Important economic considerations for Australian coalbed methane development

by

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'A secure economic and environmentally acceptable supply of energy is the very foundation of ...civilisation - the corner stone of our industry and of our prosperity. Without such a supply, no modern society could long survive..." (Rt Hon John Wakeham, MP British Secretary of State for Energy 25 April, 1991)

INTRODUCTION

Over the last ten years coalbed methane production in the United States has increased more than ten-fold in volume. For example, in the San Juan and Black Warrior Basins (the two most productive coalbed methane basins in the USA), 1980 production from the two basins combined was in the order of 0.2 billion cubic feet ("BCF"). By 1988, annual production for the two basins combined was some 38 BCF (100 million cubic feet per day).

US industry experts estimated that at the end of 1990 US coalbed methane production was in the order of 624 million cubic feet per day (i.e. 228 BCF per year). Recent estimates of likely production rates by 1993/94 indicate annual US coalbed methane production will reach 730 to 1,000 BCF.

The potential of coalbed methane as an energy source was officially recognised in the USA by the introduction of the Crude Oil Windfall Profit Tax Act of 1980. This Tax Act, introduced at a time of historically high oil prices, addressed many aspects of US energy taxation. One feature was the introduction of a direct tax credit, relating to coalbed methane production. The tax credit was linked to such factors as oil price and inflation levels. The value of the tax credit was estimated to be around US 93 cents per Mscf for 1991 and is anticipated to escalate at 4% per annum. The credit is calculated on production from wells drilled up to January 1st, 1993 and will continue on qualifying wells until January 1st, 2003. The intention of the coalbed methane tax credit in the USA was to stimulate research and development, and subsequent commercial development, of a resource that was considered to be of im

portance to the USA domestic energy supply. It was hoped that this stimulus would lead to a decline in the reliance on imported energy sources. Evidence clearly supports the view that this tax credit achieved its primary purpose and in the USA there is now a burgeoning coalbed methane industry. US Government agencies (such as the Gas Research Institute) have received funding of tens of millions of dollars to pursue technical research projects aimed at commercialising coalbed methane.

Australia, even more so than the USA, has a need to develop its energy resources, particularly a clean burning energy source such as methane gas and one which can add significant value to Australia's economic base. Ongoing and planned industrial growth along the Eastern Seaboard of Australia, and particularly along the Central and Southern coastal regions of Queensland, will be heavily influenced by the availability (or shortage) of a reasonably priced, environmentally friendly, energy feedstock.

Various independent experts have indicated that a world scale coalbed methane resource exists in the Bowen Basin in Central Queensland. Broad comparisons with other conventional gas resources indicate that the potential recoverable coalbed methane resource in the Bowen Basin may exceed the recoverable reserves of the North West Shelf gas project. Development of such a gas resource would bring substantial, long term benefits both locally and nationally. This development process requires a heavy commitment to research and subsequently to exploration and field development.

MARKETS FOR QUEENSLAND'S COALBED METHANE RESOURCE

Gas market opportunities for the Bowen Basin coalbed methane resource exist both domestically, in Southern and Central Queensland, and internationally, particularly in Japan.

Queensland gas market studies highlight:

1. Projected growth in demand for gas in the Southern and Central Queensland gas markets, particularly considering the current and planned industrial developments in Gladstone and the Greater Brisbane area.

2. Dwindling supplies of natural gas from the Surat Basin, currently connected by gas pipelines to markets in Southern and Central Queensland.

3. The likely high cost of gas if the source of gas supply becomes South West Queensland, due to the significant pipeline costs to transport South West Queensland gas to seaboard markets.

4. The emergence of the Queensland Electricity Commission as a potentially major user of gas for power generation purposes.

The Bowen Basin is strategically located close to existing gas pipelines in which significant spare capacity exists.

With respect to potential export markets, a primary opportunity exists to process methane gas into methanol at a plant, located somewhere along the Central Queensland coast, with the methanol being exported to Japan.

In 1990 Mitsubishi Gas Chemical Company Inc. ("MGC") a leading Japanese petrochemical company with a significant share of the Japanese methanol market, acquired a majority interest share in the largest existing coalbed methane exploration permit in the Bowen Basin. MIM has now joined with MGC in this venture. MGC's openly stated objective is to prove up a sufficiently large coalbed methane reserve base to justify construction of a methanol plant on the Central Queensland Coast, with the methanol to feed into the Japanese market.

MIM and other major resource development companies are also actively engaged in intensive R & D programmes in various permit areas, endeavouring to gain access to the expanding Queensland gas market.

Internationally there are now major efforts being made to reduce environmental pollution. For instance, in the US, the Clean Air Act is placing severe requirements on oil companies to reformulate motor fuels by the addition of oxygenates. Demand for methyl tertiary butyl ether ("MTBE"), a process derivative product of methanol, is expected to increase significantly throughout the 1990's, spurring demand for methanol world wide. MTBE is the leading fuel additive product being used in the fuel reformation processes. Studies have predicted that world demand for MTBE over the period of 1990 to 2000 will grow significantly and that demand will continually outstrip supply.

However, even with this capacity expansion it is predicted that there will still be significant shortages in methanol supply.

The presence of a leading Japanese producer and marketer, and a clearly growing world wide demand for methanol, provides Australia with an ideal opportunity to build a significant new export industry. Also, importantly, significant value can be added to the methane produced in the field by way of processing the gas into methanol in Australia. Substantial employment opportunities will emerge, of both long term and short term duration, if the resource is commercialised. New domestic markets, and industrial growth opportunities, will also emerge if the export project materialises. Export earnings for the methanol project are potentially worth billions of dollars.

SUMMARY OF THE POTENTIAL BENEFITS TO AUSTRALIA

Realisation of the domestic and export market opportunities outlined in the preceding section should provide Australia with significant, long lasting benefits. Some of the benefits are direct, some indirect. In summary, the more direct major benefits likely to be realised from the commercialisation of the coalbed methane resource are:-

1. Significant export earnings with a positive impact on Australia's Balance of Payments.

2. Short and long term job opportunities covering the areas of :

- Research and development
- Field exploration and development
- Drilling contracting
- Construction
- Processing plants
- Gas production and transportation
- Ports and harbours
- Trucking and transportation generally
- Raw materials

3. Growth of a broader industrial base, thereby lessening reliance on Australia's traditional, cyclical, sources of earnings (such as primary production).

4. Availability of a reasonably priced, environmentally friendly energy source which will stimulate industrial growth in Central and Southern Queensland. Failure to provide an ongoing source of reasonably priced gas may well jeopardise existing industrial projects in Central and Southern Queensland (eg. Incitec's Brisbane fertiliser plant may be uneconomic if it has to purchase South West Queensland gas)

5. Value adding opportunities - The prospective methanol plant on the Central Queensland coast, (which will rely on methane gas as the feedstock), provides an excellent value adding opportunity through the processing of the methane gas into methanol and possibly other derivative products.

6. Government taxation revenues will increase through higher personal and corporate taxes, sales tax, payroll tax etc.

7. Technology advances, and the strengthening of Australia's industrial and technical skills, (with potential application worldwide), thereby further enhancing export earning opportunities. These technology advances, if realised, may also lead to further commercialisation of Australia's significant coalbed methane resource in other parts of Australia, such as the Sydney Basin.

8. The multiplier effects on the economy as a result of additional economic inputs arising as a result of resource development.

9. Environmental benefits due to the clean burning attributes of methane, versus alternative energy forms such as coal and oil.

10. Availability of a power generation feedstock, thereby avoiding an over-reliance on coal fired plants (and their environmental concerns). Coal export opportunities will not in any way be threatened by methane, hence much of the coal otherwise used for domestic power generation can be exported, thereby increasing export earnings.

11. Increased energy self sufficiency, and a reducing dependence on energy supply from international sources.

LINKAGE TO STRATEGIC NATIONAL OBJECTIVES

Commercialisation of Australia's vast coalbed methane resources impact positively on a number of critical national objectives.

Sustainable Development

Sustainable development is dependent upon availability of a reasonably priced energy feedstock. Long term industrial development projects in Gladstone, for example, will be jeopardised by energy shortages or by energy prices which result in non-economic industrial projects.

Also, coalbed methane developments in their own right will be long term (i.e. twenty to forty years), and the benefits arising from such direct developments will be sustainable in the long term.

Environmental Objectives

The Federal Government has set a target to reduce emissions of greenhouse gases by 20% from their 1988 levels by the year 2005. Achievement of this target will require fundamental, profound changes to energy consumption in Australia. Government projections indicate a 7.8% average annual growth in net crude oil imports over the period 1989/90 to 2004/05. This will further compound the likely problems to be experienced in meeting the greenhouse gases reduction targets. ABARE forecasts that under a "business as usual" scenario, energy sector carbon dioxide emissions would grow at an

annual average rate of 2% over the period 1989/90 to 2004/05.

One of ABARE's key findings in "Projections of Energy Demand and Supply, Australia 1990/91 to 2004/05", is that achievement, or even partial achievement of the greenhouse gases reduction target, will require large scale fuel substitution.

Coalbed methane has the necessary attributes required of an appropriate fuel substitute and the resource is of sufficient scale to last for many generations. These key attributes can be summarised as follows:

- Coalbed Methane ("CBM"), by its very nature, has a low environmental impact
- CBM would reach customers without permanently scarring the landscape
- CBM burns cleanly and efficiently
- All fossil fuels contribute to global warming, but CBM (and natural gas) produce the lowest overall levels of carbon dioxide - the main "greenhouse gas".
- Taking the entire fuel chain into account, CBM (and natural gas) are the least polluting of all fossil fuels.

Value Adding

As detailed earlier, one specific market opportunity being pursued relates to the processing of methane into methanol, by way of a processing plant that would be constructed on the Central Queensland Coast. This project would provide significant opportunities for adding value to the methane gas produced in the field. Apart from the export of processed product (i.e. methanol), there are secondary opportunities that may arise to further process methanol into derivative products such as methyl tertiary butyl ether for domestic and international markets.

IS COMMERCIAL DEVELOPMENT FEASIBLE AND CAN COALBED METHANE COMPETE WITH NATURAL GAS?

Despite the magnitude of the in-place coalbed methane resource in Australia, only limited information is currently available on the technical problems that need to be overcome in order to commercialise the resource.

Substantial research and development work has to be undertaken by existing Operators, and by research bodies such as CSIRO and universities, in order to identify solutions to the technical hurdles that currently exist. For example, one of the primary problems is how to increase well production rates so that greater economic returns can be achieved. Using existing knowledge, and assuming continuation of current fiscal terms, commercialisation of the resource only generates sub-economic rates of return. Coalbed methane development projects are characterised by:

- Substantial numbers of producing wells albeit at relatively low production rates as compared to conventional gas wells
- Slow build up of production rates over the first several years, thereby depressing cash flows in the first (critical) years of the project
- Long life of individual wells (twenty or so years) and a lengthy but low tail production

In Australia, as compared to the USA, other additional problems must be overcome including:

- Limited existing infrastructure
- Significantly higher cost structure, particularly in the area of specialised services
- Limited availability of risk capital and limited number of industry participants, which in turn puts greater technical and financial burdens on the major industry participants.

The leading question to be answered is:

Can coalbed methane ("CBM") development in Queensland compete with conventional natural gas and with other sources of energy?

Despite the relative lack of information on well potential and deliverability, and the amount of gas that can be expected to be recovered over time from a CBM well, we consider that there is sufficient information available to predict that large scale field development is not too far away.

As consultants, we have undertaken a number of in-depth studies into the potential for field development and the costs of bringing CBM to the marketplace, either by way of supplying gas to a power station or into the existing pipeline network in Queensland.

There has to be a starting point in terms of what may be considered to be a valid scheme for field development and we have chosen parameters which we feel will fairly reflect the conditions which will pertain in the Central Bowen Basin viz:

- Well Spacing - 70 acres
- Well Depth - 600 - 1100 m.
- Gas in Place per well - 1500 MMSCF
- Recovery per well - 700 MMSCF
- Well Life - 17 years
- Initial Production Rate - 350 to 500 MCFD

Amongst the development options we have studied, we have chosen several that we consider to be realistic and which cover a fairly broad development range from a 15 year by 30 MMCFD development to a 25 year by 60 MMCFD development.

Our findings are best summarised in graphical form in Figure 1 (attached), which plots the sales gas price in $/GJ ex-field against the recoverable reserves over the projected life of the project.

Thus we project a gas price of $ 3.60/GJ for the small 115 BCF development over 15 years reducing to $ 2.65/GJ for a 500 BCF development over 25 years in order to provide the developer with a 15% IRR before tax. These estimates are in 1992 constant dollars.

The return to the developer is not over-exciting especially when one considers the vast amount of R & D which will have to be undertaken to establish the commercial viability of developments such as this - nevertheless, the gas prices forecast begin to come close to the upper ranges of today's conventional natural gas prices ex-field .

Mention has already been made of the major impediments to CBM development in terms of the large number of wells required and their relatively low productivity. Well drilling costs are obviously critical to the establishment of an economic venture and we suggest that an average Queensland CBM well can be drilled and completed for about $ 275,000 in a major, and properly engineered development campaign utilising multiple drilling rigs working around the clock and a completion rig(s) to complete, hydraulically fracture, and bring the well onto production. A cost breakdown for such a well is provided in Figure 2 in which Queensland costs are compared with average costs for CBM wells in the U.S.A..

It should be noted that these Queensland well costs were developed on the assumption that a large scale drilling and completion project involving hundreds of wells would be undertaken, thereby providing significant economies of scale savings on drilling, completion and stimulation costs. Smaller work programmes would clearly not be able to achieve the same level of cost efficiencies.

The immediate impact of the cost comparison is the relative low cost of our projection when compared with the U.S. wells and the question obviously has to be asked as to our confidence in the Queensland prediction. We think it to be valid based on our experience to date with CBM and oilfield drilling operations in Queensland - and if it is on the optimistic side, we have to find ways of bringing CBM well costs down to this level if we are to be successful.

The impact of a further reduction in the capital cost of the CBM developments we have considered is illustrated in Figure 1 in which a 33 1/3rd reduction in capital expenditure (for all drilling and facilities) could reduce the ex-field sales gas price to within the $ 3.00 to $ 2.10/GJ range - well within the current conventional natural gas price range on offer from the Surat Basin and Denison Trough fields.

Low productivity is another problem area which has to be addressed. We are suggesting wells which will only be capable of producing a maximum 500 MCFD at peak, a production rate in the order of one tenth of that which might be obtained from a top well in the U.S.. Our productivity estimates assume completion of the wells by conventional perforating and hydraulic fracturing - we have not considered the benefits which might be realised from improved completion techniques such as cavity completions.

Much research remains to be done to establish the place for cavity completions in Australia but given success, productivity increases will have a marked impact on project economics. A 10% increase in productivity for the average well would allow CBM to be available ex-field in the price range $ 3.30 to $ 2.40/GJ as is also shown in Figure 1.

Whilst there are still so many unknowns facing the prospective developer in terms of costs and well performance, there is little point in trying to refine the economies of field development to the n^{th} degree. The message that we wish to pass on is that the potential is there to develop CBM in Queensland at prices that will allow it to compete - assuming that industry and Government are prepared to invest the required capital in research and development and that the developer is given the necessary financial backing to cover him during the early days of the development when the reward is low. With this support, CBM will play a major role in Queensland's future energy marketplace.

WHY CONSIDER GOVERNMENT ASSISTANCE?

In the USA, apart from a critically important Federal Tax credit, substantial Government funding has been directed towards the development of the coalbed methane resource by way of Government funding of research and development projects. These Government initiatives have proven successful and the industry is now growing rapidly. Unfortunately, experience in Australia has proven that not all the technology breakthroughs in the USA can be directly applied here. Australian coal characteristics are dissimilar to USA coals and much research and field trialing is necessary in order to overcome unique Australian problems. Also, and most importantly, lower US costs for certain specialised services makes the difference between the projects being economic or not. The higher Australian cost structure for these services often results in the project being rejected on economic grounds. Consequently significant R & D is required to find alternative, cheaper ways of achieving the same technical result. This is time consuming, risky and expensive.

Given the above factors, and bearing in mind the considerable State and Federal Government benefits that would be realised from commercialisation of this vast resource, Government assistance is required in order to bridge the gap between sub economic and economic project returns. The Government assistance could be directed towards the critical first five years of the project life, thereby containing Government assistance to a finite, limited time span.

It is interesting to note that Federal Government assistance packages were provided to the conventional petroleum industry in the "early days" of Australian petroleum exploration. The assistance was originally provided through The Petroleum Search Subsidy Act (1957) and under the Act, (as amended from time to time) explorers were able to claim substantial subsidies on moneys spent on selected petroleum exploration activities within Australia.

The level of subsidy varied over time. In 1961, for example, the level of subsidy was 50% on geophysical surveys, exploratory and test drilling. Senior Federal Government officials have acknowledged the importance of the subsidy in developing Australia's petroleum resources. As stated in 1969 by Mr J. M. Rayner, Director, Bureau of Mineral Resources, Geology and Geophysics:

"No one doubts, I think, that the subsidy scheme has achieved its objective of encouraging the search for petroleum in Australia. Clearly the present level of exploration would not have been reached without the incentive and encouragement provided by discoveries, but it is significant that a very high percentage of discovery wells have been subsidised" (The APEA Journal, 1969, Volume 9, Part II, Page 24).

The major discoveries in the Cooper Basin, Surat Basin and Denison Trough, Amadeus Basin (Palm Valley and Mereenie), Bass Strait and North West Shelf were all made in the 1960's and early 1970's, during the term of the Petroleum Search Subsidy Act. Needless to say Australia's economic performance over the last twenty years would have been extremely bleak without these domestic resources of oil and gas being available to industry and government. The government funds invested under the Petroleum Search

Subsidy Act were "repaid" many times over through economic growth stemming from these fields.

A similar scheme could provide coalbed methane with the same impetus given to the conventional petroleum industry which, in turn, could lead to similar long term economic benefits flowing to Australia as have flowed from conventional petroleum developments. It is important to take a long term view of these benefits, and the economic developments that may accrue, and not take a simplistic short term view that the government should not interfere with market forces.

SHARING OF THE COSTS AND BENEFITS

Commercialisation of the resource will lead to significant short term and long term benefits to both State and Federal Governments. Some of the more direct benefits have been identified elsewhere in this paper. These benefits flow to both State and Federal Governments, and to the Australian community generally. Benefits should also flow to the development participants, as reward for the risks and financial contributions borne by them.

Development of the resource is technically feasible, subject of course to a degree of technical risk. Commercialisation of the resource will only come if industry participants achieve an economic return commensurate with the technical and financial risks being borne. Without both Federal and State Government assistance, it is unlikely that the resource will be developed in the short term. Successful exploitation of the resource may still occur but possibly not for ten to twenty years.

Industry participants have demonstrated a willingness to confront the technical and commercial risks associated with the commercialisation of Australia's methane resource. To date, in excess of $50 million has been spent in this effort however no commercial reward has been forthcoming. Substantial progress has been achieved but ongoing, long term efforts (and high levels of risk capital) are required in order to properly address the technical and development problems.

Industry is showing itself keen to pursue development of the resource but Government assistance in various forms will be required in order that industry efforts can proceed in a timely manner.

There are several forms of assistance that have been assessed to be of significant value in overcoming the projected cash flow difficulties in the early, critical years of project development.

State Government Assistance

A royalty holiday for the first five years of production will provide an economic boost to coalbed methane projects. By itself, it will be insufficient to bridge the project economic shortfall as currently forecast. However, if coupled with other forms of Government assistance they can jointly provide the necessary fiscal boost for coalbed methane developments to proceed.

Federal Government Assistance

Federal Government fiscal initiatives will be critical to the successful commercialisation of coalbed methane over the next ten to fifteen year period.

There are various forms these fiscal initiatives could take. Some of the initiatives presented in this paper for consideration include:

- **Research and Development Allowances**
  All expenditure on coalbed methane projects incurred prior to 31 December 1997 to be regarded as allowable Research and Development expenditure and to therefore qualify for a 150% tax deduction, deductible immediately against income from any source.
- **Share Subscriptions**
  The deduction detailed in 1. above to be made available to investors providing equity capital injection by way of share subscription payments. The company would have to warrant that the funds would only be used on coalbed methane developments and where the deduction was to be passed on to the equity investors, the company would automatically forgo the deduction entirely. This mechanism would provide a positive boost to the raising of the necessary risk capital.

- **Tax Credit**
  The Federal Government to adopt a tax credit system similar to that operating in the USA. The USA coalbed tax credit escalates with inflation and for the 1990 tax year the credit was worth US 86.53 cents per thousand cubic feet (A$1.15 at current exchange rates). For the 1991 tax year the credit is estimated to be worth US 93 cents per thousand cubic feet (A$1.28 at current exchange rates). There is strong justification for introducing a tax credit in Australia for non-conventional gas production. As with the USA, Australia needs to increase its domestic energy sources of supply, thereby reducing long term reliance on imported energy. Also, the growing concerns about the environmental impact of solid fuels (eg. coal, oil, etc.) has been clearly recognised by the Federal Government. Government initiatives directed towards reducing greenhouse gas emissions by encouraging development of environmentally friendly energy sources such as coalbed methane are economically and politically justified . A specific tax credit, of similar magnitude to that of the USA, would greatly stimulate the development of this vast, un-utilised energy source while at the same time directly assisting the Government in pursuing the national objectives of sustainable development, reduced greenhouse gas emissions and value adding capabilities.
  It should be realised by Government that any tax credits to be granted will only be a "cost" to Government a number of years into the future. A commitment to a tax credit can serve to accelerate development in the short term whereas the fiscal impact on Government will only occur in the long term (ie. some years into the future when commercial production commences).
  An important consideration in the legislation of any tax credit would be to ensure that the tax credit was not ring fenced ie. companies should be allowed to offset the tax credit against their tax liability generally, regardless of where the taxable income arose.
- **Government Direct Subsidy**
  The Federal Government could consider introducing a direct subsidy system whereby a percentage of qualifying exploration expenditure was reimbursed to industry participants.
  Such a subsidy would be directly comparable to the system operated in the 1950's and 1960's under the Petroleum Search Subsidy Act (1957), as amended. A direct subsidy policy would assist the industry in the critical upfront years when heavy exploration expenditures will be required.

CONCLUSIONS

Successful commercialisation of Australia's coalbed methane resource faces difficult technical hurdles while at the same time offering tremendous long term benefits that would be shared by all Australians.

By world standards, the scale of the in-place coalbed methane resource in Australia is vast.

The technical challenges facing coalbed methane development in Australia are substantial but not overwhelming. Development efforts in the USA have resulted in notable technological advances, with substantial (more than 100 fold) increases in annual production levels over the last ten years. These rapid advances have been made possible by the presence of a tax credit in the USA, calculated on production of coalbed methane. Consequently, there is now a burgeoning US coalbed methane industry with coalbed methane accounting for three quarters of net gas reserves growth in the USA in 1990. As much as one third of all USA gas wells drilled in 1990 were drilled for non-conventional gas.

We consider that development of Australia's coalbed methane resource will ultimately prove to be an attractive commercial proposition able to compete with other energy sources.

Domestic and export gas market opportunities have been identified which provide outlets for coalbed methane production from Queensland's Bowen Basin. These market opportunities also provide a value adding opportunity for the construction of a methane processing plant on the Central Queensland

coast with plant output, methanol, to be exported to Japan.

The CSIRO have recognised the importance of this resource and are now directing financial resources, albeit on a limited scale, towards relevant research and development. The CSIRO efforts, while valuable and much appreciated by industry, will need to be strongly supported by broad Government and industry initiatives and expenditures if the benefits of developing this resource are to be realised in the foreseeable future. MIM and a number of other industry members are funding a major part of CSIRO's coalbed methane research.

Apart from a wide range of direct benefits to the Australian community (by way of jobs, export earnings, State and Federal tax payments - both corporate and personal, energy feedstock for industrial growth, economic multiplier effects etc.), development of Australia's coalbed methane resource will also contribute significantly to the Government's broad national objectives of

- Sustainable development
- Value adding development
- Environmentally friendly development

However, Government assistance is required in order to bridge the gap between sub-economic and economic returns on coalbed methane development. The reasons for projected sub-economic returns are primarily related to the unique nature of the resource, as referred to in the body of this report, in that there is a requirement for an extremely high front-end capital expenditure to drill the substantial numbers of producing wells which individually have long lives but with low production rates (as compared to conventional natural gas wells) and with a slow build up of production from each well. The economic impact of these characteristics is a heavy front-end investment and a delayed positive cash flow from production. However, these projects have a long life and once the negative economic impact of the first few years is overcome, the projects will generate long term, strongly positive cash flows. Overcoming these economic difficulties by increasing the gas sales price is not economically feasible because it restricts industrial growth and it is also likely to lead to a shut-down of existing industrial plants if feedstock input prices results in an uncompetitive price for the processed product.

Government assistance targeted at the first critical years of start-up will make the difference between these projects rapidly proceeding for the long term benefit of Australia (twenty to forty years and beyond), or being deferred for perhaps ten to twenty years while technology advances are pursued on an ad hoc, limited basis.

Industry has shown its willingness to commit significant financial resources to developing Australia's coalbed methane industry but needs Government assistance in order to fast track these efforts and in order to build a viable industry.

Government must address itself to its competing budget priorities and to the long term need to encourage development of a major energy resource.

As so aptly stated by the Right Honourable John Wakeham, the British Secretary of State for Energy, " A secure, economic and environmentally acceptable supply of energy is the very foundation of .... civilisation - the corner stone of our industry and of our prosperity. Without such a supply, no modern society could long survive ...."

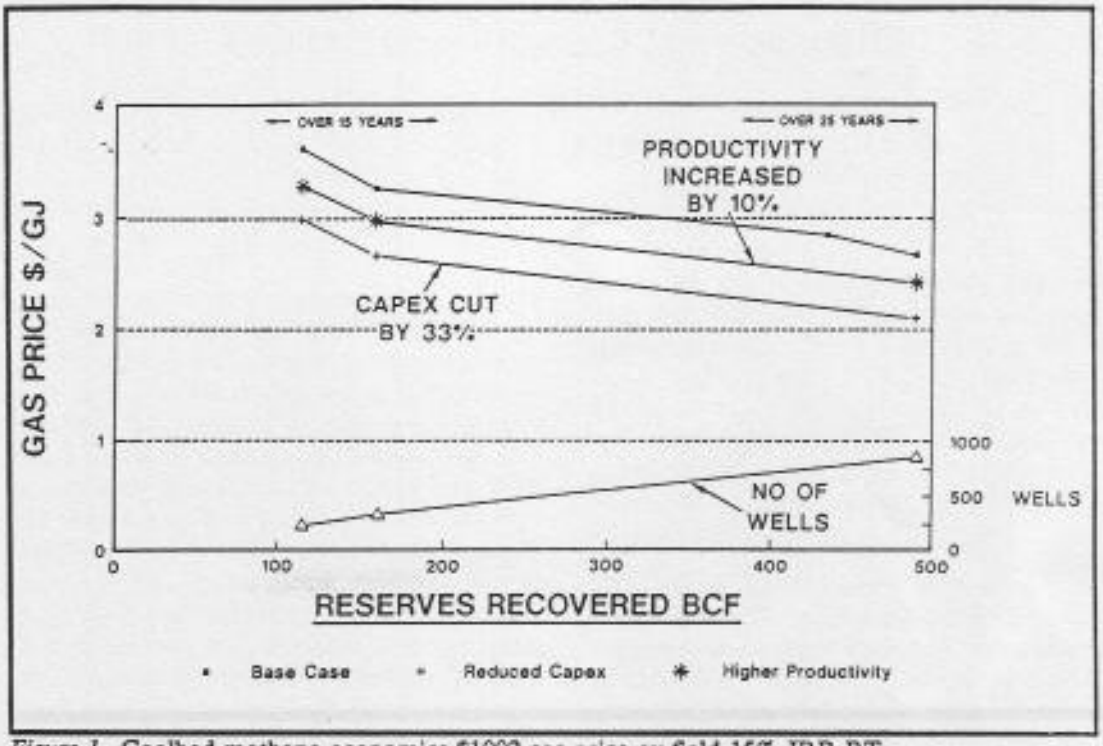

Figure 1. Coalbed methane economics $1992 gas price ex-field 15% IRR BT

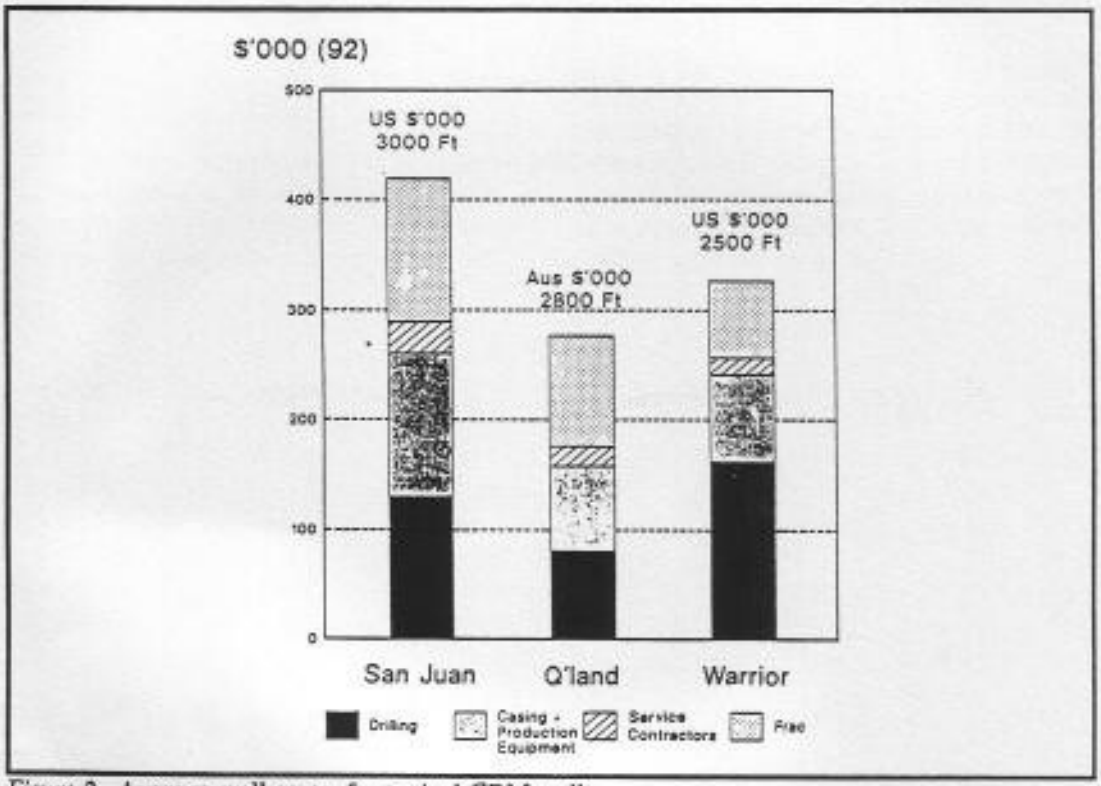

Figure 2. Average well costs for typical CBM wells