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16.1 Introduction

The principles of sustainable development, including ecologically sustainable development (ESD), have played an integral role in Santos' decision making processes in respect of the planning and design of the GLNG Project. Santos is committed to continue to take into account the principles of ESD during the construction, operational, decommissioning and rehabilitation phases of the GLNG Project.

This section explains the concept of sustainable development and outlines the sustainability assessment framework developed by Santos and summarises the sustainability objectives that have been identified for the GLNG Project under this framework. It goes on to outline how these objectives have been integrated into the EIS and will be integrated into front end engineering design (FEED) and into Santos' annual sustainability scorecard assessment and reporting. The section then provides a review of the project against the principles of ESD.

16.2 The Concept of Sustainable Development

16.2.1 Background

Over the last three decades, there has been increasing global awareness of the concept of sustainable development. In 1987 the United Nations World Commission on Environment and Development, through the Brundtland Report *Our Common Future*, adopted what has become a popular definition of sustainable development, being:

> *Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*

In recognition of the importance of sustainable development, the Commonwealth Government developed a National Strategy for Ecologically Sustainable Development (NSED), which was adopted by all levels of Australian Government in 1992 as part of Agenda 21. The NSED defines ESD as:

> *Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.*

The NSED has the goal of:

> *Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.*

The core objectives of the NSED are to:

- Enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- Provide for equity within and between generations; and
- Protect biological diversity and maintain essential processes and life support systems.

The NSED recognises that the participation of all levels of Government, business, unions and the community is essential to facilitate the implementation of ESD in Australia. Part 1 of the NSED provides:

> *Private enterprise in Australia has a critical role to play in supporting the concept of ESD while taking decisions and actions which are aimed at helping to achieve the goal of this Strategy. Many have already been active participants in the ESD process, including taking significant individual steps to ensure that Australia's economy and production base are put on an ecologically sustainable footing.*

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The principles of ESD have been adopted on a federal level in Australia by the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).

16.2.2 ESD Under Commonwealth Legislation

Section 3 of the EPBC Act articulates the objects of the Act. Section 3(1) provides:

> *The objects of this Act are:*
>
> *(a) to provide for the protection of the environment, especially those aspects of the environment* that are matters of national environmental significance; and
>
> *(b) to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources; and*
>
> *(c) to promote the conservation of biodiversity; and*
>
> *(ca) to provide for the protection and conservation of heritage; and*
>
> *(d) to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples; and*
>
> *(e) to assist in the co-operative implementation of Australia's international environmental responsibilities; and*
>
> *(f) to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and*
>
> *(g) to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.*

The principles of ESD are set out in section 3A of the EPBC Act. Section 3A provides:

> *The following principles are principles of ecologically sustainable development:*
>
> *(a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;*
>
> *(b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;*
>
> *(c) the principle of inter-generational equity--that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;*
>
> *(d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;*
>
> *(e) improved valuation, pricing and incentive mechanisms should be promoted.*

Section 136 of the EPBC Act sets out mandatory considerations and factors the Minister must take into account in deciding whether or not to grant approval to a project. Section 136 relevantly provides:

> ***General considerations***
>
> *Mandatory considerations*
>
> *(1) In deciding whether or not to approve the taking of an action, and what conditions to attach to an approval, the Minister must consider the following, so far as they are not inconsistent with any other requirement of this Subdivision:*

(a) matters relevant to any matter protected by a provision of Part 3 that the Minister has decided is a controlling provision for the action;

(b) economic and social matters.

Factors to be taken into account

(2) In considering those matters, the Minister must take into account:

(a) the principles of ecologically sustainable development…

In addition, Section 391 of the EPBC Act provides:

Minister must consider precautionary principle in making decisions

Taking account of precautionary principle

(1) The Minister must take account of the precautionary principle in making a decision listed in the table in subsection (3), to the extent he or she can do so consistently with the other provisions of this Act.

Precautionary principle

(2) The precautionary principle is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.

Section 391(3) lists the decisions in which the Minister is required to take into account the precautionary principle. These relevantly include the Minister's decision whether or not to approve the taking of an action under Section 133 of the EPBC Act.

16.2.3 ESD Under Relevant State Legislation

The principles of ESD have been adopted on a State level in Queensland by the *Integrated Planning Act 1997* (Qld) (IP Act).

Section 1.2.1 of the IP Act articulates the purpose of the Act as follows:

Purpose of Act

The purpose of this Act is to seek to achieve ecological sustainability by—

(a) coordinating and integrating planning at the local, regional and State levels; and

(b) managing the process by which development occurs; and

(c) managing the effects of development on the environment (including managing the use of premises).

Section 1.2.2 of the IP Act provides that where a function or power is conferred on an entity under the IP Act, that entity must have regard to the IP Act's purpose, and in certain circumstances perform the function or exercise the power in a way that advances the IP Act's purpose. Section 1.2.3 of the IP Act relevantly provides:

What advancing this Act's purpose includes

(1) Advancing this Act's purpose includes—

(a) ensuring decision-making processes—

(i) are accountable, coordinated and efficient; and

(ii) take account of short and long-term environmental effects of development at local, regional, State and wider levels; and

(iii) apply the precautionary principle; and

(iv) seek to provide for equity between present and future generations; and

(b) ensuring the sustainable use of renewable natural resources and the prudent use of non-renewable natural resources; and

(c) avoiding, if practicable, or otherwise lessening, adverse environmental effects of development…

(2) For subsection (1)(a)(iii), the precautionary principle is the principle that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment if there are threats of serious or irreversible environmental damage.

Section 1.3.3 of the IP Act defines ecological sustainability:

Meaning of ecological sustainability

Ecological sustainability is a balance that integrates—

(a) protection of ecological processes and natural systems at local, regional, State and wider levels; and

(b) economic development; and

(c) maintenance of the cultural, economic, physical and social wellbeing of people and communities.

Section 1.3.6 further provides:

Explanation of terms used in ecological sustainability

For section 1.3.3—

(a) ecological processes and natural systems are protected if—

(i) the life supporting capacities of air, ecosystems, soil and water are conserved, enhanced or restored for present and future generations; and

(ii) biological diversity is protected; and

(b) economic development occurs if there are diverse, efficient, resilient and strong economies (including local, regional and State economies) enabling communities to meet their present needs while not compromising the ability of future generations to meet their needs; and

(c) the cultural, economic, physical and social wellbeing of people and communities is maintained if—

(i) well-serviced communities with affordable, efficient, safe and sustainable development are created and maintained; and

(ii) *areas and places of special aesthetic, architectural, cultural, historic, scientific, social or spiritual significance are conserved or enhanced; and*

(iii) *integrated networks of pleasant and safe public areas for aesthetic enjoyment and cultural, recreational or social interaction are provided.*

The principles of ESD are, similarly, adopted by the *Environmental Protection Act 1994* (Qld) (EP Act). Section 3 of the EP Act, which sets out the object of the Act, provides:

> ***Object***
>
> *The object of this Act is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development).*

Furthermore, on a policy level, the Queensland Government is committed to the principles of ESD and assists industries to meet these requirements through a range of programs. These programs support the Government's 2020 vision for Queensland entitled *"Towards Q2: Tomorrow's Queensland"* which addresses five key current and future challenges: strong economy; green environment; smart education; healthy Queenslanders and fair communities. Queensland Government programs that relate to business sustainability include:

- Environmental Protection Agency (EPA) Sustainable Industries Award which is the EPA's showcase to recognise leadership and innovation in business sustainability;
- The ecoBiz program which aims to reduce energy, water and material consumption in Queensland industries; and
- The Queensland Water and Energy Sustainable Technologies Network (QWESTNet) which provides a forum to share knowledge for sustainable technologies and provides access to retailers of these technologies.

16.2.4 Principles of ESD

The principles of ESD include five key concepts:

- Long term and short term economic, environmental, social and equitable considerations;
- The precautionary principle;
- Inter-generational equity;
- Conservation of biological diversity and ecological integrity; and
- Improved valuation, pricing and incentive mechanisms.

Each of these five key concepts is discussed in detail below.

Long term and short term economic, environmental, social and equitable considerations

The principles of ESD require the effective integration of environmental considerations and resources in decision making. This may include consideration of ecosystems; people; communities; natural and physical resources; the qualities and characteristics of locations, places and areas; and the social, economic and cultural aspects of these things in the present and future.

The concept of equitable considerations may include, for example, the idea of intra-generational equity, being that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for its own generation.

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The precautionary principle

Environmental assessment involves predicting what the environmental outcomes of a development are likely to be. The precautionary principle reinforces the need to take risk and uncertainty into account.

The precautionary principle is the principle that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.

Inter-generational equity

Inter-generational equity is the concept that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

Conservation of biological diversity and ecological integrity

Biological diversity, or "biodiversity", is considered to be the number, relative abundance, and genetic diversity of organisms from all habitats (including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are a part) and includes diversity within species and between species, as well as diversity of ecosystems. For the purposes of the EIS, ecological integrity is considered in terms of ecological health.

Improved valuation, pricing and incentive mechanisms

The principles of ESD require that environmental factors be included in the valuation of assets and services. This may include concepts such as:

- Polluter pays – those who generate pollution and waste should bear the cost of containment, avoidance or abatement;
- The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste; and
- Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

This principle reflects the idea that if the real value of natural resources is incorporated into the cost of using those resources, it is more likely that these resources will be used in a sustainable manner, adequately managed, and not wasted.

16.3 The Global Context of the GLNG Project

16.3.1 Market demand for energy

The provision of adequate, reliable and affordable energy is essential to meeting the needs and aspirations of people in both developed and developing countries. Global energy demand expressed in millions of oil equivalent barrels per day is expected to increase, on average, by 1.3 per cent per year from 2005 to 2030, even with significant efficiency gains. Eighty per cent of this increase in demand is likely to come from developing countries such as China and India, where economies are growing most rapidly.

The export of energy sources is an integral part of the Australian economy. Australian energy producers face a cost increase under the Commonwealth Government's proposed Carbon Pollution Reduction Scheme (CPRS), as well as reporting requirements under the *National Greenhouse and Energy Reporting Act 2007* (Cth) and the *Energy Efficiency Opportunities Act 2006* (Cth).

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16.3.2 Increased Demand for LNG

In the transition to a lower-carbon world, Australian LNG offers a unique opportunity for Australia – both for growing the domestic economy and growing the potential to contribute to reduce global emissions.

The scale of prospective investment in Australian LNG development is already significant but is embryonic compared to its potential. Achieving this potential will bring with it economic growth; and export, employment and Government revenue benefits, while providing diversity to Australia's energy economy with increased penetration of gas in the domestic manufacturing industry and a major boost to remote regional economies in Queensland.

The Australian Petroleum Production and Exploration Association's submission to the Government on the Green Paper relating to the design of the CPRS noted that natural gas is the lowest Greenhouse Gas (GHG) emitting fossil fuel. When used for power generation, it generates less than 50 % of the emissions associated with coal-fired power and uses only a small fraction of the water. It is an abundant and affordable resource, available today and to future generations of Australians.

As part of the project EIS, a study of the relative greenhouse gas emissions of coal, oil and LNG fired energy is included in Appendix T.

There is a clear global requirement for the development of low carbon resources which are able to assist existing Australian energy producers in the country's transition to sustainable energy development and use. As a global stakeholder in the energy business, Santos recognises its responsibility to pursue energy strategies which contribute to a reduction or offset of global emissions through displacement of coal-fired energy sources. Accordingly, the provision of increased LNG supply will assist Australia to move towards a cleaner energy portfolio.

There is a global environmental benefit to encouraging the expansion of the natural gas industry, including "cleaner global contributors" like Australian LNG.

16.4 Santos' Commitment to Sustainable Development

16.4.1 Santos' Corporate Vision and Values

Santos has previously demonstrated, and will continue to demonstrate, a commitment to the principles of ESD. Santos' firm commitment to the principles of ESD is recognisable in the existing environmental initiatives in respect of its various projects.

The Santos Sustainability Report 2008 articulates Santos' corporate vision and values. The following statements are taken from that report and are also published on the Santos website.

> *Santos' vision is to be the leading energy company for Australia and Asia through delivering the base business, tapping our resource riches, being a great place to work and doing it safely and sustainably to deliver a superior shareholder return.*
>
> *We are a team that:*
>
> - *Discovers – by opening our minds to new possibilities, thinking creatively and having the courage to learn from successes and failures, to take on new challenges, to capture opportunities and to resolve problems;*
> - *Delivers – by taking personal responsibility and pride in our work to delivery timely, quality results that benefit Santos and help achieve our vision and strategy;*
> - *Collaborates - by recognising the value and power in diversity of thought and communicating openly to understand the perspective of others; demonstrating leadership by sharing what we know and respectfully challenging each other to achieve the best results for all; and*

- *Cares – by taking the long-term view to build a sustainable future for our company, our people and the environments and communities in which we operate.*

These values are the basis of Santos' commitment to operating with a view to its long-term sustainability as an energy company.

16.4.2 Santos Strategic Approach to Sustainability

In order to ensure that the GLNG Project is recognised as a leader in sustainable energy development, Santos has developed a process to identify and evaluate project-specific sustainability objectives which may be aligned with Santos' high-level goals which include:

- Developing and maintaining the GLNG Project in a manner that reflects Santos' core values of caring for its people, its community, the environment and the economy; and
- Strengthening Santos' position as a leading long-term energy company in south-east Asia.

Santos has a corporate sustainability framework document which identifies 24 sustainability indicators which need to be taken into account to ensure that the concept of sustainability is adequately addressed in the context of a project such as the GLNG Project. The sustainability indicators identified in this corporate framework document are based on the Global Reporting Initiative (GRI) G3 Guidelines, the Oil and Gas Industry Guidance on Voluntary Sustainability Reporting published by the International Petroleum Industry Environmental Conservation Association and American Petroleum Institute reporting guides.

The four key focus areas of the Santos corporate framework represent the converging realms of environmental, social and economic benefits through which sustainable development can be achieved. These are:

- Environment;
- Community;
- Our People; and
- Economic.

Santos understands that sustainable development cannot be achieved by complying with individual standards in discrete indicator areas without also addressing standards in other indicator areas.

Table 16.4.1 lists the 24 sustainability indicators.

Table 16.4.1 Santos Sustainability Indicators

Environment	Community	Our People	Economy
Air Quality	Community Wellbeing	Governance and Policy	Business Partnerships' Performance
Biodiversity and Land Disturbance	External Stakeholder Engagement	Health and Wellbeing	Financial Performance
Climate Change Management	Indigenous Rights and Cultural Heritage	Safety	New Project Development and Acquisitions
Incidents and Spills	Product Responsibility and Reputation	Workforce Capability	Research and Development
Waste Management	Social Infrastructure	Workforce Composition, Culture and Commitment	Risk Management
Water Resources	Transparency and Disclosure	Workforce Remuneration and Benefits	Supply Chain Performance

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The corporate sustainability framework is used to assess company-wide sustainability performance on an annual basis. The assessment uses a scorecard of sustainability performance, which assesses the performance of the 24 sustainability indicators on a ten-point scale. This scorecard assessment is carried out annually and results are reported to the Board and published in the annual sustainability report.

The ten-point scale, which forms the basis of the scorecard, is outlined in Table 16.4.2.

The goal for the GLNG Project is a "High Performance" rating according to the Santos scorecard for all sustainability indicators, which implies that the issue is well understood and implementation of the solution is supported across many areas of the GLNG Project.

The sustainability performance of the GLNG Project will be incorporated into Santos' annual sustainability scorecard report, as discussed in Section 16.5.

Table 16.4.2 Santos' Sustainability Scorecard

Development Phase	Implementation Rating	Description of Rating
No procedures, poor performance	Not considered	The issue has not been considered by the company, there is a lack of awareness about it, no information collected, no systems or policies in place.
	Recognition of issues	There is recognition of the issue in the company, but information is anecdotal and not collated in any systematic way. There is no policy or formalised system.
Developing policy / systems	Policy developed but no procedure or system	Information on the issue is collected but is incomplete or ad hoc. Information is not aggregated at corporate level. There is a policy in place, but no formal management system for performance monitoring.
	Developing procedure / system	Information on the issue is collected but is incomplete or ad hoc. Information may not be aggregated at corporate level. Formal strategy / procedure / process to manage issue are under development.
Putting things in place	Rollout of procedure / system	Information is collected on the issue and policies and management systems exist, but are not fully implemented.
	Partial implementation	Data are collected in an organised manner but not formally monitored for performance and anomalies, nor are they formally communicated to staff or external parties.
High performance	Implementation	Issue is formalised in the company and full information is recorded and available. This may be in the form of an implemented policy or system with periodic performance monitoring.
	Full implementation and communication	Policy and procedures implemented and effective. The issue is communicated throughout the company via training sessions and other means and external communication occurs as appropriate.
Recognised as a leader	Implementation and continuous improvement	Policy and procedures implemented and effective. Issue is reviewed to identify continuous improvement opportunities. Continuous improvement achieved.
	Innovation	Policy and procedures implemented and effective. Improvement opportunities identified and implemented are at the leading edge of industry practice.

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16.5 Project Initiatives with Respect to Sustainability

16.5.1 Project Sustainability Process

Figure 16.5.1 illustrates the sustainability planning and assessment process which has to date been, and will continue to be, undertaken for the purposes of the GLNG Project. This is an iterative process which involves identifying, assessing, progressing and re-assessing sustainability opportunities and integrating new sustainability innovations over the life of the GLNG Project. This process is commonly known in project management practices around the world as the "Plan-Do-Check-Act" cycle, and is specifically recommended in the Project Sustainability Management Guidelines recommended by the International Federation of Consulting Engineers (FIDIC), and the Australian Consulting Engineers Association (ACEA).

16.5.2 Project Sustainability Indicator Objectives

Objectives for 21 of the 24 sustainability indicators were developed during the sustainability assessment and planning process via a series of workshops involving the EIS team. These workshops reviewed the sustainability framework in detail and developed project specific objectives where relevant.

These objectives form the cornerstone of the approach to sustainability for the GLNG Project and are outlined below.

The sustainability indicator objectives have been integrated into the impact assessment process and development of mitigation measures, which are documented in the relevant sections of the EIS.

The integration of these objectives into the project, and particularly the development of detailed strategies to achieve them, is an ongoing process which will be carried on into FEED.

Santos will also integrate the GLNG Project sustainability objectives into Santos' annual sustainability scorecard report and annual sustainability reports.

Environment

Indicators	Objective	EIS Section
Air Quality.	No detrimental impact on human and ecological health.	6.8, 7.8 and 8.8.
Conservation and land disturbance.	Conservation of ecological values and maintenance of soil stability and integrity.	6.4, 7.4 and 8.4.
Climate Change.	Application of energy-efficient production and processing methods to produce a low carbon-intensity energy product.	6.9, 7.9 and 8.9.
Water Resources.	Minimal impact to water resources from associated water management. Minimal impact to marine environment.	6.7. 8.7.
Incidents and Spills.	No environmental incidents from the GLNG Project of moderate or higher consequence.	6.3.2, 7.3.2 and 8.3.2.
Waste Management.	Effective waste management beyond compliance, following the waste hierarchy.	5.

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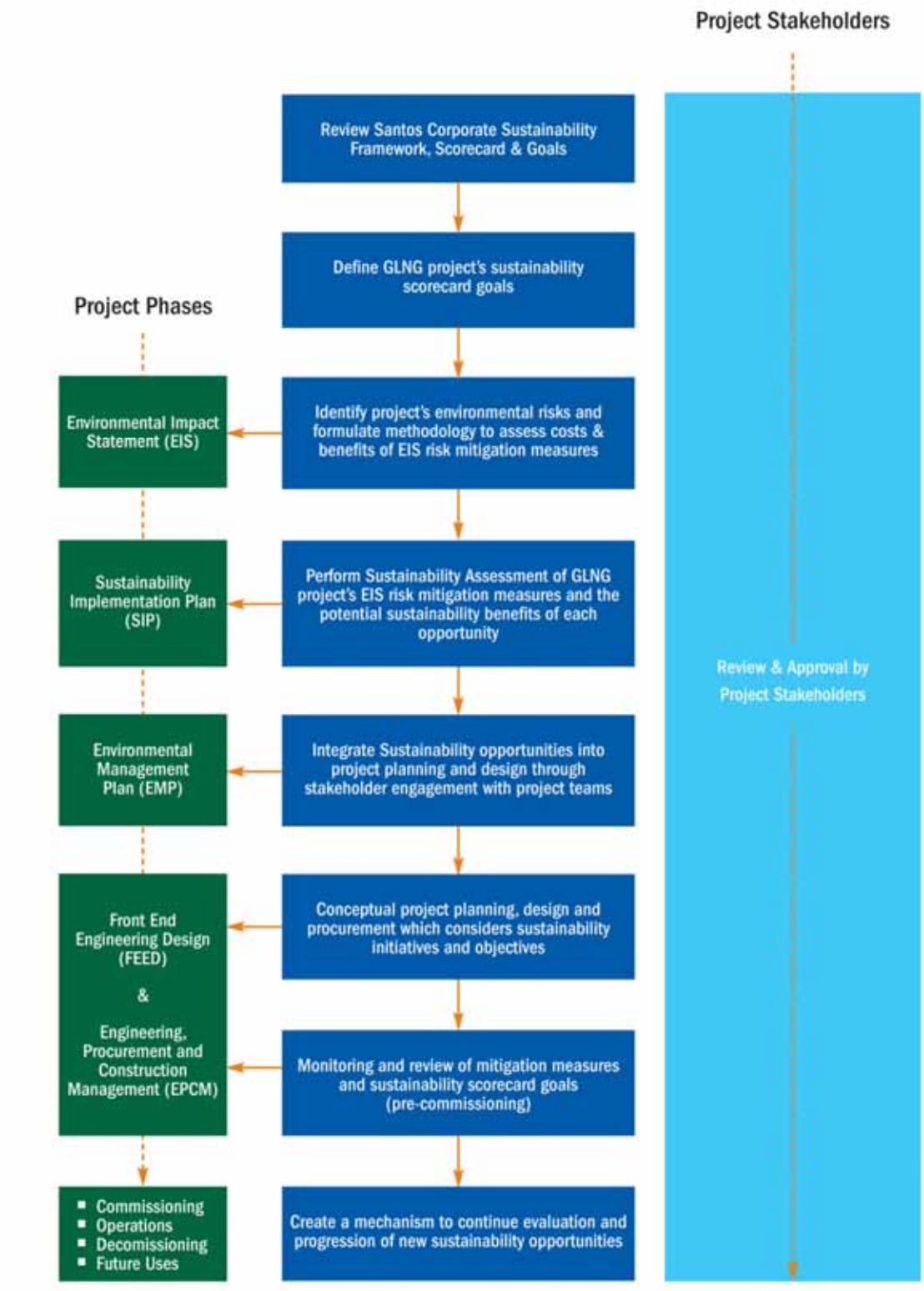

Figure 16.5.1 Sustainability Planning and Assessment Flowchart

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Community

Indicators	Objective	EIS Section
Community Wellbeing.	Strengthened and enhanced community wellbeing in the GLNG area of influence.	9.
External stakeholder engagement.	Stakeholder acceptance, support and trust.	9.
Product responsibility and reputation.	Santos' reputation in delivering coal seam gas to LNG enhanced.	9.
Social Infrastructure.	Strengthened and enhanced community development in the GLNG Project area.	6.14, 7.14 and 8.14.
Indigenous rights and cultural heritage.	Indigenous wellbeing strengthened and enhanced and cultural heritage respected in the GLNG Project area.	6.13, 7.13 and 8.13.
Transparency and disclosure.	Disclosure of the GLNG governance and project impacts to the relevant stakeholders.	9.

Our People

Indicators	Objective	EIS Section
Governance and policy.	Implementation of Santos' systems and policies to the GLNG Project to achieve a standard of governance and ethics beyond compliance.	6.14, 7.14 and 8.14.
Health and wellbeing.	Provision of a GLNG Project workplace that encourages the workforce to achieve and maintain a healthy lifestyle.	9.
Safety.	GLNG workforce goes home from work without injury or illness.	10.
Workforce capability.	Attraction and development of workforce skills, knowledge and behaviours to enable achievement of the GLNG Project goals.	6.14, 7.14 and 8.14.
Workforce composition, culture and commitment.	Alignment of project practices with Santos shared values and principles to maximise the commitment and retention of the workforce.	6.14, 7.14 and 8.14.
Workforce remuneration and benefits.	Provision of payment and benefits for job performance, in accordance with Santos Policies, to attract and retain the talented workforce for the GLNG Project.	6.14, 7.14 and 8.14.

Economic

Indicators	Objective	EIS Section
Financial performance.	Delivery of strong financial performance and returns on GLNG Project investment for shareholders.	6.15, 7.15 and 8.15.
Risk management.	Identification, assessment and mitigation of risks and maximisation of opportunities within the GLNG Project.	10.
Supply chain performance.	Optimisation of the supply chain to maximise eco-efficiency and socio-economic benefits.	6.14, 7.14 and 8.14.
Research and development.	Maximisation of innovation and its integration into all aspects of the GLNG Project life cycle.	N/A.
Business partnerships' performance.	These indicators are not applicable to individual projects in isolation.	N/A.
New project development and acquisitions.	These indicators are not applicable to individual projects in isolation.	N/A.

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A comprehensive project risk assessment has also been completed (Section 10). The design of risk mitigation measures in response to the risk assessment will incorporate sustainability assessment and will be included in the environmental management plans for the GLNG Project.

16.6 Review Against the Principles of ESD

16.6.1 Long Term and Short Term Economic, Environmental, Social and Equitable Considerations

In the course of preparing the EIS, Santos examined the potential environmental, social, cultural and economic impacts of the GLNG Project. In doing so, Santos developed and implemented a clear, transparent and repeatable framework to identify the possible impacts, benefits and risks associated with the GLNG Project.

The potential long term impacts of the GLNG Project have been assessed by leading experts in a number of fields through the carrying out of specialist studies on land, terrain and soils, terrestrial flora and fauna, aquatic flora and fauna, surface water, groundwater, the marine environment, air quality, GHG emissions, noise and vibration, visual amenity, indigenous and non-indigenous cultural heritage, and the social environment and the community. The outcomes of each of these studies are summarised in the sections of the EIS which deal with these issues.

16.6.2 The Precautionary Principle

The EIS risk assessment procedures designed and implemented for the GLNG Project have evaluated the potential for serious or irreversible harm to the environment arising out of development associated with the GLNG Project. Where potential for harm to the environment has been identified, to minimise the uncertainty as to the nature and scope of the threat of environmental damage, Santos has undertaken detailed studies to identify the risks of environmental harm. Santos has identified measures which may be implemented, where practicable, to minimise the anticipated threat of environmental damage.

An extensive range of measures have been adopted as components of the GLNG Project design to minimise the potential for either or both of serious and irreversible damage to the environment, including the development of environmental management plans that will be implemented during construction and operational phases of the GLNG Project.

The application of the precautionary principle to the GLNG Project is reflected in:

- Adoption by Santos of external and internal codes of practice, guidelines, standards and principles for environmental management and community relations activities. Examples of such codes, guidelines, standards and principles that have been adopted by Santos include:
  - Santos' corporate vision and values;
  - Santos' Environment, Health and Safety Management System (EHSMS);
  - Santos' Environment Policy;
  - Santos' Climate Change Policy; and
  - Other Santos' systems and policies relating to areas such as business conduct, social and workplace and employment.
- Comprehensive study, planning, evaluation and development of the GLNG Project proposal.

  The planning and design of the GLNG Project has taken place since early 2006. Santos has made substantial efforts, through the use of a sizeable team of staff and expert consultants, to identify all potential short and long term effects of the GLNG Project. The EIS was prepared considering approximately 12 months of site specific baseline environmental studies in respect of the GLNG Project site and its surrounding area. Project planning and environmental impact assessment was conducted on an iterative basis, according to the sustainability planning and

assessment framework, with the outcomes of environmental studies and modelling being fed back into project planning, design of mitigation measures and the environmental assessment process.

- Extensive consultation with Government, individuals in the community and community interest groups.

  Extensive consultation has taken place with a wide range of individuals and organisations including Government, industry, service providers, key community stakeholders and the general public. A variety of consultative and assessment mechanisms was used to engage stakeholders in relation to the GLNG Project. The stakeholder consultation and engagement process, and its results, are discussed in detail in Section 9.

- Objective and comprehensive environmental impact and risk assessment of the GLNG Project.

  A team of recognised experts, with extensive relevant experience, was formed to conduct the detailed assessment of key issues that needed to be assessed in the EIS. This incorporated a multi-staged approach, comprising:

  1. initial project scoping (pre EIS);
  2. development of a costed EIS investigation program (pre EIS);
  3. conduct of a strategic level, semi-quantitative risk assessment to identify key project risks that needed to be assessed in the EIS;
  4. review of EIS investigation program designs and incorporation of amendments as necessary to incorporate the findings of stage 3 work;
  5. conduct of EIS investigation programs;
  6. stakeholder consultation; and
  7. conduct of additional investigation work where required as a result of stakeholder feedback.

  The process and outcomes of these studies are discussed in the various sections of the EIS and accompanying technical appendices.

- Comprehensive environmental management systems.

  Santos is committed to implementing an environmental management system which adequately addresses all substantive risks of harm to the environment associated with the various components of the GLNG Project.

16.6.3 Inter-generational Equity

The goal of inter-generational equity will continue to play an integral role in the decisions made, and actions undertaken, by Santos in the context of the GLNG Project.

The concept of inter-generational equity has been addressed in the design and planning phase, and will continue to be relevant to the construction and operational phases of the project through:

- Assessment of the likely social impacts of the GLNG Project (see Sections 6.14, 7.14 and 8.14).
- Design and implementation of monitoring initiatives and management measures, where required, in relation to the potential impacts of the GLNG Project during construction, operation and decommissioning on affected aspects of the environment including land, water, air, flora and fauna (see Sections 6, 7 and 8). These measures aim to mitigate risks of environmental degradation in order to, amongst other things:
  - Ensure biodiversity and ecological integrity are not compromised during the GLNG Project; and
  - Retain options for future generations with respect to the use of natural resources.
- Responding to concerns expressed by the community during public consultation through consideration of issues raised during stakeholder consultation as part of the project alternative selection process (see Section 9).

- Undertaking investigation and assessment of heritage values represented in the GLNG Project area, and adopting strategies to minimise impacts on indigenous and non-indigenous cultural heritage sites where required (see Sections 6.13, 7.13 and 8.13).
- Implementation of responsible waste management strategies which will promote safety and mitigate the risks of environmental degradation of natural resources on site (see Section 5).
- Designing project rehabilitation programs to consider prior and possible future land uses to maximise the availability of good quality agricultural land.

The analysis undertaken by Santos together with the relevant EIS study specialist identified material benefits to current and future generations which are likely to come about as a result of the construction and operation of the GLNG Project. These include:

- The generation and maintenance of employment

  The Project would benefit the current and future generations through the generation and maintenance of employment, created at various stages of the GLNG Project as well as indirect employment opportunities (see Sections 6.14, 7.14 and 8.14).
- Environmental offsets

  Environmental offset initiatives may be implemented in relation to the GLNG Project in accordance with the policy, principles and guidelines that are outlined in Queensland Government Environmental Offsets Policy (QGEOP). The final offset strategy adopted will be negotiated between Santos and the regulator.
- Santos will incur the costs of the mitigation measures

  Santos will incur the costs of the mitigation measures for the GLNG Project which would result in environmental benefits (discussed above). The current and future generations will therefore have the opportunity to receive the benefits of these measures, and reallocate the funding which would otherwise be required to carry out measures necessary to improve the state of the environment to this level.
- Creation of infrastructure

  The access roads and marine facilities established for the purposes of the GLNG Project have the potential to be used for the benefit of future generations after the completion of the operational phase of the GLNG Project.
- Short and long term economic benefits

  The project will stimulate the local, regional and national economy, and provide valuable export earnings. This in turn is likely to result in benefits such as improved social welfare and improvements to infrastructure for the current and future generations.

16.6.4 Conservation of Biological Diversity and Ecological Integrity

The GLNG Project site and its surrounding area have recognised ecological values, which include listed or otherwise significant flora and fauna species and communities and habitat for migratory species.

In accordance with ESD principles, the GLNG Project addresses the conservation of biodiversity and ecological integrity by proposing a comprehensive environmental management framework designed to conserve ecological values and long term species diversity as far as practicable (see Sections 6.4, 7.4 and 8.4) throughout the design and planning of the GLNG Project. This ideal will remain at the forefront of Santos' decision making and actions in the construction, operational and decommissioning and rehabilitation phases of the GLNG Project.

Santos' awareness of the need to conserve biological diversity and ecological integrity as far as practicable is evidenced by:

- The GLNG Project infrastructure having been designed to minimise impacts on the existing environment where practicable. For example, the co-location of the gas transmission pipeline right of way (ROW) where practicable with the QGP ROW so as to minimise habitat fragmentation;
- The implementation of operating procedures including site selection protocols to identify the potential for disturbance of new ground and selection of well sites and associated infrastructure to avoid disturbance to endangered, vulnerable and rare and threatened flora species as far as possible and to minimise fragmentation and habitat disturbance of protected species; and
- The implementation of proven operating systems and pollution control measures for the GLNG Project. The potential for environmental degradation will be minimised through training of personnel, environmental auditing and the development of contingency plans that would be implemented in the case of an emergency which is likely to impact on the environment.

16.6.5 Improved Valuation, Pricing and Incentive Mechanisms

One of the most common broad underlying goals or concepts of sustainability is economic efficiency, including improved valuation of the environment. Resources should be carefully managed to maximise the welfare of society, both now and for future generations. Consideration of economic efficiency, with improved valuation of the environment and carbon emissions, aims to overcome the underpricing of natural resources and has the effect of integrating economic and environmental considerations in decision making, as required by ESD.

Having regard to this principle of ESD, the economic assessment of the GLNG Project carried out for the purposes of Sections 6.15, 7.15 and 8.15 incorporated environmental values (see Sections 6, 7 and 8).

16.7 Matters of National Environmental Significance – Sustainability Considerations

The principles of ESD have influenced the manner and extent to which possible impacts on the matters of national environmental significance have been assessed and addressed in the planning and design of the GLNG Project. The principles of ESD will continue to guide Santos in the context of matters of national environmental significance in the construction, operational, decommissioning and rehabilitation phases of the GLNG Project.

Possible project impacts on the matters of national environmental significance are discussed in detail in the EPBC Act report (Appendix G). These impacts include:

- Listed threatened species and ecological communities;
- Listed migratory species;
- Declared World Heritage property; and
- National Heritage places.

16.8 Conclusion

This section of the EIS has demonstrated Santos' commitment to the principles of ESD in the design of the GLNG Project and the ways in which these principles will be integrated into the construction, operational, decommissioning and rehabilitation phases of the GLNG Project. This section is intended to be used as the basis for ensuring continuing integration and realisation of sustainability objectives as the GLNG Project moves into FEED.