



Technical Appendix F1

Economic Consequences and
Management Measures

This page left blank intentionally.

ChevronTexaco Australia Pty Ltd

Gorgon Gas Development:
Economic Consequences and
Management Measures -
Technical Appendix F1:

October 2004

**Environmental Resources Management
Australia**

6th Floor, 172 St Georges Terrace

Perth WA 6000

Telephone +61 8 9321 5200

Facsimile +61 8 9321 5262

www.erm.com

ChevronTexaco Australia Pty Ltd

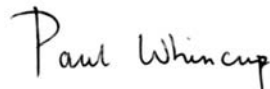
Gorgon Gas Development:
Economic Consequences and
Management Measures -
Technical Appendix F1:

October 2004

Reference: 0013438

For and on behalf of Environmental Resources
Management Australia

Approved by: Paul Whincup



Signed:

Position: Project Director

Date: 19 October 2004

TABLE OF CONTENTS

1	Economic Consequences and Management Measures.....	1
1.1	Overview	1
1.2	Economic Factors Requiring Assessment	1
2	National and State Impacts	3
2.1	Summary of Impacts.....	3
2.2	Model Assumptions and Descriptions.....	5
2.2.1	Assumptions	5
2.2.2	AE-MACRO	5
2.2.3	MMRF-GREEN	7
2.3	Detailed Description of Modelling Results	8
2.3.1	AE-MACRO National Results	8
2.3.2	AE-MACRO State Results	12
2.3.3	Summary of Results	14
3	Regional and Local Impacts	19
3.1	Introduction	19
3.2	Employment.....	19
4	Other Economic Impacts	21
4.1	Conservation Values.....	21
4.2	Greenhouse Emissions	22
5	Summary of Consequences	22
6	Management and Mitigation Strategies	23
6.1	Social Impact Management Plan.....	23
6.2	Australian Industry Participation Policy	24
6.3	Management of Local Content	24
6.4	Management of Conservation Values	25

6.5 Management of Greenhouse Gas Emissions 25

1 Economic Consequences and Management Measures

1.1 Overview

The economic benefits from the Gorgon Development have national, state and regional dimensions. The benefits derive mainly from general economic growth, which result in flow-on effects across the community through businesses, workers and government revenues, and from increased competition in domestic gas markets. There may also be economic costs associated with risks to conservation values and potential regulation of greenhouse gas emissions.

Increases in economic activity are quite well understood, based on empirical evidence. Future impacts are best estimated using economic modelling. For projects of the size of proposed Gorgon Development that have a significant impact on exports and Gross Domestic Product, it is necessary to undertake macro level modelling.

The benefit of modelling is to enable analysis of the possible medium-term macroeconomic impacts of the Development in terms of economic variables such as investment, exports and tax revenues, measured as deviations from a control scenario and long-run growth path without the Development. The focus of the analysis is the aggregate economic response over periods from one to ten years, rather than on the long-run growth path of the overall economy.

1.2 Economic Factors Requiring Assessment

The proposal has the potential to result in impacts at the national, state, regional and local levels. Table 1.1 shows potential impacts against these levels, and makes an assessment of the significance of impact and the need for its management. These impacts are discussed in detail in the following sections.

Table 1.1 Economic Factors Requiring Assessment

Impact Area	Commonwealth	State	Regional / Local
Revenue flows to government	Company tax, PRRT systems already in place	Payroll tax, duty in place. No royalty sharing agreement between state and Commonwealth.	Limited revenue flows to local governments
Employment	Some migration to WA	Significant employment opportunities, managed on FIFO basis	Need to manage expectations with availability of labour
Direct economic activity	Moderately significant, but need to manage opportunities	Significant, but need to manage opportunities	Need to manage expectations with availability of goods and services
Indirect economic activity	Moderate	High	Need to manage expectations with availability of goods and services
Economic assessment of conservation value	Not applicable	Significant, framework set out in State Agreement	Significant, process not yet established
Economic implications of greenhouse	Negligible unless there is national regulation	Current WA Draft Greenhouse Strategy does not impose targets	Need to submit proposals for injection of carbon dioxide

The scoping prepared for the Development, and approved by the Department of Environment and Heritage (DEH) and Environmental Protection Authority (EPA), identifies those factors requiring assessment.

2 National and State Impacts

2.1 Summary of Impacts

The national and state economic consequences of the Gorgon Development have been assessed by two independent macroeconomic models of the Australian economy - AE-MACRO and MMRF-GREEN. AE-MACRO is a dynamic model developed in 1992 by Access Economics¹. The model has a stable long-term growth path that accords with neoclassical economic theory, together with short-term dynamics derived from the Australian economic experience over the past 25 years.

Results from the AE-MACRO modelling studies have previously been published in Chapter 11 and Appendix K of the *ESE Review*. MMRF-GREEN is operated by the Centre of Policy Studies at Monash University, and is based on the same economic principles as AE-MACRO.

Results from the MMRF-GREEN modelling studies have been included in a report by the Allen Consulting Group², which was made available to the government. The results are summarised below. The key finding from the modelling is that the Gorgon Development will produce very substantial economic benefits (refer Tables 2.1 and 2.2).

Table 2.1 Summary of Modelling Results for Australia

Economic Consequences Net Present Value (NPV) increase over Business As Usual till 2030, unless otherwise indicated	AE-MACRO A\$ million NPV, at 5% discount rate	MMRF-GREEN Scenario 1 A\$ million NPV, at 4% discount rate	MMRF-GREEN Scenario 2 A\$ million NPV, at 4% discount rate
Gross Domestic Product	3,600 (in 2030)	21,000	31,200
Business Investment	11,000	-	-
Export Revenues	2,400 per year (2012-2030)	4,000 (in 2020)	5,600 (in 2020)
Commonwealth Revenue	7,000	10,000	10,000
Commonwealth Budget Balance	9,000	11,400	14,300
Employment	6,000 in 2030	100 in 2020 ³	100 in 2020
Private Consumption	1,800	7,100	6,600
Welfare Impact	24,000	-	-
Source: Reports by Access Economics and Allen Consulting			

¹ Access Economics, *National and Western Australian Economic and Fiscal Impacts of the Gorgon Gas Supply and LNG Projects*, Final Report to ChevronTexaco, December 2002.

² Allen Consulting Group, *Report on Economic Modelling Outcomes*, June 2003.

³ The MONASH model does not produce significant impacts at the national level due to treatment of labour. However State level employment is significant.

Table 2.2 Summary of Modelling Results for Western Australia

Economic Consequences Net Present Value (NPV) increase over Business As Usual till 2030, unless otherwise indicated	AE-MACRO A\$ million NPV, at 5% discount rate	MMRF-GREEN Scenario 1 A\$ million NPV, at 4% discount rate	MMRF-GREEN Scenario 2 A\$ million NPV, at 4% discount rate
Gross State Product	2,900 (in 2030)	25,800	43,500
Public Revenues	-	48,000	18,000
State Budget Balance	300	1,000	1,900
Employment	1,700 in 2030	6,600 in 2020	4,500 in 2020
Private Consumption	240	1,700	4,600
Welfare Impact	4,000	-	-
Source: Reports by Access Economics and Allen Consulting			

Differences between the modelling results are due to:

- differences between scenarios modelled, as shown in Table 2.3.
- methodological differences between models.

Table 2.3 Scenarios Modelled

Gorgon Development Details	AE-MACRO	MMRF-GREEN (Scenario 1)	MMRF-GREEN (Scenario 2)
Raw Gas Production	Raw gas production begins at 150 PJ in 2007 and plateaus at 740 PJ annually from 2019-2030.	Not stated	Not stated
Domestic Gas (DOMGAS) Supply	Domestic gas sales begin in 2012, peaking in 2015 at 110 PJ per annum until 2030.	Domestic gas sales begin in 2012, peaking in 2015 at 110 PJ per annum until 2030.	Domestic gas sales begin in 2012, peaking in 2015 at 110 PJ per annum until 2030.
Condensate Export	Condensate export reaches a peak of 5.6 MMSTB/year from 2019-2030.	Condensate export reaches 5.6 million tonnes per annum from 2019-2030	Condensate export reaches 5.6 million tonnes per annum from 2019-2030
First LNG Train	Production from 2007, achieving full throughput from 2012. From this point until 2030, LNG will average 9.85 million tonnes per annum	Production from 2007, achieving full throughput from 2012. From this point until 2030, LNG will average 9.85 million tonnes per annum	Production from 2007, achieving full throughput from 2012. From this point until 2030, LNG will average 9.85 million tonnes per annum
Second LNG Train	Not included	9.85 million tonnes of LNG annually from 2012.	9.85 million tonnes per annum
First GTL Phase	Not included	GTL operation consisting of a quantity of 50,000 Barrels per day.	GTL operation consisting of a quantity of 50,000 barrels per day.
Second GTL Phase	Not included	Not included	GTL operation consisting of a quantity of 50,000 barrels per day.
Regulation of greenhouse gas emissions	No	No	No
Source: Reports by Access Economics and Allen Consulting			

2.2 Model Assumptions and Descriptions

2.2.1 Assumptions

Apart from the assumptions for different scenarios, the models include the following important assumptions:

- PRRT revenues will be returned to taxpayers.
- No assistance or tax concessions by either Commonwealth, state, or local governments.
- Carbon taxes or carbon credits are excluded.
- Australian and international economies develop along steady long-run paths.
- For most assets, depreciation begins when it comes into use, not when capital expenditure is first undertaken. The depreciation values are denominated in constant 2002 prices, while adjustments were made to allow for domestic and overseas inflation.
- The export price of the product of the hypothetical gas-based resource Development grows by 2% annually in US Dollar terms. Prices of condensate are constant in inflation adjusted terms, while the price of LNG experiences real price declines.

2.2.2 AE-MACRO

In the AE-MACRO model, the best measures of the Development's overall impact on economic welfare the increase in annual flows of private consumption and public sector final expenditures that it allows. Another is the estimated increase in public and private sector wealth at the end of the simulation period.

The analysis involved comparing two long-term simulations of the AE-MACRO model that represented scenarios with and without the Development. The first is a standard long-run projection, based on assumptions about trends in macro-economic variables. In the second, the gas supply and LNG activities are added to the model used in the standard projection. The difference between the two simulations provides an indication of the likely macroeconomic impact of the Development.

For the purposes of the AE-MACRO modelling exercise, the overall Development included:

- Upstream development of the Gorgon gas fields, pipelines and offshore platforms
- Downstream establishment of the LNG preparation facility and all associated infrastructure
- Construction of a hypothetical gas-based resource Development in two phases and its ongoing operation

- Increased competition in the WA domestic gas market.

While it is possible to also use the Gorgon gas as feedstock for a world-scale plant producing low sulphur distillate for the domestic and international markets (GTL facility), this activity has not been included in the AE-MACRO scenarios.

AE-MACRO assumes that most of the Gorgon field gas is converted into LNG at a plant on Barrow Island and then exported. The Development also generates condensate for export, and natural gas piped onshore for the WA domestic market. Natural gas demand and supply projections for the Western Australia indicate a surplus of up to 60 PJ of gas that would be available to allocate to an export oriented gas-based resource project.

The AE-MACRO modelling horizon extends to 2030, which equates to the estimated near depletion point of the Gorgon gas field. While there are significant additional gas resources nearby that might allow the Development to continue operating, this is not considered in the economic study.

The upstream development of the Gorgon gas field includes the collection of natural gas from extraction wells and infield flow-lines, using sub-sea equipment and hardware. Export flow-lines transmit the gas onshore into a slug-catcher, which separates the condensate. Carbon dioxide and inert gases are removed, for pumping underground. The remaining water and hydrocarbons are then removed before the gas passes to further processing.

The economic model assumes that raw gas production begins at 150 PJ in 2007 rising to a plateau of around 740 PJ annually from 2019 to 2030. The LNG plant uses feed gas subject to pre-treatment processes and piped ashore. The LNG plant reaches full operation in 2012 and produces at a constant level.

Condensate, a valuable by-product, is derived from both upstream and downstream production phases, with a greater share produced from the slug-catcher (upstream) than from the LNG liquefaction phase (downstream). The LNG liquefaction phase involves the removal of condensate, water and inert gases, and compression of the raw feed gas. The LNG produced is stored until exported.

The model assumes that the total output of condensate will reach a peak from 2019 to 2030, at around 5.6 million standard barrels per annum (MMSTB/year). The Development is expected to begin producing LNG from 2007, achieving full LNG throughput from 2012. From this point until 2030, LNG will average 9.85 million tonnes per annum (energy content 538 PJ).

The Development also yields natural gas for sale in the domestic market (DOMGAS) for commercial and industrial uses. The gas will be piped to the mainland, compressed and then injected into the Dampier-to-Bunbury gas pipeline. Natural gas will be available for domestic sale from 2012, reaching full production of 110 PJ per annum in 2015.

The gas-based resource Development considered by the AE-MACRO model assumes that the amount of gas available will be on the order of 29 PJ annually from 2016 to 2019, and 61 PJ from 2020 to 2030. This quantity would be sufficient to sustain a petrochemicals facility, constructed in two stages. Capital expenditure is concentrated in two periods, from 2014 to 2015, and from 2018 to 2019. It would export its product, and would rely mainly on gas as a raw material. Total investment is projected at US\$200 million, with approximately 40% local content. Employment during the main operational phase would be 70 persons from 2020 to 2030.

To estimate the economic impacts on WA, the state and industry modules of AE-MACRO were used. These models allocated a national simulation of the model to state and industries, in line with projected long run trends in demand structure and industry and state relativities. It therefore allowed an assessment of the implications of a shock to the national economy at the level of an individual state.

2.2.3 MMRF-GREEN

The MMRF-GREEN model expanded the Development considered by the AE-MACRO model in two different scenarios. The analysis involved comparing three long-term simulations - representing scenarios with and without two different gas-based projects (scenario 1 and scenario 2). As in the AE-MACRO model, the base-case without the scenarios was a standard long-run projection, based on assumptions about trends in macro-economic variables.

In scenario 1, an initial development of one LNG train plus DOMGAS was expanded later to include a second LNG train, producing 9.85 million tonnes of LNG annually from 2012. The LNG would all be exported. Condensate would also be produced, building up to 5.6 million tonnes per annum from 2019. DOMGAS sales reach 110 PJ per annum in 2015.

Under scenario 2, the scenario 1 development activities are supplemented by two phases of GTL production. The GTL operation modelled by MMRF-GREEN consists of a quantity of 50,000 Bpd per phase.

The MMRF-GREEN horizon also extends to 2030, and therefore, does not consider additional exploration of gas resources nearby. Net present values for 2030 are derived using a 4% discount rate, instead of a 5% discount rate considered by the AE-MACRO model. The low discount rates in both models were used in order to present results in real terms (constant 2002 prices).

Representation of different scenarios relies heavily on the data and modelling assumptions supplied by the project developers. The results obtained by the modelling approach are a projection, on the assumption that past economic trends and current policies continue. The results are conditional on the various assumptions made, and represent a potential outcome, rather than an exact forecast of the long-term behaviour of the economy.

2.3 Detailed Description of Modelling Results

The following sections describe first, the direct and indirect economic consequences at the Commonwealth and state levels derived from first, the AE-MACRO, and then from the MMRF-GREEN model.

2.3.1 AE-MACRO National Results

The AE-MACRO model implies that the Development's main direct national economic impacts are on business investment, exports and Commonwealth tax revenues. The Development provides a substantial boost to overall business investment until the 2020s, totalling over \$11 billion. Once production begins, LNG and condensate sales generate substantial export revenues. Over the period from 2007 to 2030, Development exports average over \$2 billion annually. The Development is expected to make additional company tax and PRRT payments to governments (not only the Commonwealth budget sector) projected at around \$17 billion, over the life of the Development.

During the investment and initial production phase (2003 to 2009), the Development investment raises aggregate demand economy-wide. While a considerable proportion of the investment is imported, a substantial increase in national output and employment occurs.

As investment reaches its peak in 2006, Gross Domestic Product (GDP) increases by about \$1.5 billion and total employment rises to 15.5 thousand at its maximum point. Private consumption reaches \$750 million reflecting higher wage incomes.

Higher aggregate demand leads to a \$1.7 billion increase in 2006, and a \$1.6 billion deterioration in the trade balance. This is financed by capital inflows from the Development's investors.

The sharp rise in total demand leads to a temporary increase in inflation, peaking in 2007. This raises the price of domestic output relative to imports, raising the real exchange rate, resulting in some crowding out of other exports. The Government responds by raising short-term interest rates. Imports rise and interest-sensitive components of demand such as dwelling investment fall.

GDP increases further from 2009 onwards, as the first investment phase increases production while investment in the second phase is at a peak. Domestic final demand and imports reach a second peak in 2009. In that year GDP is some \$2 billion, or 0.2% above the level in a scenario without the Development. Employment impact is some 7,000 higher in 2009. There is a further slight rise in inflation.

The economic model estimates that between 2012 and 2030, annual GDP is on average 0.25% - some \$3.6 billion - above the level in a scenario without the Development. Private consumption is nearly \$1.8 billion higher (a 0.20% increase). Employment raises, on average, by over 6,000.

Higher demand and activity leads to some increase in inflation is not fully offset by higher interest rates and a higher exchange rate. Inflation on average is some 0.05 percentage points higher over the period from 2012 to 2030. The short-term interest

rate is on average 0.07 percentage points above the level in a scenario without the Development, while the real exchange rate is up by 0.2% on average.

As mentioned above, the Development and the additional economic growth it stimulates will generate substantial additional revenue for the Australian public sector, which includes the:

- Commonwealth budget sector
- Combined state/territory budget sectors
- Commonwealth and state/territory off-budget authorities
- Local government.

The Development's impacts on the Commonwealth budget were calculated under the assumption that net increases in revenues from the government tax and the PRRT would allow a decrease in tax burdens, and that current policies would be maintained.

Under current tax arrangements, the Gorgon Development (and the associated upstream development) are projected to result in additional company tax and PRRT payments of around \$17 billion over the life of the Development. In net present value terms, this comes to \$7 billion at a 5% real discount rate.

It is assumed that the Commonwealth and state governments will respond to increased revenues from the Development, and the additional growth this stimulates. It is likely that Government will increase expenditures in line with the growth in the economy, and reduce the average personal income tax rate to keep the ratio of public debt to GDP from falling too rapidly. Income tax reductions in turn stimulate further growth.

The overall public sector gain can be seen as the direct company tax and PRRT payments generated by the Gorgon Development, along with other revenue stimulated by additional economic activity. In turn, that equals the sum of additional outlays by the Commonwealth and State Governments, and their additional net lending to other sectors of the economy, together with revenue the public sector forgoes because it provides a tax cut.

At a discount rate of 5% in real terms, the Development generates an overall net impact of \$11.3 billion, of which \$5.9 billion takes the form of an assumed cut in income taxes.

The impacts of the Development on the Commonwealth budget can also be isolated. The Commonwealth receives company tax and PRRT payments from the Development's investors. Commonwealth tax receipts benefit from the overall increase in economic activity, while Commonwealth expenditures also rise. At a real discount rate of 5% the net present value of overall Commonwealth budget gains is projected at over \$9 billion.

The Development's overall impact on the Australian economic welfare is measured as the increase in annual flows of private consumption and public sector final expenditures that it allows, and the increase in public and private sector wealth at the end of the simulation period.

According to AE-MACRO the welfare impact is mainly on the private sector. At a real discount rate of 5%, the Development results in a total private consumption and wealth of \$17,610 million in net present terms, while public expenditure and wealth amounts to \$6,420 million. Therefore, the welfare impact is mainly on the private sector, and totals around \$24 billion in net present values terms.

In summary, the Development's direct impacts on the national economy include a substantial increase in GDP and net exports. Although the Development generates an offsetting outflow in the invisibles account of the balance of payments to pay dividends, its overall impact is positive. The Development raises government revenues, allowing a cut in personal income taxes. Higher consumer demand reflects in higher imports, but also an increase in Australian production and employment. The Australian economic welfare is improved mainly by an increase in private consumption and wealth over the Development life.

MMRF-GREEN

The MMRF-GREEN modelling national results are similar to those obtained from the AE-MACRO model. The MMRF-GREEN model considered two different scenarios relative to a case without the Development (scenario 1 and 2). Scenario 2 results are always presented inside brackets. Net present values for 2030 are derived using a 4% discount rate.

GDP would be boosted by the Development, to a total of \$1.9 billion (\$2.9 billion) or 0.21% (0.33%) higher in 2020 than in a scenario without the Development. The fact that the gain in GSP is higher than the gain in GDP reflects the fact that some economic activity is crowded out in other states and territories. In Net Present Value (NPV) terms to 2030, GDP is almost \$21 billion (\$31.2 billion) higher than it would otherwise have been.

Under both scenarios the Development provides a significant and positive impact on state employment, but does not promote significant employment increases at the national level - around 100 full time equivalent workers (FTE) in 2020 for scenario 1 and 2 as compared to a scenario without the Development.

Under scenario 1, both exports and imports increase in volume at the national level. Australian export volumes in 2020 would be \$716 million higher, while import volumes are \$414 million higher. In NPV terms, net exports would be around \$4.0 billion higher than otherwise.

Under scenario 2, Australian exports and imports both increase in volume as well. However, the volume of exports decreases until 2012, leading to a lower relative impact over the projection period. National export volumes are \$1.5 billion higher in 2020, while import volumes are \$315 million higher. In NPV terms, net exports at the national level are around -\$5.6 billion.

In the MMRF-GREEN model, consumption is used as a proxy to total economic welfare. The Development generates substantial increases in consumption nationally, as compared to the state level. Consumption would be \$7.1 billion (\$6.6 billion) in NPV

terms higher over the entire modelling period. The lower figure under scenario 2 is largely explained by the lag in PRRT payments as compared with the smaller scenario. This implies that many of the gains in economic welfare will be felt beyond 2030.

Under scenario 1, the Gorgon Development generates substantial revenue for the Commonwealth Government, raising over \$375 million annually in PRRT by 2020 and around \$345 million in company taxes relative to the scenario without the Development. As a result, the net financing requirement for the Commonwealth declines from 2004 thus implying a significant positive impact on the Government's fiscal position. The net impact on Australia's net financing requirement over the life of the Development is also positive - that is, the Development will improve the Australian government's budget balance by a NPV of \$11.4 billion.

In scenario 2, the Development gives rise to over \$688 million in company taxes in 2020, but does not generate PRRT until later in the simulation period because of the higher field development costs associated with the greater production of gas. As a result, the change in net financial requirements (i.e. the need to borrow or raise additional taxes) for the Commonwealth brought about by the Development is negative (implying a positive fiscal impact) from 2003. The Development will improve the Commonwealth's budgetary position (i.e. reduce its net financing requirement) by \$14.3 billion in NPV terms.

The economic assessment of major projects needs to consider the ability of "crowding out" the investment potential for other projects. There is a limit to the ability of Australian investors to attract foreign investment from global capital markets, as well as, on the potential labour supply. Aggregate investment at a given period, is determined by macroeconomic variables, impacted by the Gorgon Development. Other potential projects in Australia may suffer consequences from changes in variables such as the exchange rate, the real wage rate, and the level of demand for Australian exports.

Under both models, the Gorgon Development results in limited crowding out. Since it is a capital-intensive project, there is little crowding out as a consequence of changes in real wages. In terms of the exchange rate, while the Development gives rise to significant additional exports (which tends to push the value of A\$ relative to other currencies up), there are also high dividend payments to the overseas owners of the capital, which forces the value of A\$ relative to other currencies down. Moreover, the more that Governments tax income flows from the Development, however, the more the offsetting downward pressure on the exchange rate is reduced and the greater the crowding out effect. The AE-MACRO model suggests less crowding out than the MMRF-GREEN model.

In the MMRF-GREEN model, the balance of trade effect is influenced by a higher degree of crowding out under scenario 2 than scenario 1, generated by different exchange rate impacts. The high level of exports under scenario 2 contributes to crowding out by pushing the real exchange rate up, and this effect is exacerbated by high levels of inward investment in the Development of a larger scale and over a longer period than in scenario 1. Outward flows of dividends have a lower offsetting effect over this period in scenario 2 as compared to scenario 1.

2.3.2 AE-MACRO State Results

Although tax revenues flow mainly to the Commonwealth, the Developments output and expenditures occur mainly in WA. The State macroeconomic impacts broadly mirror the national results, with some differences occurring through the investment and production phases. In percentage terms, the Development has a much larger impact on the State economy than on the national economy. The peak impact on the GSP, at about 2.2%, is well above the corresponding impact on GDP, 0.25%.

The Development provides a substantial boost to overall business investment until the 2020s, totalling over \$11 billion for Australia. This projected investment volume adds directly to the state's final demand, so that almost the entire increase to national investment is reflected in the state outcome. The same holds true for Development exports - the net increase in the state's merchandise exports closely mirrors Development exports. Once production begins, LNG and condensate sales generate substantial export revenues. Over the period from 2007 to 2030, the Development's exports average over \$2 billion annually.

During the investment and initial production phase (2003 to 2009), the Development's investment raises aggregate demand to successive peaks, the largest in 2006. A considerable proportion of the investment is imported, but there is still a substantial increase in output and employment. As expenditure on the first production phase reaches its peak in 2006, GSP increases by about \$650, and total employment by almost 8,000 jobs. Private consumption is \$200 million higher at this point, reflecting higher wage incomes.

Up to 2012, direct impacts on the state accrue mainly through the employment of production workers, payment of payroll tax and expenditure on intermediate inputs. Operation expenditures and employment rise as the Development is implemented. Direct employment by the Gorgon Development is over 600 in 2012. Non-wage operating costs average some \$230 million annually.

As the Development reaches full operation in 2012, direct impacts include a substantial contribution to GSP and merchandise exports. Between 2012 and 2030, annual GSP is on average some \$2.9 billion above the level in a scenario without the Development. The percentage increase is over 2% in 2012. It then declines mainly because the Development's output remains constant while the state overall experiences strong growth.

Private consumption is on average some \$240 million higher over the period from 2012 to 2030. Reflecting the national pattern it shows a gradual increase throughout this period. On average, it is 0.25% higher than in a scenario without the Development. Over this period, state employment is up, on average, by about 1,700 jobs over this period. The Development creates demand for labour through its ongoing investment expenditure, as well as its operational employment. The increase in the State's employment is partly met by increased labour supply from the existing population, and partly met by increase in interstate migration.

The Development would have considerable impacts on state public sector finances. The Development's impacts on the state budget were calculated under the assumption that net increases in revenues from the government tax and PRRT would allow a decrease in tax burdens, and that current policies would be maintained. As an example, revenues from the Commonwealth (in the form of GST and other payments) are assumed to be distributed on the same basis as at present. It also implies no change in state tax rates. The projection of expenditures is consistent with relevant national and state macro-economic determinants. This avoids policy changes that would result in substantial deficits, as well as reductions in tax rates to take advantage of a strong budgetary position.

As compared to the Commonwealth budget sector, the Development has only modest direct impacts on the State public sector finances. On the revenue side, the main impact is the additional payroll tax on the Development's employment. On the expenditure side, it is assumed that there is no state government subsidies. Nor is there a requirement for project-specific investment in infrastructure by state authorities. Indirect effects are more substantial, but still modest as compared to the impacts on the Commonwealth budget.

In the absence of large specific impacts, the net effect on the state budget is highly dependent on the precise assumptions employed. The economic modelling results in an increase in both state revenues and expenditures. Initially, expenditures run ahead of revenues as the state economy expands. As production increases, the position is reversed by the flow of economic resources in the form of higher consumption expenditure and goods and services tax (GST) revenues. The overall increase in state employment results in a positive impact in payroll tax receipts. Also, a slight increase in state population raises the state's share of the GST pool. Revenues reach a peak (in real terms) at around 2010, at the end of the initial investment phase. After 2020, this level is surpassed by further revenue growth, as the Development's wider benefits flow through.

The NPV of the projected revenue gain is approximately \$1.1 billion at a 5% real discount rate. The NPV of projected additional current expenses is slightly smaller (at \$0.8 billion) resulting in an improvement in NPV of the general government balance. However, taking account of projected capital expenditures and other items, turns this into a slight fall in the NPV of the state's underlying fiscal position (and net lending).

The Gorgon Development would also have considerable impacts on the state's economic welfare. The definition of economic welfare used in the national model is slightly broader than the one used for the state. For the national model, economic welfare includes estimates of the changes in private and public wealth, rather than just the change in net public debt as considered for the State.

The Development's overall impact on the state's economic welfare is measured as the increase in annual flows of private consumption and public sector final expenditures that is allowed, and the increase in public and private sector wealth at the end of the simulation period.

According to AE-MACRO the welfare impact affects both private and public sectors. At a real discount rate of 5%, the Development improves state's economic welfare by an estimated \$4 billion in net present terms. This estimate is about one sixth of the increase

in total Australian economic welfare derived in the national modelling of the Development.

MMRF-GREEN

The MMRF-GREEN modelling state results are similar to those obtained with the AE-MACRO model. As noted above, the MMRF-GREEN model considered two different scenarios relative to a case without the Development (scenario 1 and 2). Scenario 2 results are shown inside brackets. NPV's are calculated using a 4% discount rate till 2030.

GSP would be boosted by the Development, to a total of \$ 2.2 billion (\$3.3 billion) or 2.1% (3.2%) higher in 2020 than in a scenario without the Development. In NPV terms to 2030, GSP is around \$25.8 billion (\$43.5 billion) higher. There is a significant and positive impact on employment in WA. The Development leads to an increase in employment of 6,600 FTE (4,500 FTE) persons in 2020 over a scenario without the Development.

In the MMRF-GREEN model, consumption is used as a proxy to total economic welfare. The Development generates less substantial increases in consumption in WA, then nationally. Consumption would be \$1.7 billion (\$4.6 billion) in NPV terms over the entire modelling period.

Scenario 1 results indicate that the Government budgetary impacts for the State are substantially less than the Commonwealth impacts. The Development generates \$70 million in additional revenues for the State by 2020, while the net outlays are lowered by around \$22 million. The net impact on the State's net financing requirement over the life of the Development is also positive - that is, the Development will improve the State Government's budget balance by a NPV of \$1.0 billion.

The budgetary impacts for WA generated under scenario 2 are substantially less than the Commonwealth impacts. The Development generates \$73 million in additional revenues for WA by 2020, while net outlays are lowered by about \$55 million. The net financing requirement is reduced from 2003. The Development will reduce the State Government's net financing requirement (ie. improve its budgetary position) by \$1.9 billion in NPV terms.

2.3.3 Summary of Results

Overview

The economic modelling available shows the most significant impacts as increase in annual flows of private consumption (spending) and public sector final expenditures. Western Australian benefits from significant economic growth but there are modest impacts on state finances.

The nature, direction and magnitude of economic indicators of these impacts over the modelled period (2002-2030) are summarised in Table 2.4.

Table 2.4 Summary of Economic Indicators

Indicator	National	State
Economic output (GDP)	Results in substantial growth in operational phases adding 0.25% to GDP (\$3.6bn). Growth during investment phase is lower.	Gross State Product increases by \$650m during investment peak (2006) and very substantial growth in the operational phase adding 2% to state product (\$2.9bn). Approximately 1/6 of the increased economic welfare is captured by WA. The major beneficiaries are the construction, logistics and business services sectors.
Imports	\$1.7bn (0.4%) increase in investment phase (2006) leading to a large \$1.6bn deterioration in balance of trade. Thereafter strongly positive impact on balance of payments despite outflow of dividends.	Imports are substantial lower than the baseline during the investment phase.
Exports	Generates exports from 2007 onward and a nationally significant \$2.4bn annually between 2012 and 2030.	Operational phase makes substantial contribution to state product (around 3.7% at peak)
Business investment	Direct investment impacts of \$11bn over 20 years with most increase (0.85%) in investment phase.	Substantial boost to 2009 (as high as 6.45% between 2002-06) with investment continuing at lower levels until mid 2020s.
Household disposable income	Higher government revenues over medium term allow cuts in personal income tax resulting in 0.2% rise in the longer term.	Higher employment, wage income and modelled cuts in personal income tax add between 0.4% and 0.55% to after tax income.
Private consumption	\$750m higher in 2006 reflecting higher wage incomes. Additional consumer demand between 2012 and 2030 of \$1.8bn reflects in higher imports.	\$200m higher at 2006 investment peak and \$240m higher during operations.
Employment	Additional employment of 15,000 (0.08%) at investment peak and reducing thereafter	Additional employment of 8,000 at investment peak and around 2,000 higher during operations.
Inflation rate	Adds between 0.03% initially, 0.07% in the medium term and 0.06% over the longer term	Adds around 0.5% to inflation consistently throughout the Development
Budget finances	Company tax and PRRT payments of raise \$7bn. The overall improvement in public sector finances is \$11.3bn of which \$9.2bn is the impact on Commonwealth budget finances.	Overall modest impacts despite higher payroll tax revenue and transfers from Commonwealth of higher GST revenue. Initially expenditure runs ahead of revenue. Revenue of \$1.1bn is marginally exceeded by outlays.

In summary, results obtained from the AE-MACRO model were confirmed by the second modelling using the MMRF-GREEN model. This second economic model considered the economic consequences of two different Development scenarios as the

one considered by AE-MACRO. In scenario 1, an initial development of one LNG train plus DOMGAS is expanded later to include a second LNG train.

In scenario 2, the scenario 1 development activities are supplemented by two phases of GTL production. Thus, the MMRF-GREEN model considers a larger number of activities at Barrow Island.

The MMRF-GREEN model results for scenario 1 (scenario 2 results in brackets) in terms of NPV out to 2030, as compared to a scenario without the Development, are:

- GDP would be \$21 billion (\$31.2 billion) higher
- The community's economic welfare, as measured by consumption, would be \$7.1 billion (\$6.6 billion) higher
- Australian exports would be \$9.1 billion (\$4.7 billion) greater.

In WA, GSP would increase to \$25.8 billion (\$43.5 billion). As in the case of the AE-MACRO model, the Commonwealth and State Governments would allow the tax burden to be reduced because of increased company tax and PRRT revenues. The net impact on the Commonwealth budget is estimated at \$11.4 billion (\$14.3 billion) in NPV terms to 2030. The equivalent figure for the WA budget is much lower, at \$1.0 billion (\$1.9 billion).

In general, the AE-MACRO model generated less crowding out than the MMRF-GREEN model. Crowding out is used here to describe the effect that fierce competition for a finite supply of an input into production (e.g. land, construction materials, skilled labour) has in forcing up the prices for that input and thus making more marginal uses of the input uncommercial. Such competition and inflation is a normal market reaction to scarcity of supply and in the long run is likely to result in inputs being allocated to projects in which they are most productively. However, 'crowding out' could be said to apply in the short term or when demand from a project far outstrips the local capability to supply.

Under both models, the Gorgon Development results in limited crowding out. Since it is a capital-intensive project, there is little crowding out as a consequence of changes in real wages.

Both models suggest that the major impact of the Development in terms of economic activity (GDP/GSP) would be in WA. However, much of the gain at the state level also occurs elsewhere in Australia. This is, in large part, a consequence of the disparity in the budgetary impacts. Since the Development is based on developing a natural resource that lies in the Commonwealth jurisdiction (and therefore pays PRRT) and company taxes are paid at the federal level, the net positive impact on the state's budget is much less significant than the impact on the Commonwealth.

Summary of National Results

AE-MACRO results (in 2002 prices) indicate that the Development's direct economic contribution will include:

- A total of \$11 billion of investment expenditure. The data imply direct employment of around 3,000 in the peak investment year (2006), with further employment in subsequent investment phases.
- The generation of exports from 2007 onwards. At full operation, net exports would average \$2.4 billion annually over the period from 2012 to 2030. Operational employment would average some 400 persons, with an additional annual average of 200 persons associated with an ongoing investment program.
- A contribution to Commonwealth tax revenues totalling \$17 billion (including company tax and PRRT payments) over the life of the Development. In NPV terms this comes to \$7 billion at a 5% real discount rate.

According to the AE-MACRO economic modelling, the Development would generate substantial positive national economic impacts divided between the different Development phases.

During the initial investment phase (from 2003 to 2009), the main results are:

- As investment reaches its peak in 2006, GDP increases by about \$1.5 billion, and total employment by up to 15.5 thousand jobs. Private consumption is about \$750 million higher, reflecting higher wage incomes.
- Higher aggregate demand leads to \$1.7 billion increase in imports in 2006, and \$1.6 billion deterioration in the trade balance. This is financed by capital inflows from the Development's investors.

During full operation (from 2012 to 2030):

- There is a substantial increase in GDP and net exports, with an offsetting outflow in the invisibles account of the balance of payments to pay dividends to the Development's investors. However, the Development's overall impact on the balance of payments is strongly positive.
- The Development raises government revenues, allowing a cut in personal income taxes. Higher consumer demand reflects in higher imports, but also an increase in Australian production and employment.
- Between 2012 and 2030, annual GDP is on average 0.25% - some \$3.6 billion above the level in a scenario without the Development. Private consumption is nearly \$1.8 billion higher - a 0.2% increase. Employment is higher on average, by over 6,000 jobs.

The Gorgon Development will also result in positive economic impacts on overall public sector finances, the Commonwealth budget and on national economic welfare. The overall impact on public sector finances is measured as the sum of the model's estimates of additional public sector revenues, plus the revenue foregone through income tax cuts.

According to this definition:

- The NPV of the impact on overall public sector finances is an estimated \$11.3 billion at a real discount rate of 5%.
- Using a similar definition of net impact, the NPV of the impact on Commonwealth budget finances is an estimated \$9.2 billion in 2002 at a real discount rate of 5%.

In the AE-MACRO model, the best measures of the Development's overall impact on economic welfare is the increase in annual flows of private consumption and public sector final expenditures that it allows, and the increase in public and private sector wealth at the end of the simulation period. As modelled, in NPV terms, the welfare impact is mainly on the private sector. At a real discount rate of 5% the Development improves Australian economic welfare by an estimated \$24 billion in NPV terms.

Summary of State Results

The state macro-economic impacts broadly mirror the national results, with some differences. While the Development's output and expenditures occur mainly in WA, the tax revenues flow mainly to the Commonwealth. At a real discount rate of 5% the Development improves the state's economic welfare by about \$4 billion. This estimate is about one sixth of the increase in total Australian economic welfare derived in the national modelling of the Development.

AE-MACRO modelling results for WA also indicate that the Development generates a substantial contribution to business investment over the period until 2009 (with further investment continuing until the mid 2020s), and to GSP and merchandise exports once it begins operation.

The projected response of WA business investment closely tracks that of the Development, being slightly higher over the entire Development period. As expenditure on the first production phase reaches its peak in 2006, GSP increases by about \$650 million, and total employment by almost 8,000 jobs. Private consumption increases by \$200 million, reflecting higher wage incomes.

The consequences of an increase in GSP and exports are mostly felt at the national level, through the real exchange rate and Commonwealth tax revenues. These effects flow back to the state (and to other states/territories) through a rise in real incomes and wealth, a reduction in the average rate of personal income tax and an increase in Commonwealth transfers of GST revenues to the Western Australian Government.

The Development has only modest direct impacts on WA public sector finances. Indirect effects are more substantial, but smaller than the impacts on the Commonwealth budget. Model results indicate that initially expenditures run ahead as the state economy expands. However, as production plateaus and the Development's national economic impacts flow through in the form of higher consumption expenditure and GST revenues, the position is reversed and the state budget benefits. The NPV of the projected revenue gain to WA over the project lifetime is approximately \$1.1 billion in NPV terms at a 5% real discount rate.

The Development also has direct impacts on the state through the employment of production workers, payment of payroll tax and expenditure on intermediate inputs. Between 2012 and 2030, annual GSP is on average some \$2.9 billion above the level in a scenario without the Development. In percentage terms, the Development has a much larger impact on the Western Australian economy than on the national economy. The peak impact on the GSP (at about 2.2%) is well above the corresponding impact on the GDP (0.25%).

State employment increases, on average, by about 1,700 jobs over the period from 2012 to 2030. The increase in the state's employment is partly met by increased labour supply from the existing population, and partly by a small increase in interstate migration.

3 Regional and Local Impacts

3.1 Introduction

Specific regional modelling has not been undertaken. However modelling using MMRF-GREEN suggests that Gross Regional Product in the Pilbara Region would be 37.1% higher in 2020 under Scenario 1 and 54.6% higher under Scenario 2 than under business-as-usual assumptions. Hence regional impacts may be proportionally greater than state impacts, at least to the extent that the regional economy provides labour and materials.

The extent to which labour and services are provided locally will depend on how the Development is managed. However Development planning and management will not be settled until after detailed design studies have been done, so the following assessment is based on current proposals and expectations.

3.2 Employment

Total employment in the Pilbara region has ranged between 22,000 and 24,000 from 1999 to June 2003⁴. The unemployment rate has ranged between 3% and 5%, which is more than 2% lower than Perth. At its peak, the Gorgon construction workforce is expected to require over 3,300 workers or more than 10% of the entire Pilbara workforce. This means that the Development is so large that the regional economy will not be able to provide all the labour when required.

Interaction with other regional projects will also be very important, as Gorgon Development construction could smooth out demand if it is ramping up when other projects are ramping down. For example, there could be a fifth train constructed for the NWS project by 2008, and possibly the Sunrise project in the Timor Sea in 2009, and the remote Scott Reef on the North-West Shelf could follow in 2012⁵. At the same time, it is

⁴ *Regional trends and indicators – Pilbara Region*, <http://www.regional.wa.gov.au/rti/pirti.pdf>, June 2003

⁵ “Woodside draws up Shelf train No. 5 timetable”, *The Age*, March 30, 2004

important to recognise the risk that a significant draw on available labour by the Development could result in labour and skill shortages for other projects.

Each percentage point of unemployment represents about 250 workers, so even if there was a downturn in other project activity, it would not be possible to supply more than 20 per cent of the labour from the current workforce. In the ESE Review it is estimated that “*more than 10 per cent of the construction and operational workforce could be sourced from the Pilbara region.*” Even at this level of supply, there could be an increase in wages and/or ‘crowding out’ of other activities.

The Development proponent is proposing that the project be staffed on a Fly-In Fly-Out (FIFO) basis, with the construction workforce housed on Barrow Island. Flights would generally come from Perth to provide access to a greater source of labour, which will reduce unemployment in the south west of the state. In fact, the state modelling described above suggests that some labour would need to be supplied from interstate.

The *Pilbara Regional Priority Plan*⁶ has raised concerns with “*the continued use of fly-in fly-out employment practices which can be seen as a reflection of the lack of social amenity in the region.*” However the issue with the Gorgon Development is more that there is insufficient labour available in the short term to meet the demand. The impact of FIFO on social factors is discussed in the social impact assessment.

The *Pilbara Regional Priority Plan*⁷ raises another concern that “*the practice of fly-in fly-out means that local small businesses are not considered for the supply of goods and services. That is, supplies are often flown into the (mine) direct from Perth.*” As with labour, there is a significant risk that the increased, short-term, demand for local goods and services will increase prices and/or lead to crowding out of other activities. In a free market economy, businesses ought to be able to anticipate an increased demand for services, and scale up to provide these.

The *Barrow Island Act 2003* requires the Development to use local labour, professional services and materials, “*as far as it is reasonable and economically practicable to do so*”⁸. However the Western Australian Government did not explicitly require local content to be defined in the context of where the Development is located.

The Gorgon Joint Venturers have however committed to an Australian Industry Participation Policy. This Policy addresses potential impediments to establishment of local industries supplying to a major, world-class facility through provision of information, briefings and other factors. It is in the JV Partners’ interests to foster sustainable, competitive industries that can provide ongoing services to the Development, such as logistics. However the challenge is to provide positive benefits without adversely affecting the existing economy through price rises and crowding out. The aim is to develop sustainable economic activities that survive the short-term

⁶ *Pilbara Regional Priority Plan*, Oct 2003, <http://www.pdc.wa.gov.au/>, p.14

⁷ *Pilbara Regional Priority Plan*, Oct 2003, <http://www.pdc.wa.gov.au/>, p.14

⁸ *Barrow Island Act 2003*. Section 15 of Schedule 1

construction period. This will be difficult to achieve, as demonstrated by the problems of sustainability of staffing in the public sector⁹.

4 Other Economic Impacts

4.1 Conservation Values

The Barrow Island Act requires the Joint Venturers to pay to a special state trust account an (indexed) amount of \$40 million, for *‘ongoing programs that will provide Net Conservation Benefits’*¹⁰. The WA Conservation Council’s submission has criticised the approach of payments to a trust account, saying:

“The Conservation Council will only consider environmental offsets, as a last resort, if all other options have been exhausted and the project is one that is necessary and brings major undisputed social, economic and environmental benefits... This has not been demonstrated in this case.”

However the payment should not be interpreted as an offset, as there may be little or possibly no demonstrable loss of environmental values. No tourists are permitted to visit Barrow Island, so there is no need to compensate for loss of recreation value. There is unlikely to be any significant additional loss of wilderness value, given the presence of oil and gas infrastructure on Barrow Island prior to the proposed Development.

The payment is in fact a provision against a risk of environmental impact, and beyond that offers additional benefit, as made clear in Sustainability Criteria 5.3 – Acceptable legacy¹¹. It is very difficult to quantify the risks or to value their impacts, although the proponent is attempting to do so¹². However, the Conservation Council says¹³:

- “Nothing could offset the loss of some or all of Barrow’s ‘evolutionary significant units’.”
- “Given the high level of irreplaceability of the biodiversity values of Barrow Island, the extreme difficulty of translocating viable populations to the mainland through a reintroduction program, and a quarantine breach ‘virtually certain’, in principle approval of this proposal will result in at the least, a loss of biodiversity values and at the most, extinction of species.”

The Joint Venturers have agreed to an increase in the amount from \$10 million as proposed in the ESE Review to \$40 million specified in the *Barrow Island Act 2003*. The

⁹ Pilbara Regional Priority Plan, Oct 2003, <http://www.pdc.wa.gov.au/>, p.13

¹⁰ Barrow Island Act, Schedule 1, section 11

¹¹ *Barrow Island Act 2003*, Schedule 1

¹² Response to Submissions, April 2003, p. 3

¹³ *Response from the Conservation Council of Western Australia to the Consideration of access to Barrow Island for Gas Development (July 2003)*

amount of \$40 million to be paid into the trust account is likely to exceed reasonable provision against risk, and hence could provide an increase in overall conservation values in WA.

The trust will be managed by government and the allocation of funds to conservation projects will need to be undertaken with care.

4.2 Greenhouse Emissions

There will be two significant contributions to greenhouse gas emissions from the Gorgon Development, namely:

- Carbon dioxide from the gas wells
- Emissions from the energy used to extract and liquefy the gas.

The proponent proposes that carbon dioxide from the reservoir be separated and injected. Such an approach is being used in Norway, and is expected to work here, as discussed in Chapter 13 of the Draft EIS/ERMP. In fact, the State Agreement allows the Minister to decide not to consider complete detailed proposals for activities or infrastructure on Barrow Island unless he has received a proposal for injection of carbon dioxide.

Emissions from combustion in the liquefaction process cannot be readily separated and will presumably be vented as is the case with all other LNG processing plants in the world in 2004. Some may argue that there is an economic cost associated with such emissions, even in the absence of regulatory requirements to manage greenhouse gas emissions. However valuing economic cost in the absence of regulation requires assumptions about the marginal effect of a particular project on climate, and hence production or health impacts.

There will be an economic cost associated with emissions if targets are introduced, namely the economic cost of meeting the target, which can be valued in terms of cost of abating an additional ton of green house gas (GHG) emissions. Hence it is prudent to consider ways to manage emissions.

5 Summary of Consequences

The two independent economic modelling studies show that the Gorgon Development would have significant positive economic consequences for Australia and WA. These benefits are driven by the export income that the Development produces, the amount of money spent in the local economy, and the taxes and royalties paid by the participants, businesses and individuals. These are certain to occur.

The consequences for the regional and local economies in the Pilbara region are very difficult to quantify however it is likely that greater revenues will flow to the nation and the state. Key positive consequences of the development that are likely to occur include:

- Local employment; and
- Procurement from local businesses for goods and services.

This will be derived from the supply base and the development on Barrow Island and will relate to both the construction and operation phase.

The extent to which local expectations about employment and procurement will be met is a separate issue and is discussed in the stakeholder consultation and social impacts sections of the EIS/ERMP.

The regional economy is not large enough to provide all labour, goods and services required for the Gorgon Development, especially given the other project activity already occurring and planned to occur. There is a risk that short-term demand (e.g. labour for construction) will cause price rises and crowd out other activities.

It is unlikely there will be an economic impact on conservation values. Provided that the Development is managed well to reduce risk of loss of conservation values, and funds in the Net Conservation benefit trust account are spent wisely, there may even be an increase overall conservation values in Western Australia.

The risk of economic impact from greenhouse gas emissions on the Development is high, due to the requirement to have proposals for injection of carbon dioxide prior to approvals. This does not have any risk at state, national or regional level.

6 Management and Mitigation Strategies

6.1 Social Impact Management Plan

The State Agreement Act for the Gorgon Gas Development requires the Gorgon Gas Joint Venture to prepare a Social Impact Management Plan (SIMP). The purpose of this Management Plan is to identify management measures specifically aimed at addressing the impacts associated with the Gorgon Gas Development and identified in the impact assessment. It will not be used as a broader policy document but will be focussed on the particular requirements of the Gorgon Development.

The SIMP is required to be prepared during the Proposal stage of the Development, taking into account the outcomes of the impact assessment, stakeholder consultation and the opportunities for local content and procurement identified during the FEED and EPCM stages of the Development. It needs to be approved by the Minister for State Development, Industry and Resources who will seek advice from other Ministers and Government departments as necessary.

An outline of the content and intent of the SIMP is included in Table 6.1 and it is clear this Plan will include consideration of local content, employment and other socio-economic factors.

Table 6.1 Social Impact Management Plan Outline

Component of Plan	Intended Outcome
Introduction: <ul style="list-style-type: none"> • Development • Purpose • State Agreement Act requirements • Gorgon Social and Economic Commitments 	Provides overview of Plan and its purpose.
Process for Preparation of SIMP: <ul style="list-style-type: none"> • Stakeholder input • Approvals process 	Explains how SIMP has been developed.
Management Strategies: <ul style="list-style-type: none"> • Local content and procurement • Stakeholder engagement • Employment and training • Indigenous people • FIFO • Cultural heritage • Community development 	Specific strategies and actions aimed at achieving social and economic management objectives for the Gorgon Gas Development.
Social Investment Strategy	Summary of social investment budget and priorities for Gorgon Gas Development. Linkages to the Industry Participation Policy and local procurement initiatives.
Implementation, Monitoring and Review	Outlines summary list of actions, responsibilities and process for monitoring and review.

The SIMP provides significant opportunities to the Gorgon Joint Venture to make a positive contribution to community development, particularly in the Pilbara Region. In particular, the SIMP will focus on the key elements of:

- Education and training;
- Youth and indigenous employment;
- Research and development; and
- Community engagement with stakeholders in the Pilbara.

6.2 Australian Industry Participation Policy

Strategies for managing economic activity are broadly in place. In particular, these strategies include Clause 11 of the State Agreement and the Australian Industry Participation Policy. This Policy is discussed in detail in Chapter 2.

6.3 Management of Local Content

Management of local content has been identified as a significant issue, as recognised in the State Agreement. The Australian Industry Participation Policy sets out a number of actions to achieve local industry participation. However there are potentially conflicting objectives between local content requirements and commercial drivers.

- The purchaser wants a wide choice of suppliers, so that competition between suppliers keeps prices low and quality high; but
- Mandating local content limits the range of suppliers, so that local suppliers may take advantage of their privileged position to raise prices or reduce quality; and
- Local suppliers may not, at least initially, have the capacity sought by the purchaser. Even if they can supply the purchaser, the increased demand may exceed the capacity of local industry to supply, resulting in ‘crowding out’ of other activities or price rises.

The commercial tensions between the purchaser and the local suppliers will remain, so it will be important to manage expectations of local supply, for labour, goods and services, and hence indirect impacts.

6.4 Management of Conservation Values

The risk of impacts on conservation values has been highlighted as a significant environmental issue. The State Agreement recognises it as an economic issue as well, by nominating an amount to be paid into a trust account. It will be important to manage the process of deciding where and how to spend funds in the ‘Net Conservation Benefits’ trust account.

6.5 Management of Greenhouse Gas Emissions

The JV is investigating separation of carbon dioxide from natural gas in flows from the reservoir, and subsequent sequestration underground (refer to Chapter 13 of the Draft EIS/ERMP). The Gorgon JV is required to submit specific proposals for injection of carbon dioxide recovered during gas processing. In addition the Development will be designed to meet NEPM standards and goals for emissions. While these currently have not been implemented in legislation throughout Western Australia, the Department of Environment (DoE) has indicated their intention to implement them through the development of a state-wide Environmental Protection Policy (refer to Chapter 8 of the Draft EIS/ERMP).

Should further emissions reductions be considered, the Joint Venturers may wish to:

- Identify opportunities to reduce greenhouse gas emission by substituting more carbon intensive fuels for Gorgon gas in the Australian energy industry.
- Promote an energy efficiency program during all Development phases in order to minimise energy usage.
- Buy or trade in emission reduction credits.

This page left blank intentionally.