignores the issue or it states that its assessment is in line with the appropriate NSW Guidelines.[1] On only a limited number of issues does Santos actually dispute points in our submission.

Below we discuss Santos' Response. We do not repeat the arguments which can be found in our submission.[2] We also discuss the takeover bid for Santos by a foreign entity which was announced on 3 April 2018. If this takeover were to occur it would dramatically reduce the benefits, if any, that would flow from the Project.

[1] Santos (2018) *Narrabri Gas Project: Response to Submissions*.

[2] Campbell and Shields (2018**)** *Narrabri Gas Project: Submission,* The Australia Institute, May 2017.

Benefit cost analysis of Narrabri Gas Project

AUSTRALIA INSTITUTE KEY POINTS ON FINANCE AND COSTS NOT DISPUTED BY SANTOS

Our submission stated that the benefit cost analysis of the Project is misleading, heavily understating the costs of the Project. We pointed out that:

- The GHD benefit cost analysis implied that the total Project was worth $2.2 billion, however both Project owners (Santos and CLP Group) value the Project at zero. Santos' Response does not dispute this contradiction or explain it. Instead it simply says that Santos has met the NSW Guidelines.[3] Some of the difference in valuations could be due to different discount rates. However, in our submission, we pointed out that the benefit cost analysis calculated a net present value (NPV) of around $1.1 billion for the Project when a 10% discount rate was used. CLP Group, the other owner of the Project, calculated the value of the Project using almost the same discount rate (10.5%) and calculated that the Project was worthless. Santos does not explain this contradiction.

- The GHD benefit cost analysis assumes capital and operating costs far below published estimates by other analysts. In 2015 the Australian Energy Market Operator (AEMO) commissioned analysis that included estimates of gas production costs in the Gunnedah Basin which includes the Narrabri Gas Project area. It estimated costs of between $6.53 and $7.98 per gigajoule (GJ), with a central estimate of $7.25/GJ. Even without allowing for inflation or any discounting of future costs, GHD's costs per gigajoule are lower than AEMO's most optimistic scenario, $6.25/GJ compared to $6.53/GJ. As soon as any inflation, financing costs, risk and uncertainty are considered through a discount rate, GHD's costs are far lower than those commissioned by AEMO. Exact comparison is difficult without more information on both studies, but GHD's central present value cost per gigajoule is just 34% of AEMO's central value, at $2.48/GJ. Santos' Response does not dispute this contradiction or explain it. Instead it simply says that Santos has met the NSW Guidelines.[4]

[3] Santos (2018) *Narrabri Gas Project: Response to Submissions*, p6-264.

[4] Santos (2018) *Narrabri Gas Project: Response to Submissions*, p6-264.

VALIDATION OF ASSUMPTIONS

GHD's original assessment, as noted in our submission, stated:

> *GHD has prepared this report on the basis of information provided by Santos which GHD has not independently verified or checked beyond the agreed scope of work…It was outside the scope of this analysis to independently appraise project parameters such as forecast gas prices, capital and operating costs and gas production estimates.*

The NSW Guidelines with which this benefit cost analysis should comply, require the economic assessment to 'be based on rigorous, transparent and accountable evidence that is open to scrutiny'. Cost and production data in the GHD analysis are not rigorous or transparent, and have not been subject to scrutiny even by GHD, contrary to the NSW Guidelines. Santos has not provided any more information than that in the GHD benefit cost analysis to enable others to evaluate the analysis[5] nor has it sought to explain the contradictions and inadequacies which we have highlighted.

CONSIDERATION OF OPTIMISM BIAS

GHD's lack of independent appraisal and rigour is typical of large project assessments. Nobel laureate, Daniel Kahneman, and Amos Tversky, have outlined the systematic biases that are common in such assessments, including optimism bias, strategic misrepresentation and principal-agent misalignment of objectives. The world's most cited scholar on major project assessment, Bent Flyvbjerg points out:

> *Success in megaproject management is typically defined as projects being delivered on budget, on time, and with the promised benefits. If, as the evidence indicates, approximately one out of ten megaprojects is on budget, one out of ten is on schedule, and one out of ten delivers the promised benefits, then approximately* ***one in one thousand projects is a success****, defined as "on target" for all three. Even if the numbers were wrong by a factor of two—so that two, instead of one out of ten projects were on target for cost, schedule, and benefits, respectively - the success rate would still be dismal, now eight in one thousand. This serves to illustrate what may be called the "iron law of megaprojects":* ***Over budget, over time, over and over again****.* ***Best practice is***

[5] Santos (2018) *Narrabri Gas Project: Response to Submissions*, p6-257.

> ***an outlier, average practice a disaster*** *in this interesting and very costly area of management.*[6]

In reference to benefit cost analyses, Flyvbjerg further writes that:

> *When cost and demand forecasts are combined, for instance in the cost-benefit analyses that are typically used to justify large infrastructure investments, the consequence is inaccuracy to the second degree**. Benefit-cost ratios are often wrong, not only by a few percent but by several factors**. As a consequence, estimates of viability are often misleading, as are socio-economic and environmental appraisals, the accuracy of which are heavily dependent on demand and cost forecasts. These results point to a significant problem in policy and planning:* ***More often than not the information that promoters and planners use to decide whether to invest in new projects is highly inaccurate and biased making plans and projects very risky****.*[7]

Our submission cited studies that found the financial forecasts for oil and gas projects are just as likely as other projects to suffer from optimism bias and strategic misrepresentation. Santos' Response does not dispute the dangers or extent of optimism bias and strategic misrepresentation. Nor does it dispute our recommendations. Instead, Santos' Response simply claims to have complied with the NSW Guidelines, which do little to help decision makers understand or avoid such problems.[8]

OPTIMISTIC GAS PRICES

Santos has a history of making optimistic oil and gas price forecasts and this was present in the gas price forecast it supplied to GHD. Santos does not dispute its history of optimistic oil and gas forecasts. We have updated the table in our previous submission which highlighted Santos' history of optimistic oil price forecasts. While Santos' most recent forecast for oil prices for the next two years is conservative, its forecasts for the longer term, ie 2021 onwards (when the Project is forecast to start producing), are still some 15% higher than compared to those implied by the futures market.

[6] Flyvbjerg (2014) *What you should know about megaprojects and why….,* p11, emphasis added.

[7] Flyvbjerg (2008) *Curbing Optimism Bias and Strategic Misrepresentation in Planning…*, p5, emphasis added.

[8] Santos (2018) *Narrabri Gas Project: Response to Submissions*, p6-256, p6-257.

Table 1: Santos oil price forecasts

	Brent oil price: $US/barrel						
	2015	2016	2017	2018	2019	2020	2021 onwards
Santos oil price forecast Dec 2014	$55	$70	$80	$90	$90	$90	$90
Santos oil price forecast Dec 2015		$40	$60	$70	$75	$75	$75
Santos oil price forecast Dec 2016			$60	$70	$75	$75	$75
Santos oil price forecast Dec 2017				$55	$60	$65	$70
Historic average price	$52	$44	$54				
Brent Oil Financial Futures April 2018				$75	$69	$64	$59

Sources: Santos (2015) Santos Annual Report 2014, p52, Santos (2016) Santos Annual Report 2015, p60. Santos (2017) Santos Annual Report 2016, p77. Santos (2018) Santos Annual Report 2017, p79. Statisita (2018) UK Brent Oil Price Changes since 1976 https://www.statista.com/statistics/262860/uk-brent-crude-oil-price-changes-since-1976/. CME Group (2018) Brent Last Day Financial Futures Quotes. Price quoted for June each year. 2021 onwards is an average of the forecast June price for years 2021-2025. http://www.cmegroup.com/trading/energy/crude-oil/brent-crude-oil-last-day.html.

Santos states that the forecast gas price used in the benefit cost analysis is within the NSW Division of Resources and Geoscience expected range of future gas price prices in the east coast gas market. Santos' general response to this topic is to state:

> *The positive outcome of the cost benefit analysis was found to be relatively insensitive to a range of variation in the in the* [sic] *input assumptions. The most extreme test was a reduction of 30 per cent in the gas price, which resulted in a net present value close to zero and a benefit cost ratio of close to one, under which circumstance the project would be of no economic value to the community.* [9]

[9] Santos (2018) *Narrabri Gas Project: Response to Submissions*, p6-257.

Given the volatile nature of energy markets, the claim that testing a change of 30% in gas price is in any way 'extreme' is extraordinary, and entirely symptomatic of the optimism problems identified in economic literature by authors such as Flyvbjerg.

NO DISCUSSION OF GAS PIPELINE

Our submission highlighted that the Project requires a $450 million gas pipeline and this further increases the likelihood of project delays and cost over-runs which reduce the net benefit of the Project. The construction of the pipeline is omitted entirely from the GHD assessment. The Santos Response does not dispute the need for the pipeline, or update the assessment to include it. The Santos Response claims some cost for transportation of gas is included in operating costs.[10]

COSTS OF POTENTIAL ENVIRONMENTAL EXTERNALITIES

Our submission highlighted the uncertainty around external costs such as groundwater contamination, which could have a devastating impact on farms and ecosystems. It is difficult to predict the probability and value of such impacts, but GHD's assessment simply considered the risk of such events as low and ignored them.[11] Similarly, the Santos Response simply states that the cost benefit analysis was undertaken in line with the stated requirements.[12]

Santos' Response does not comply with NSW Guidelines, which state:

> *Guidance on how to identify and value these impacts of the project is expected to be provided in Technical Notes. Regardless of whether a Technical Note has been released, proponents are expected to address each of the following issues…*[13]

There is a Technical Note addressing groundwater, which states that an assessment should consider:

[10] Santos (2018) *Narrabri Gas Project: Response to Submissions*, p6-257.

[11] GHD (2016) *Narrabri Gas Project – Environment Impact Statement Economic Assessment, p10.*

[12] Santos (2018) *Narrabri Gas Project: Response to Submissions*, p6-258, 6-259.

[13] DPE (2015) *Guidelines for the economic assessment of mining and coal seam gas proposals*, p16.

The potential impacts of the proposed project, including maximum potential impact, and the level of confidence for model projections.[14]

Santos and GHD's approach of assuming no impact does not comply with the NSW Guidelines or the more recent Technical Note. The possibilities of human failure and communication failure are very high, especially over the long 25 plus year construction and production life of the Project. The incentives to cut corners and save costs to improve the bottom line are strong in marginal projects such as this and such risks should be considered in economic assessment. GHD's single paragraph on groundwater is clearly inadequate.

Our submission also highlighted research from overseas and by University of Melbourne researchers that raise increasing concern about carbon emissions from coal seam gas. The research has found that emissions which occur as part of the coal seam gas production process (termed 'fugitive emissions') may be significantly underestimated. This is particularly due to methane which is emitted as part of the production process. Methane is a powerful contributor to greenhouse gas emissions. Santos does not dispute these concerns and simply states that it has met the stated requirements.[15]

REGIONAL ECONOMIC AND SOCIAL IMPACT

Our submission pointed out that the economic and social impacts of coal seam gas are uncertain. A report by The Australia Institute based mostly on gas industry funded research found that local businesses in unconventional gas regions in Queensland believe that gas development led to deterioration in their finances, local infrastructure, social connections and labour force skills. The research also found a decrease in social cohesion.[16] Santos does not dispute this research but instead points to the limited temporary economic benefits that last for the short period of construction.

[14] DPE (2018) *Technical Notes supporting the Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals*, https://www.planning.nsw.gov.au/Policy-and-Legislation/Mining-and-Resources/~/media/B64341A77D124B9FA5CC15315505C5F1.ashx

[15] Santos (2018) *Narrabri Gas Project: Response to Submissions*, p6-259.

[16] Ogge (2015) *Be careful of what you wish for,* The Australia Institute.

THE NECESSITY OF THE PROJECT

Santos states that the Project is necessary to supply a shortage of gas in the NSW market. Santos' record on predicting gas shortages is poor, as shown in Figure 1:

Figure 1: 2016 Santos prediction of NSW energy crisis


NSW

Gas shortages set to hit NSW as energy crisis looms: Santos boss James Baulderstone claims

September 24, 2014 5:33am
Geoff Chambers The Daily Telegraph

Source: Daily Telegraph

Our submission pointed out that due to gas market pipelines connecting the eastern states there is no stand-alone NSW gas market instead there is an east coast gas market. In this market, over time and provided there is sufficient competition or regulation, the gas price will move towards parity with the Asian gas price due to the existence of three LNG plants at Gladstone.

We pointed to the downward pressure on gas prices into the future from the rapidly decreasing price of renewable energy. Renewable energy can be produced at very little marginal cost making it hard for other energy sources to compete. The EIS forecasts a revenue stream from the Project based on a constant gas price of $A8.70 per GJ received over the 25 year life of the Project. Making such a prediction so far into the future given the likely downward pressure on energy prices from renewable energy is difficult and should have come with a much wider range of sensitivity analysis.

Our submission pointed out that gas prices are currently high due to Gladstone LNG producers buying up domestic gas to supply export markets because their estimates of gas production from their own gasfields have proven to be over-optimistic. We also pointed out that over time the East Coast gas price will reduce to be on parity with the world gas price as gas consumers turn to cheaper alternative energy sources (e.g. renewable energy) or LNG producers choose to supply the higher priced domestic market instead of exporting. Santos does not dispute this.

The gas price is very volatile. It fell by more than half between 2014 and 2016. This makes predictions of gas prices more than 25 years into the future very difficult.

Other parts of Santos' Response

DRG SUBMISSION

Santos' discussion of the submission from the NSW Division of Resources and Geoscience (DRG) also discusses a shortage of gas. As discussed above and in our submission, there is no shortage of gas – gas is just not available at the price it was in the past. Over time the forces of reduced demand and increased supply will bring the domestic price of gas into alignment with the Asian parity price.

Santos noted that the DRG concluded that both the total amount of gas to be produced from the Project and the maximum rate per annum is achievable. Once again we note this assumption is likely to suffer from over-optimism and strategic misrepresentation.

Santos' Response contains an assessment of alternatives to the Project.[17] Once again, Santos states that there is a shortage of gas and quotes a report by the AEMO in support of this. Once again Santos ignores how the market forces of increased supply and reduced demand will over time bring the Australian gas price down to parity with the world gas price.

PROJECT COMMITMENTS

While Santos commits to reduce environmental impacts, the reality is that there is a probability that these commitments they will not be kept over the 25 year life of the Project and beyond. This needs to be reflected in the economic assessment and the wider assessment of the Project. Human error and the incentives to cut corners and cut costs to improve the bottom line will be ever present through the Project's life. Strong regulators can reduce the probability of non-compliance but will certainly not eliminate it.

Of note are Santos commitments regarding rehabilitation after the Project is completed. Despite resource companies' commitments to rehabilitate sites, in reality this is rare. There are an estimated 60,000 abandoned mine sites and features in Australia. There has never been a major open cut mine closed, completely

[17] Santos (2018), p6-46

rehabilitated and relinquished.[18] No coal seam gas site has ever been fully rehabilitated and relinquished due to the recent nature of the industry, but the record of the wider mining and extractive industry is poor.

[18] Campbell et al (2017) *Dark side of the boom,* http://www.tai.org.au/content/dark-side-boom

Possible takeover of Santos

Santos is described in the media as a "takeover target," and the possibility of a takeover by foreign investors has been the subject of speculation for several years.[19] On 3 April 2018 a US firm, Harbour Energy, launched a $6.50 a share takeover bid for Santos which values Santos at $13.5 billion. The Santos board considered, but ultimately rejected the bid.[20] The Harbour bid could still be refined and other takeover proposals may emerge. If a successful takeover were to go ahead prior to the approval and commencement of the Project there could be significant implications for estimated benefits to NSW, that have to be considered in line with NSW Guidelines.

GHD's benefit cost analysis is based on 87% Australian ownership of Santos.[21] If Santos is taken over by a foreign owner, the benefits to Australia from the Project could reduce substantially, as any profit would instead go to foreign shareholders. Arguably, some portion of the sale price reflects a valuation of the Project and a realised benefit by current Australian owners. This is likely to be very small given Santos' record of giving the Project low-priority. If the takeover proceeded before approval, this would represent a 'sunk benefit' to the Australian community and is not appropriate to include in cost benefit analysis. GHD's analysis should be adjusted to consider the possibility of takeover.

We believe that the GHD calculated net present value (NPV) of the Project is highly likely to be over-stated and could well be zero, in which case there is no benefit of the Project in the event of a foreign takeover of Santos. Even if the calculated NPV is accepted, the foreign takeover of Santos dramatically reduces the NPV and requires that the benefit cost analysis of the Project be recalculated.

[19] Macdonald-Smith (2018) *Santos chases deals as US suitor works up bid*, http://www.afr.com/business/energy/oil/santos-chases-deals-as-us-suitor-works-up-bid-20180419-h0yztt

[20] Santos Limited (2018*), Receipt of unsolicited, non-binding, indicative and conditional proposal from Harbour Energy and granting of due diligence,* 3 April 2018, https://www.asx.com.au/asxpdf/20180403/pdf/43swtq34zv185g.pdf

[21] Note that this is contradicted by reporting of a 15% stake by Chinese investors alone, Chau and Letts (2018) *Santos loses $1b on stock market, after rejecting Harbour Energy's $14.4b offer*, http://www.abc.net.au/news/2018-05-22/santos-rejects-harbour-energy-offer/9788930

Conclusion

Santos' Response to Submissions on the Narrabri Gas Project does not seriously dispute any of the claims made in our earlier submission. The Project is financially marginal and its benefit cost analysis understates its costs and overstates benefits. It should not be approved by NSW authorities.