Western Australian Technology and Industry Advisory Council
Annual Activity Report 2010–2011

Hon John Day MLA
Minister for Science and Innovation
Level 13
Dumas House
2 Havelock St
WEST PERTH WA 6005

Dear Minister

On behalf of the Western Australian Technology and Industry Advisory Council (TIAC), I am pleased to submit the TIAC Annual Activity Report for the year ending 30 June 2011, for your information, and subsequent presentation to Parliament in accordance with Section 26(1) and Section 26(2) of the *Industry and Technology Development Act 1998* (ITD Act).

TIAC has also reported through the Department of Commerce Annual Report and Financial Statement in accordance with Section 26(3) of the ITD Act in compliance with Section 62 of the *Financial Administration and Audit Act 1985*.

Yours sincerely

Mr Alan Bansemer
Chair

26 August 2011

On behalf of Council members:

Current members (as of 30 June 2011)

Mr Alan Bansemer
Professor Lyn Beazley AO
Mr Colin Beckett
Mr Brian Bradley
Dr Mal Bryce AO
Professor Shaun Collin
Professor Barry Marshall AC
Dr Beverley Ronalds
Dr Jim Ross AM

Mr Charles Morgan (resigned 22 March 2011)
Mr John Poynton AM (resigned 6 April 2011)

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Introduction

The members of the new Western Australian Technology and Industry Advisory Council (TIAC) were appointed by the Minister for Science and Innovation, and endorsed by the State Cabinet, on 6 December 2010 under provision of the *Industry and Technology Development Act 1998* (ITD Act).

The members were selected on merit as representatives of the State's economic strengths to provide advice to the Western Australian (WA) Government on the strategy directions for industry, science and innovation in WA.

TIAC reports through the Minister to Parliament under Section 26(1) and Section 26(2) of the ITD Act. TIAC reports under the *Financial Administration and Audit Act 1985* through the Department of Commerce under Section 26(3) of the ITD Act.

TIAC Membership

The members of TIAC during 2010–2011 were:

Mr Charles Morgan
TIAC Chair (8 December 2010 to 22 March 2011)
Managing Director
Seaspin Pty Ltd

Professor Lyn Beazley AO
Western Australian Chief Scientist
(Term expiry: 31 December 2011)

Mr Colin Beckett
General Manager, Gorgon
Chevron Australia Pty Ltd
(Term expiry: 30 June 2013)

Dr Mal Bryce AO
Chair
iVEC
(Term expiry: 30 June 2012)

Professor Shaun Collin
Western Australian Research Fellow
The University of Western Australia
(Term expiry: 30 June 2013)

Professor Barry Marshall AC
Nobel Laureate
The University of Western Australia
(Term expiry: 30 June 2012)

Mr Alan Bansemer
TIAC Chair (from 30 May 2011)
Director
Banscott Health Consulting Pty Ltd
(Term expiry: 30 June 2013)

Mr John Poynton AM (8 December 2010 to 6 April 2011)
Executive Director
Azure Capital

Dr Beverley Ronalds
Group Executive
CSIRO Energy Group
(Term expiry: 30 June 2013)

Dr James Ross AM
Chairman
Earth Science Western Australia
(Term expiry: 30 June 2012)

Mr Brian Bradley (*ex officio*)
Director General
Department of Commerce

Resignations and New Appointment

On 22 March 2011, Mr Charles Morgan officially resigned from his position as Chair and member of TIAC.

A Deputy Chairperson (Mr Brian Bradley) was appointed during the 5 April 2011 TIAC meeting to exercise the powers and functions of the Chair for the purpose of the meeting.

The appointment of Mr Alan Bansemer as the new Chair of TIAC by the Minister for Science and Innovation, the Hon John Day MLA, was approved by the State Cabinet on 30 May 2011.

On 6 April 2011, Mr John Poynton AM officially resigned from his position as a member of TIAC.

Objects of the *Industry and Technology Development Act 1998*

The objects of the ITD Act (Section 3) are to:

1) promote and foster the growth and development of industry, trade, science, technology and research in the State;
2) improve the efficiency of State industry and its ability to compete internationally;
3) encourage the establishment of new industry in the State;
4) encourage the broadening of the industrial base of the State; and
5) promote an environment which supports the development of industry, science and technology and the emergence of internationally competitive industries in the State.

Functions of the Western Australian Technology and Industry Advisory Council

The Council, under Section 21 of the ITD Act, is required to:

1) provide advice to the Minister, at the initiative of the Council or at the request of the Minister, on any matter relating to the objects of the *Industry and Technology Development Act 1998*; and
2) carry out, collaborate in or procure research, studies or investigations on any matter relating to the objects of the Act, including matters relating to the:
    a) role of industry, science and technology in the policies of government;
    b) social and economic impact of industrial and technological change;
    c) employment and training needs and opportunities relating to industrial, scientific and technological activities in the State;
    d) adequacy of, priorities among and co-ordination of, scientific, industrial and technological activities in the State;

e) methods of stimulating desirable industrial and technological advances in the State;

f) application of industrial, scientific and technological advances to the services of the Government; and

g) promotion of public awareness and understanding of development in industry, science and technology.

Ministerial Directions

The Minister, under Section 25 of the ITD Act, may give directions in writing to the Council with respect to the performance of its functions or the exercise of its powers.

The TIAC Chair received the following directions in writing from the Minister for Science and Innovation, the Hon Bill Marmion MLA, on 7 December 2010:

"The functions of the Western Australian Technology and Industry Advisory Council (TIAC) are clearly defined in Part 6 Section 21 of the *Industry and Technology Development Act 1998* (ITD Act).

In the context of these functions, the Minister requests that the Council provide him with the following advice and deliver the following activities:

- develop an overall strategy including priorities and goals, to be communicated to all stakeholders, to guide industry, science and innovation investments and activities in Western Australia, in line with the objects defined in the ITD Act*;*
- continuously inform and evolve the overall strategy by engaging with relevant stakeholders in industry, academia and government to identify opportunities to develop and strengthen the State's competitive advantages and maximise benefits to Western Australia;
- provide advice regarding the improvement of systems used by government agencies to manage industry, science and innovation investments and initiatives;
- develop a report, to be updated annually, measuring and evaluating industry, science and innovation investment and initiatives to establish a baseline for these activities in the State and to identify critical areas of priority;
- provide advice regarding the development of whole-of-government priorities and strategies to support better collaboration and coordination within government, with particular focus on encouraging the development of programs and initiatives supporting innovation across government agencies;
- provide advice on strategies to increase the level of Federal funding for research and industry initiatives to Western Australia; and
- provide advice, when requested by the Minister, on selected funding recommendations from government agencies regarding industry, science and innovation investments, to ensure that these are aligned with the overall strategy."

TIAC Activities in 2010–2011

Charter and Operating Protocol

At its first meeting in December 2010, the Council approved the TIAC Charter which encompasses the objects of the ITD Act and the Code of Conduct (Appendix 1).

The Council also approved and endorsed an Operating Protocol which outlines the operating arrangements between the Council and the Department of Commerce (Appendix 2).

From Strength to Strength Report

The interim Council for Science and Innovation produced a report, titled *From Strength to Strength - An Innovation Plan for Driving Western Australia's Future Prosperity*, as part of their term of operation from December 2009 to 30 June 2010.

The report made 12 recommendations for an innovation plan for driving Western Australia's prosperity, which included recommendations on strategy, leadership, investment and implementation.

The report was endorsed by TIAC out of session and was published on the TIAC website on 18 March 2011.

Addressing the Ministerial Directions

The Ministerial directions have been progressed by TIAC as follows:

1. **Direction**:
   - *develop an overall strategy including priorities and goals, to be communicated to all stakeholders, to guide industry, science and innovation investments and activities in Western Australia, in line with the objects defined in the ITD Act.*

   Action:

   As a starting point for developing a high-level, overall strategy for the next two to five years, the Council endorsed the *From Strength to Strength* report's recommendation that industry-research-government collaboration should be stimulated within specific sectors in order to identify opportunities to build on existing strengths, or address market gaps or failures.

   The Council also endorsed the following four value-creating sectors identified in the report as areas where industry-research-government collaboration could be stimulated:
   - Minerals (including minerals technologies);
   - Gas (including petroleum technologies);
   - Environment; and
   - Medical, including preventative health.

   In addition, TIAC designated broadband and science education as 'enablers' to support these priority areas.

2. **Direction**:

   - *continuously inform and evolve the overall strategy by engaging with relevant stakeholders in industry, academia and government to identify opportunities to develop and strengthen the State's competitive advantages and maximise benefits to Western Australia.*

   Action:

   In March 2011, the Council hosted stakeholder consultation forums with key stakeholders in three of the four value-creating sectors as part of the preliminary steps in developing the overall strategy. Feedback from the consultations will be used to identify priorities and associated activities aimed at supporting the development and growth of Western Australia's key sectors.

3. **Direction**:

   - *provide advice regarding the improvement of systems used by government agencies to manage industry, science and innovation investments and initiatives.*

   Action:

   The Council provided strategic direction regarding the development of the Department of Commerce's evaluation framework for science and innovation investments. The evaluation framework, developed in line with recommendations from the *From Strength to Strength* report and the 2009 Western Australian Science and Innovation Review, will help guide future State Government investments in science and innovation.

   The Council established a working group which provided in-depth feedback through various stages of the evaluation framework's development. The Council's recommendations for the current priority areas for State Government investment was a critical input into the evaluation framework.

   The evaluation framework is one element of the department's new process for assessing and prioritising science and innovation investments. The department has also developed five new Western Australian Innovation Development Schemes. The Council reviewed the scheme guidelines and provided feedback to the department. The Minister for Science and Innovation has since approved the new schemes.

4. **Direction**:

   - *develop a report, to be updated annually, measuring and evaluating industry, science and innovation investment and initiatives to establish a baseline for these activities in the State and to identify critical areas of priority.*

   Action:

   The Council is currently considering options for this report.

5. **Direction**:

   - *provide advice regarding the development of whole-of-government priorities and strategies to support better collaboration and coordination within government, with particular focus on encouraging the development of programs and initiatives supporting innovation across government agencies.*

   Action:

   The State Government has identified the need for a more innovative public sector and has publicly committed to fostering and raising the profile of innovation in WA and advancing the growth of WA's innovation-based industries.

   The Council had some preliminary involvement in the current State Government initiatives to encourage innovation in the public sector. For example, the Council provided feedback on the Department of Commerce's preparation of the business case for the creation of an Innovation Gateway in collaboration with other stakeholders, including local, Federal and other State Government agencies. The proposed Innovation Gateway will be a centralised on-line portal detailing innovation and commercialisation initiatives and services across Western Australia.

   The Council has also corresponded with the Department of Agriculture and Food WA (DAFWA), which is the lead agency in progressing innovation in the Western Australian public sector.

6. **Direction**:

   - *provide advice on strategies to increase the level of Federal funding for research and industry initiatives to Western Australia.*

   Action:

   The Council provided advice in the evaluation process for the initial funding round of the department's new Innovation Co-investment Program (ICP). The ICP aims to leverage significant Commonwealth/international/industry R&D funding into the state, including funding through the Commonwealth Cooperative Research Centres (CRC) Program. Two TIAC members (Professor Lyn Beazley and Dr Beverley Ronalds) sat on the four-member evaluation panel for the initial 2011 ICP round, which was specifically for WA-based applicants submitting a bid to the 14th CRC Program Selection Round.

   In addition, the Council noted that there is a need to increase, and support existing, Western Australian representation on Commonwealth panels related to science and innovation.

7. **Direction**:

   - *provide advice, when requested by the Minister, on selected funding recommendations from government agencies regarding industry, science and innovation investments, to ensure that these are aligned with the overall strategy.*

   Action:

   At the Minister's request, the Council provided feedback on the Department of Commerce's proposed notional funding allocations for the Research and Innovation Fund for 2011–2012.

Website

The Council commissioned the creation of a new TIAC website to increase awareness and understanding of the Council's role, priorities and activities among internal and external stakeholders (including the general public), and to distinguish themselves from previous advisory bodies.

The website includes profiles and photographs of the Council members, information about the Council's current activities and downloadable copies of TIAC reports and other publications. There is also an internal members-only area of the website.

The website was created by Alyka Web Design and was released to the public on 9 March 2011. The website can be found at www.tiac.wa.gov.au.

Stakeholder Consultation

The stakeholder consultation forums hosted by the Council in March 2011 targeted the following three value-creating sectors: Minerals, Gas (and Petroleum), and Environment. The Council commissioned Integral Development Associates Pty Ltd to coordinate these forums and prepare summary reports.

The Council's aims for the forums were to:

- engage, and build relationships, with key stakeholders in each sector to promote TIAC's work and give stakeholders an opportunity to influence TIAC initiatives and planning; and
- gain a good overview of stakeholder views and opinions on:
  - current issues in each sector (particularly related to innovation and science/technology), including needs, strengths, weaknesses, market failures and gaps;
  - actions needed to address the identified current issues, including the role of the Western Australian Government and recommended priority actions for the State Government; and
  - key opportunities for each sector from the National Broadband Network (NBN) roll out.

The invited participants at each consultation forum were key stakeholders in each sector drawn from industry, research and government. Council members aligned with particular sectors attended the respective sector forum as a TIAC representative as below:

- Minerals – Dr Jim Ross (Earth Science WA)
- Gas (and Petroleum) – Mr Colin Beckett (Chevron Australia)
- Environment – Professor Shaun Collin (University of Western Australia Oceans Institute). Professor Lyn Beazley, the WA Chief Scientist, also attended this forum.

A draft report was prepared following each sector forum and sent to the respective participants for their feedback. The Council reviewed the final reports in preparation for the development of sector plans. The final reports are provided in the appendices section (as Appendix 3, 4 and 5).

A fourth stakeholder consultation forum targeting the Medical (including Preventative Health) sector was not held due to low attendance responses.

Research Report: Performance Assessment of Department of Commerce Science and Innovation Programs

The Council requested that the outcomes of three major science and innovation funding programs administered through the Department of Commerce be assessed and evaluated.

The programs included in the performance assessment were the:

- Western Australian Major Research Facility (WAMRF) Program;
- Centres of Excellence (COE) in Science and Innovation Program; and
- Western Australian Premier's Research Fellowship (WAPRF) Program.

The purpose of the assessment was to compare the impact of State Government investment in the programs, and to assess the level of success that projects from each program had in delivering the relevant program's aims.

A selection of the projects with the most comprehensive data available was included in the assessment for each program. These tended to be the most recent projects and mainly received State Government funding during the last ten years.

No new funding will be allocated to the assessed programs. However, the findings of the assessment may be used to inform funding strategies and recommendations for new programs.

The Council agreed to fund contractors to complete the assessment. Data collation for the assessment was commenced by Beth Cameron, and completed by Lucy Dunne who also developed the report. As of 30 June 2011, the report is being finalised with a planned release date of July 2011.

Science Education Committee

At its second meeting in February 2011, the Council approved the establishment of a TIAC Science Education Committee, comprising the following TIAC members: Professor Lyn Beazley, Professor Shaun Collin and Dr Jim Ross.

The committee aims to develop recommendations and initiatives that support science, technology, engineering and mathematics (STEM) education in Western Australia's primary and secondary schools.

Review of the ITD Act

Council members were informed that the Minister for Science and Innovation is undertaking a review of the *Industry and Technology Development Act 1998* (ITD Act), as per Section 32 of the Act.

Financial Provisions

The expenses of Council are provided for under Section 15 of the ITD Act via the Western Australian Industry and Technology Development Account.

TIAC was allocated a total budget for 2010–2011 of $551,000.

Members' Remuneration

Council members' remuneration was recommended by the Public Sector Commissioner under provisions of Section 24 of the ITD Act as follows:

(a) Chairperson's Salary:	$40,000 (per annum)
(b) Member's Sitting Fee – Non-Public Sector:	$660 (per meeting)
(c) Member's Sitting Fee – Public Sector:	Nil.

TIAC met four times between the Council's appointment in December 2010 and 30 June 2011: on 21 December 2010, 1 February 2011, 5 April 2011 and 7 June 2011.

Council Support Branch

As per the Operating Protocol between the Department of Commerce and the Council, the department makes a team of staff (known as the Council Support Branch) available to TIAC, who provide the following services to the Council:

- secretariat support:
  - minutes
  - agenda
  - conflict of interest registry
  - booking conference attendance;
- project management support;
- budget and financial administration;
- public interest disclosure officer; and
- direct advice.

The Director of the Department of Commerce's Policy, Science and Project Management Directorate is the main point of contact for TIAC, and liaises with the Council Support Branch and TIAC to ensure continuity of information and advice (as per the Operating Protocol).

The Director attends TIAC meetings as an observer. Two members of the Council Support Branch (the General Manager and the TIAC Executive Officer) also attend TIAC meetings as observers.

Financial Statement

TIAC reports under the *Financial Administration and Audit Act 1985* through the Department of Commerce Annual Report and Financial Statements.

Outlook for 2011–2012

TIAC Research Project: An Analysis of the Impact of Key Initiatives Supporting Primary and Secondary STEM Education in Western Australia and Strategies to Improve the Teaching, Literacy and Perceptions of STEM

The Council's Science Education Committee has established a Science Education Working Group to oversee the committee's initial research project, which will review the key programs/initiatives supporting science, technology, engineering and mathematics (STEM) education in Western Australia's primary and secondary schools.

The members of the Science Education Working Group are:

Dr Jim Ross (Chair)
TIAC Member

Professor Lyn Beazley
TIAC Member

Mr Alan Brien
CEO, Scitech

Mr John Clarke
CEO, Science Teachers Association of Western Australia

Professor Shaun Collin
TIAC Member

Professor Vaille Dawson
Science & Mathematics Education Centre, Curtin University of Technology

Dr Pamela Garnett
Dean of Curriculum, St Hilda's Anglican School for Girls

Ms Louise Nielsen
Principle Consultant, Policy and Advice Department of Education WA

Mr David Wood
Public Sector Commission
(former CEO, Curriculum Council)

The project, to be conducted by an external consultant, will deliver a report that will:

- map and analyse the key existing state, national and local community-based STEM education support programs/initiatives (public, private, formal and informal) in Western Australia and assess their impact and effectiveness; and
- provide recommendations for suitable strategies that TIAC could recommend to government and more widely to improve STEM teaching, literacy and perception in Western Australia's primary and secondary schools.

As at 30 June 2011, the request for quotation process to select a suitable consultant has progressed to the stage of evaluating the submissions. The Science Education Working Group's three-member evaluation panel will make its recommendation as to the successful respondent in the next financial year.

The project will commence once the contract has been formally awarded to the selected consultant, with a view to completion of the report in December 2011.

The Council's Science Education Committee, and the Science Education Working Group, expect that the initial study will identify actions that may require a more substantial follow up study with more specific objectives during 2011–2012.

Appendices

Appendix 1

Western Australian Technology and Industry Advisory Council Charter

TIAC

Technology and Industry Advisory Council

Western Australian
Technology and Industry Advisory Council

Charter

WESTERN AUSTRALIAN TECHNOLOGY AND INDUSTRY ADVISORY COUNCIL CHARTER

Contents

Introduction

The Technology and Industry Advisory Council (Council) is established under the *Industry and Technology Development Act 1998* (ITD Act).

Objective

The objects of the ITD Act under Section 3 are:

- to promote and foster the growth and development of industry, trade, science, technology and research in the State;
- to improve the efficiency of State industry and its ability to compete internationally;
- to encourage the establishment of new industry in the State;
- to encourage the broadening of the industrial base of the State; and
- to promote an environment which supports the development of industry, science and technology and the emergence of internationally competitive industries in the State.

According to Section 21 of the ITD Act:

1. The Council is to —
    a. provide advice to the Minister, at the initiative of the Council or at the request of the Minister, on any matter relating to the objects of this Act; and
    b. carry out, collaborate in or procure research, studies or investigations on any matter relating to the objects of this Act, including matters relating to:
        i. the role of industry, science and technology in the policies of government;
        ii. the social and economic impact of industrial and technological change;
        iii. employment and training needs and opportunities relating to industrial, scientific and technological activities in the State;
        iv. the adequacy of, priorities among and co ordination of, scientific, industrial and technological activities in the State;
        v. methods of stimulating desirable industrial and technological advances in the State;
        vi. the application of industrial, scientific and technological advances to the services of the Government; and
        vii. the promotion of public awareness and understanding of development in industry, science and technology.
2. The Council may publish and make available any report or finding produced as a result of any research, study or investigation under subsection (1).
3. The Council is to liaise with and advise any person, body or organization with respect to the conduct of any research, study or investigation into a matter relating to industry, science and technology in the State.
4. In carrying out its functions the Council is to —
    a. have regard to the needs of the Western Australian community and the resources of the State;

b. promote developments in industry, science and technology that increase productivity and competitiveness; and
c. support developments that create employment opportunities.

5. The Council has the power to do all things necessary or convenient to be done for or in connection with the performance of its functions.

Reviewing

The Charter and Code of Conduct will be reviewed annually.

Reporting Structure

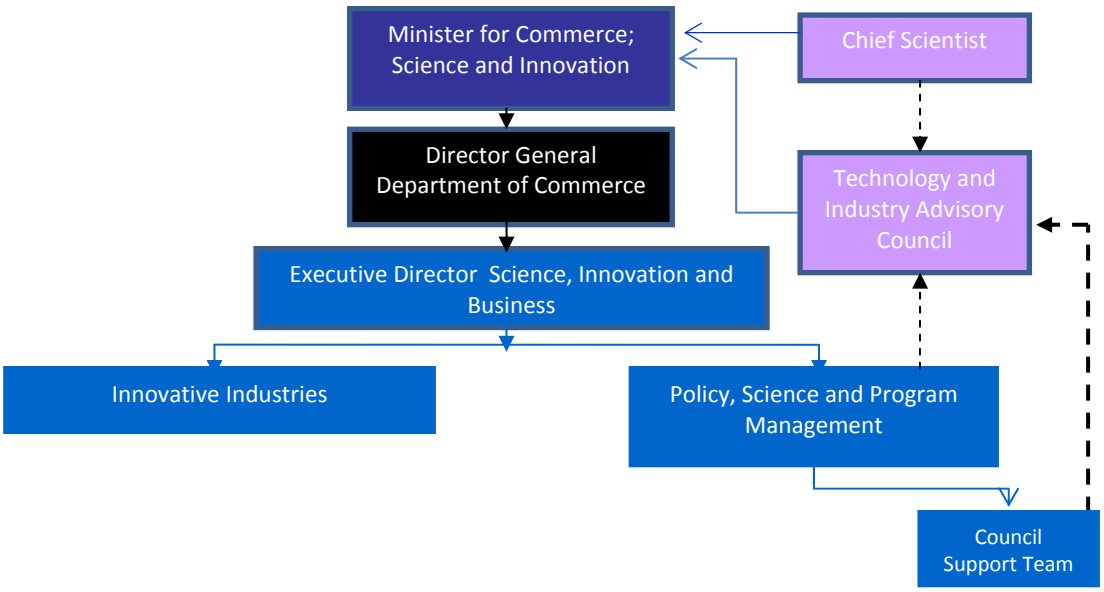

Diagram: Technology and Industry Advisory Council reporting structure in relation to the Department of Commerce.

Structure of the Council

The Minister is to appoint a chairperson of the Council from among the appointed members of the Council.

The Council will include members with wide experience in industry and innovation in practice.

Members will be appointed for a term as specified in their appointment, not exceeding three years, but may from time to time be re-appointed.

Resignation, removal, etc.

As per ITD Act 1998 Section 23 Schedule 1 (2.1 and 2.1).

Minister may give directions

The Minister may give directions in writing to the Council with respect to the performance of its functions or the exercise of its powers, either generally or in relation to a particular matter, and the Council is to give effect to any such direction.

The text of a direction given under subsection (1) is to be included in the annual report of the Council under Section 26.

Operations

The Council will meet at the times and places that the Council determines at intervals not longer than 2 months.

The Director, Policy, Science and Program Management will be the main point of contact between TIAC and the Department of Commerce. The Director will be invited to attend TIAC meetings as an observer.

A board coordinator, appointed by the Department of Commerce, will coordinate meetings and prepare minutes which will be recorded and stored in accordance with public sector record management standards.

The Chairperson, will submit a copy of the minutes of each meeting to the Minister within 14 days after the meeting at which the minutes were confirmed.

Annual report of the Council

The Council, must, as soon as practicable after 1 July, and in any event on or before 31 August, in each year, prepare and give to the Minister a report on its operations and proceedings for the previous financial year.

The Minister is to cause the Council's report to be laid before each House of Parliament within 7 sitting days of the House after the Minister has received it.

This section does not affect any duty of the accountable authority of the department under Part 5 of the *Financial Management Act 2006* to prepare and submit an annual report containing information about the Council or the operation of that Act in relation to that annual report.

Remuneration or Sitting Fees

Members are remunerated under Section 24 of the ITD Act 1998.

Code of Conduct

This Code of Conduct (Code) is based on the Western Australian Public Sector Code of Ethics (Code of Ethics) as issued by the State Government's Public Sector Commissioner. It is applicable to most public sector bodies, including boards, and Councils created for a public purpose under Western Australian legislation.

In this Code, "member" means a Technology and Industry Advisory member duly appointed by the Minister under the ITD Act 1998.

Members are expected to:

- Act with care and diligence and make decisions that are honest, fair, impartial, and timely and consider all relevant information.

- Treat people with respect, courtesy and sensitivity and recognise their interests, rights, safety and welfare.

- Use the resources of the state in a responsible and accountable manner that ensures the efficient, effective and appropriate use of human, natural, financial and physical resources, property and information.

Personal behaviour

Members are expected to:

- act ethically and with integrity;
- act according to the legislative requirements, policies and ethical codes that apply;
- make decisions fairly, impartially and promptly, considering all available information, legislation, policies and procedures;
- treat members of the public and colleagues with respect, courtesy, honesty and fairness, and have proper regard for their interests rights, safety and welfare;
- not harass, bully or discriminate against colleagues, members of the public and support staff;
- contribute to a harmonious, safe and productive work environment by their work habits, and professional workplace relationships; and
- serve the government of the day by fulfilling their purpose and statutory requirements.

Communication and official information

Members are expected to:

- not disclose official information or documents acquired through their work, other than as required by law or where proper authorisation is given;
- not misuse official information for personal or commercial gain for themselves or another;
- adhere to legal requirements, policies and all other lawful directives regarding communication with Parliament, ministers, ministerial staff, lobbyists, members of the media and members of the public generally; and
- respect the confidentiality and privacy of all information as it pertains to individuals.

Fraudulent and corrupt behaviour

Members are expected to:

- not engage in fraud or corruption;
- report any fraudulent or corrupt behaviour;
- report any breaches of the code of conduct; and
- understand and apply the accountability requirements that apply.

Use of public resources

Members are expected to:

- be accountable for official expenditure;
- use publicly-funded resources diligently and efficiently. These include office facilities and equipment, vehicles, cab charge vouchers, corporate credit cards;
- not use office time or resources for party political work or for personal gain, financial or otherwise;
- keep to policies and guidelines in the use of computing and communication facilities, and use these resources in a responsible and practical manner; and
- be careful to ensure that any travel for official purposes is only done so when absolutely necessary.

Record keeping and use of information

Members are expected to:

- record actions and reasons for decisions to ensure transparency;
- ensure the secure storage of sensitive or confidential information;
- comply with the public sector record keeping plan; and
- where permissible, share information to fulfill their role.

Conflicts of interest

Under Schedule 1 (16). *Disclosures of Interests* of the ITD Act 1998, a member who has a material personal interest in a matter being considered or about to be considered by the Council must, as soon as possible after the relevant facts have come to the member's knowledge, disclose the nature of the interest at a meeting of the Council. Penalty: $5,000.

A disclosure under subclause (1) is to be recorded in the minutes of the meeting.

In addition, members are expected to:

- ensure personal or financial interests do not conflict with their ability to perform their official duties in an impartial manner;
- manage and declare any conflict between their personal and public duty; and
- where conflicts of interest do arise, ensure they are managed in the public interest.

Public Sector Requirements

The Public Sector Commissioner monitors compliance with the WA Public Sector Code of Ethics and applicable codes of conduct. The commissioner may report any public sector bodies, found to be in breach of the codes, to their relevant Minister and to Parliament.
Accordingly members on appointment will

- Receive a copy of this Charter and are expected to read and abide by it.
- Receive a copy of the Western Australian Public Sector Code of Ethics and are expected to read and comply with it.
- Receive a copy of the ITD Act 1998 and are expected to read and abide by it.

The Board accepts the minimum requirements set out in the Conduct Guide for Boards and Committees. This code of conduct builds on these minimum requirements.

Legislation, Policies and Procedures
Members will be subject to the following legislation, policies and procedures.

Relevant legislation

Auditor General Act 2006
Contact with Lobbyists Code
Corruption and Crime Commission Act 2003
Equal Opportunity Act 1984
Fair Trading Act 1987
Financial Management Act 2006
Financial Administration and Audit Act 1985
Freedom of Information Act 1992
Industrial Relations Act 1979
Industry and Technology Development Act 1998
Occupational Safety and Health Act 1984
Parliamentary Commissioner's Act 1971
Public Interest Disclosure Act 2003
Public Sector Management Act 1994
State Records Act 2000
State Superannuation Act 2000
State Supply Commission Act 1991
Statutory Corporations (Liability of Directors) Act 1996
Western Australian Equal Opportunity Act 1984
The Criminal Code
Other general requirements may be imposed by:
Administrative Instructions, Approved Procedures, Public Sector Commissioner's Circulars, Premiers Circulars and Delegations, Treasurer's Instructions

Relevant policies/guidelines

Western Australian Public Sector Code of Ethics 2002
Public Sector Standards in Human Resource Management 2001
Department of Premier and Cabinet Disciplinary Procedures Guide
Equal Opportunity Policy
Grievance Resolution Policy and Guidelines
Bullying Policy Among Staff at DOCEP
Prevention of Violence Against DOCEP Employees
Reporting Misconduct Policy and Procedures
Freedom of Information 1 & 2
Penalties for Non Compliance with Records Management Legislation
Customer Service Charter
Occupational Health and Safety Policy

Appendix 2

Operating Protocol Agreement

OPERATING PROTOCOL

AGREEMENT

Version 1, 21 December 2010

To be held by the Department of Commerce

PARTIES BOUND

This protocol is between

The **Department of Commerce, (the Department)**

AND

The **Western Australian Technology and Industry Advisory Council, (TIAC)**

PURPOSE

This Operating Protocol (Protocol) sets out a common understanding between the parties as a voluntary statement of intent and contains the serious commitment of both parties at the time the Protocol is signed for the duration of the Protocol.

This document outlines the basis of a new (or renewed) relationship and the agreed objectives between the partners of this agreement for the purpose of developing a governance framework for the effective engagement and operations between the parties.

This protocol is not intended to create legally enforceable obligations between the parties.

PERIOD OF OPERATION

This protocol (1st Edition) commences on 1 November 2010 and will continue to operate until the parties mutually agree to terminate the Protocol for any reason. A review of this protocol will take place within 12 months of commencement.

BACKGROUND

In early 2009, the former Minister for Commerce; Science and Innovation announced a review of the State Government's science and innovation advisory bodies, known as the Western Australian Science and Innovation Review (the Review).

On completion of the Review, the "ITS for WA" report (the Report) was tabled in June 2009.

A key recommendation of the report was the creation of a single, independent body, to provide a strategic, long term vision and direction for science and innovation in the State.

This single body already operates under the *Industry and Technology Development Act 1998* (ITD Act) and is known as the Technology and Industry Advisory Council (TIAC).

TIAC will operate under existing authority under the ITD Act and members will be appointed by Cabinet.

In the past, TIAC were provided with in-kind administrative support staff through the responsible Department. This support team operated independently from the Department.

It is the intention of the Department of Commerce to incorporate this support staff within the Department.

This protocol sets out the governance arrangements for interaction between TIAC and the Department including the provision of administrative support, sharing of resources, processes for provision of advice to government and dealing with confidentiality issues, on an operational level.

INTENT OF THE PARTIES

It is the intent of this protocol to:

- facilitate a spirit of partnership and cooperation between the parties;
- define the governance arrangements between the parties;
- build on and enhance the strong working relationships that already exist between the parties; and
- communicate the processes for efficiently coordinating resources and facilities so as to avoid duplication and gaps.

VARIATIONS TO THIS PROTOCOL

Either party may request variations to this protocol. Proposed variations will be addressed through discussion between the Director General, Department of Commerce, and the Chair, TIAC. Variations are to be effected in writing.

COUNCIL SUPPORT TEAM

The Department of Commerce will make available to TIAC a team of staff, known as the Council Support Team, who will provide the following services to TIAC:

- secretariat support;
    - minutes
    - agenda
    - conflict of interest registry
    - booking conference attendance
- project management support;
- budget and financial administration;
- public interest disclosure officer; and
- direct advice.

This team will comprise employees of the Department of Commerce, who will remain as employees of the Department of Commerce and operate in accordance with departmental policies and the *Public Sector Management Act*

1994. They will be selected and appointed by the Department through standard public sector recruitment processes.

The Director, Policy, Science and Program Management will be the main point of contact for TIAC. Their role will be to liaise with the Council Support Team and TIAC to ensure continuity of information and advice.

The Director will be invited to attend TIAC meetings as an observer.

DIRECT ADVICE TO TIAC

Under the ITD Act, TIAC is to provide advice to the Minister, at the initiative of the Council or at the request of the Minister, on any matter relating to the objects of the Act.

The Council Support Team will have the authority and the mandate to provide advice to TIAC, or to assist in the development of advice, independent of the Department. TIAC may then provide this advice directly to the Minister.

Additionally, the Department may choose, or be requested by the Minister, to provide separate advice to the Minister on any issue. Under these circumstances, the Council Support Team may be involved in the preparation of advice to the Minister on behalf of the Department, which may be different to the advice provided to TIAC.

A model of this reporting structure is shown here.

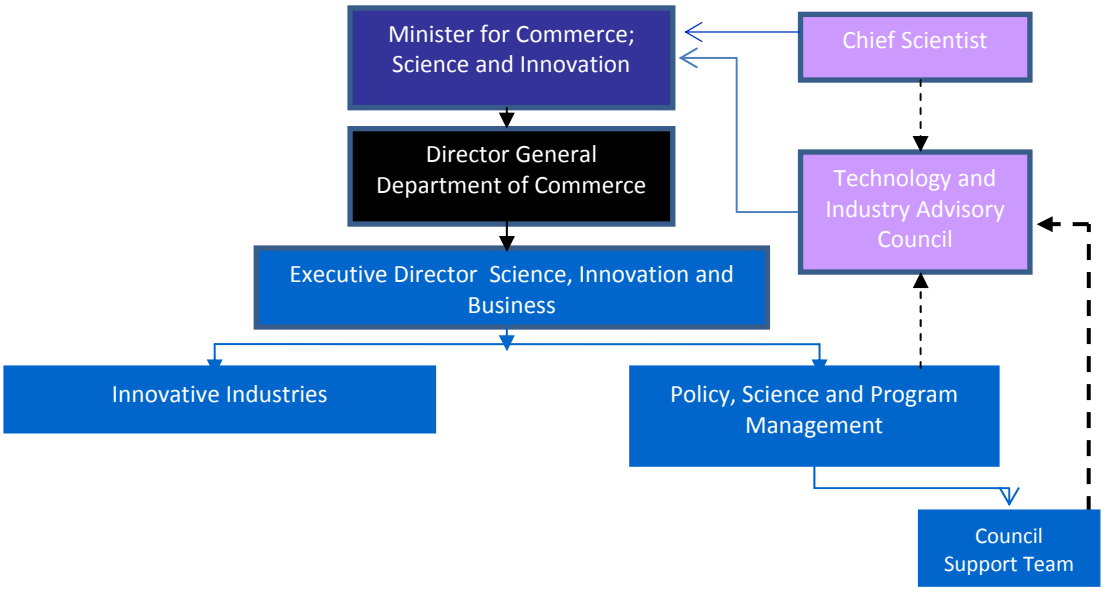

Diagram: Reporting structure for the Council Support Team within the Science, Innovation and Business division.

WORKING ARRANGEMENTS BETWEEN TIAC AND THE DEPARTMENT

According to the ITD Act, the Council reports to and advises the Minister directly. However the legislation does not address how the Council's advice is considered, assessed or implemented.

Both the Council and the Department require Ministerial approval before any advice or recommendations can be implemented. Should the Minister approve Council advice for actioning by the Department, it is recommended that the Director General, as an ex-officio member of the Council, oversees the development of the implementation plan by the Department.

Once the implementation plan is approved by the Director General, the Department can progress implementation of the project.

The Director General can direct any branch of the Science, Innovation and Business Division of the Department of Commerce to implement a TIAC initiative or project, based on the expertise and resources required to deliver the project.

The Council Support Team will be responsible for updating TIAC on the progress of the project.

SHARING INFORMATION

The two parties agree to share information, as and when appropriate, with due consideration being given to information provided to either party on a Commercial in Confidence basis.

In regards to the Department's stakeholder database, the Department will access the database on behalf of TIAC for official TIAC business only. This database will not be made available to a third party.

CORPORATE GOVERNANCE

TIAC will be allocated a budget for remuneration, allowances and for the procurement of consulting services. The Department will be responsible for administering the budget, tender processes and processing payments. The Department will also be responsible for managing administration services.

CONFLICT OF INTEREST AND PUBLIC INTEREST DISCLOSURE

The Department will manage the Conflict of Interest register. The Council Support Team and the Chair will jointly monitor this during meetings and decision processes. Compliance by members will be required in accordance with the ITD Act.

Under the *Public Interest Disclosure Act 2003*, the Department will provide a public disclosure officer for the TIAC Support team.

COMMUNICATIONS – DEALING WITH THE MEDIA

Both parties will not make representation on behalf of the other in dealings with the media.

All media enquiries to TIAC will be referred to the Minister for response.

BRANDING – TIAC LOGO

TIAC will have a logo. This logo will be incorporated in templates and documents that TIAC produces.

CONFIDENTIAL INFORMATION

With respect to any information supplied between the Council Support Team and TIAC, each party agrees to:

- protect the confidential information in a reasonable and appropriate manner in accordance with any applicable professional standards;
- use and reproduce the information only for the purposes set out in this Operating Protocol; and
- disclose or otherwise make available this information only to other Council Support Team members and not third parties unless required by law.

This does not apply to information, which:

- is publically known; or
- can be disclosed to a third party without restriction.

SIGNATORIES

Director General
Department of Commerce

21-12-2010.
Date

Chair
Technology and Industry
Advisory Council

21/12/2010.
Date

Appendix 3

TIAC Stakeholder Consultations – Minerals Sector Report

INTEGRAL DEVELOPMENT

TIAC
Technology and Industry Advisory Council

TIAC STAKEHOLDER CONSULTATIONS

Minerals Sector Report
for Department of Commerce
April 2011

Contents

1 Executive Summary

The Western Australian Technology and Industry Advisory Council (TIAC), as the State Government's advisory body on industry, science, innovation and technology, undertook consultations with stakeholders in identified value-creating sectors. The Council commissioned Integral Development to facilitate stakeholder consultation forums for the minerals and other sectors to identify opportunities to build on existing strengths, or address market gaps or failures. The aim of these consultations was to gain feedback from key stakeholders regarding their views on the role of the State Government in addressing issues in the sector and recommended priority actions for the State Government, particularly in relation to encouraging innovation and using science and technology in the minerals sector. TIAC also wished to capture participants' views on the opportunities they saw in the sector from the National Broadband Network (NBN) roll out.

Integral Development invited the TIAC nominated persons (or their delegate) from the minerals sector to a stakeholder consultation forum on 28 March 2011. Participants identified priority issues for the minerals sector including the need to:

- become more successful in mineral exploration to slow the rate at which WA miners have to rely on lower grade ore to maintain production;
- deal with the prospect of lower grade ore deposits in the State and find ways to process these more economically so as to remain internationally competitive;
- ensure that the minerals sector makes a proper contribution to the sustainable development of the State, making the sector more resilient to the cyclical nature of the industry; and
- manage the use and availability of water that is needed for mining and mineral processing.

Participants identified significant strengths in WA's minerals sector underpinned by its natural endowment and close proximity to key Asian markets. They agreed that the State possesses outstanding R&D capacity in mineral exploration, mineral processing and extractive metallurgy, amongst others. This has lead to a well developed mining equipment, technology and services (METS) sector which provides the innovation pathway for R&D outputs that are delivered to the minerals sector. In addition to this, the mining companies are, in some cases, significant participants in innovation and R&D activities, either on their own, or in partnership with the METS and R&D sectors.

Key weaknesses that the participants identified in the minerals sector included:

- the lack of clarity and focus on the part of the State Government with regard to supporting research;
- the lack of promotion of WA's successes in research and development making it difficult to build the R&D facet of the industry;
- the difficulties in undertaking pre-competitive research mean that basic research is a small component of the overall research effort;
- the structure of the contracts with large mining companies often does not include local research content which means that the research is frequently conducted elsewhere;
- weaknesses in the education system at all levels in preparing students to be involved in the minerals sector, that has contributed to the shortage of skilled labour and professionals; and
- WA's isolation, small population and Perth centric nature makes it difficult to attract world class researchers to the State, especially as mines are usually far from large population centres.

With regard to the role of the State Government in addressing the issues discussed, participants emphasised the important role that the Government has in facilitating the creation of a world class minerals precinct. This needs to be part of a clearly articulated vision for the State and the Government needs to take a leadership role in articulating, in consultation with key players, priorities for the sector. This involves funding pre-competitive R&D and facilitating the strategic development of research centres that address key needs in the sector. The WA government has a role to play in advocating on behalf of the minerals sector with the Federal and international governments and creating an education system that will provide skilled people to work within the sector, both now and in the future.

Participants recommended the following priority actions for the State Government:

- create WA as a global hub for mining R&D and innovation by establishing a renewed focus on R&D in the minerals sector , supported by a prioritised approach to R&D funding to addresses the strategic needs of the State, and building on key strengths to ensure that the State achieves global excellence in these areas of importance;
- establish a WA Minerals Institute;
- create a future fund for long-term research which is resistant to mineral and political cycles;
- appoint a Minister to champion mining R&D;
- coordinate the key players in the sector to work together and achieve common goals; and
- invest in the core skills that underpin the mining industry at primary, secondary and tertiary levels to ensure that young people are educated and trained in the skills that are, and will be, required in the sector.

Finally, the key opportunities that participants identified from the NBN roll out included its role in the provision of online training and education of staff, particularly in remote locations, the enhanced communication possibilities it offers and the increased capacity for data sharing, processing, and automation.

2 Introduction

TIAC is the State Government's advisory body on industry, science, innovation and technology in Western Australia. TIAC's role is to provide advice to the Minister and deliver recommendations to support the development and growth of Western Australia's key sectors.

With the intent of stimulating industry-research-government collaboration within specific sectors, TIAC commissioned Integral Development to undertake stakeholder consultation forums for these sectors to identify opportunities to build on existing strengths, or address market gaps or failures. The Council aimed to gain a good overview of the needs and opportunities in some key sectors, including the minerals sector, and to consult key players within these sectors, so that it could provide advice to the State Government and deliver recommendations and activities that support the development and growth of these key areas.

Through the stakeholder consultation forums TIAC aims to:

- stimulate industry-research-government collaboration in these key sectors;
- increase their understanding of the issues in each of the sectors and of stakeholder views and opinions;
- gain an improved understanding of the role that the State Government could have in stimulating activity in these areas and how this could be achieved; and
- obtain feedback from stakeholders to assist with the development of policy advice for State Government decision making.

3 Methodology

The methodology of the Stakeholder Consultation Forums was as follows:

a) Invited the TIAC nominated members of the sector (or their delegate) plus a few TIAC members to the Stakeholder Consultation Forum and provided participants with the objectives of the forum and the questions that we were to consider.

b) Welcomed participants, introduced the facilitators and the TIAC member, and provided the context for the forum, in conjunction with the TIAC member, as well as a brief description of how we would conduct the session.

c) Participants were asked to respond to questions either in a whole group context or in two sub-groups with the facilitators leading the discussion and summarising key points on the white board or large Post-it sheets (the full list of forum questions is shown in Appendix B).

d) For Questions 1 and 2 b) the facilitators gained an indication of the priority of the issues raised and actions suggested by asking participants to raise their hand in support of their top three issues/actions and recording the issue/action scores on the whiteboard (where this

prioritisation technique was used, in this report the level of support for an idea is indicated by the number in the 'Support' column, indicating that this number of people saw this idea as being in their top three ideas of those recorded).

e) Where the group split into two subgroups to address different sub questions for Questions 1 and 2, the whole group came back together to hear the input from the subgroup who discussed the other question and each subgroup had an opportunity to add to the other subgroup's displayed summary.

f) The facilitator outlined what would happen next and told participants that they would receive a copy of the draft report from the forum. They would be asked to comment on the draft report which would then be amended in the light of their comments and submitted to TIAC via the Department of Commerce. Participants were thanked for their contribution.

4 Key Themes and Reponses to Forum Questions

The key themes and responses from participants to the forum questions are listed below. In two of the tables the level of support for individual ideas is specified based on the prioritisation technique detailed in 3 e).

4.1 Current Issues facing the Minerals Sector

In response to the question, "What are the current issues facing the minerals sector?", the following were the key ideas presented:

	Issues	Support
a)	Locating high grade ore bodies is becoming increasingly difficult and finding lower grade ore bodies means that the mining process generates more waste.	5
b)	Finding and keeping skilled people.	4
c)	Ensuring that the minerals sector makes a proper contribution to the sustainable development of the State and making the sector more resilient to the cyclical nature of the industry.	4
d)	Managing water – having enough water, but not too much, and dealing with waste water from mining and mineral processing in an environmentally appropriate way.	4
e)	The challenge of developing innovative ways of processing lower grade mineral ore bodies to extract their value economically.	4
f)	The productivity of WA mines needs to be increased to enable them to be competitive in a global market place, this is highly dependent on the skills and ingenuity of those working in this sector.	4
g)	Use of energy and finding appropriate forms of energy to use in the minerals sector.	4
h)	Environmental accountability in relation to the concerns of the public about the impacts of mining on the environment.	2
i)	The barriers to pre-competitive research are significant (e.g. too hard to set up, takes too long, not worth the trouble). You have to be a believer to engage in this.	2
j)	Shortages of people, energy and innovation for the sector.	1
k)	The presence of lower grade ore means that it is difficult in some mineral sectors for WA to be competitive as a mining region with regions overseas that have higher grade ore. The lower grade of the ore means that there is a	1

greater technical and investment risk associated with mining this ore and extracting its value. For example, junior WA gold miners are less attracted to invest in WA compared to West Africa because this State is seen as less competitive internationally, even though WA is seen as a place of low sovereign risk.

l) Recognition of the diversity of the minerals sector in relation to the technology drivers which are relevant to different parts of the sector. 0

m) The minerals industry is still seen as a 'low tech' industry whereas, in fact, this is far from the truth. However, the perception affects the readiness of people to prepare themselves for the industry by having a strong science background. 0

n) WA's share of the national exploration spend has been in steady decline for a long time and so mining companies are tending to explore elsewhere. 0

4.1.1 WA Strengths/Competitive Advantages

The following ideas were presented in response to the question, "What strengths/ competitive advantages does WA have in this sector?":

a) Strengths in exploration and exploration geo-science and research e.g. Deep Exploration Technologies Cooperative Research Centre (CRC), Centre for Exploration Targeting (UWA)

b) Strengths in processing and metallurgy

c) Strength of engineering education and minerals processing e.g. CSIRO, Minerals and Energy Precinct (Curtin), Engineering School (UWA), School of Engineering and Energy (Murdoch), School of Chemical and Mathematical Sciences (Murdoch) location of Murdoch's Extractive Metallurgy program, Parker CRC, Western Australian School of Mines (Curtin), Sustainable Ecosystems Research Institute (Murdoch)

d) The culture and history in WA of applied industry-focused research, driven particularly by the State Government

e) Competitive advantages lie in WA's prospectivity information which reduces the risks for investors and encourages investment in the mineral sector

f) World class operators who are doing innovative work, especially in areas like automation, and also providers of technology in the state, including the Mineral Engineering Technical Services group (METS). The METS sector is well represented and integrated into research activities in the sector.

g) WA has a broad range of mineral commodities

h) The type of ore bodies found in WA means that companies need to be innovative if they are going to be able to exploit the value in these minerals. This in turn encourages the development of a research and development sector.

4.1.2 WA Weaknesses/ Market Failures/ Gaps

In response to the question, "What weakness/ market failures/ gaps currently exist for WA in this sector?", the following ideas were presented:

a) WA is a relatively isolated State that has relied heavily on immigration for growth in population. It is unlike Queensland, which derives most of its population growth through interstate migration.

b) The interests of companies and the interests of the State at times coincide but often each pursues its own interests to the potential detriment of the whole

c) Lack of skilled labour

d) WA's small population base means that there are a few companies competing to supply water, energy and service inputs for the mineral sector which increase the costs for utilities and services.

e) Most school leavers are not interested in pursuing technical/scientific opportunities. This is partly a result of science being devalued in schools and the high wages that can be earned in the mining industry with more basic qualifications

f) Research in the sector is undervalued – there is a lack of believers in the value that research (particularly pre-competitive research) can bring

g) The portability of research means that it is often sought interstate or overseas and consequently there is a lack of research investment occurring in WA

h) With its small population base, it is difficult to get the critical mass for world class research in WA

i) The State Government has a lack of focus on minerals research, which results in research being conducted elsewhere.

j) WA is the most expensive place to conduct research and development because of the high structural cost of undertaking such activities here

k) WA is very Perth-centric. There is a lack of larger population centres near mine sites which would provide the basis for research and development, as well as service industries, associated with mine sites

l) The structure of contracts with larger mining companies demonstrates a lack of local research content which often leads to the research being undertaken elsewhere

m) The lack of marketing of WA's successes makes it difficult to attract further investment in research and development

n) Pre-competitive research is a very small percentage of the total research effort.

4.2 Actions Needed to address Current Issues

The following ideas were presented in response to the question, "What actions need to be taken to address the current issues identified above?":

a) The State Government needs to create a real focus on research and development and back this up with substantial resources directed to strategic needs, or to build on key strengths, in the WA minerals sector. A focused approach, rather than a scatter-gun investment strategy in research, is advocated.

b) Create continuity of effort in R&D across time and beyond the political cycle. There need to be R&D champions within Government who persist in their support for these initiatives and provide the certainty that enables the R&D to happen.

c) Focus on engaging students in schools in relation to the attractiveness of working in the minerals sector by having scientists and engineers sharing their experience with students and also by developing appropriate curricula for schools e.g. Earth Science WA. While there are a number of players in the education space, there is a need to coordinate and focus the efforts of those involved so that sufficient students are drawn into the sector and come with a good scientific education behind them.

d) Identify the future focus for education programs that will meet the needs for the minerals and related sectors e.g. studies that will prepare students for involvement in the current and upcoming automation projects in the sector.

e) Increase the mutual articulation between the higher education and Vocational Education and Training (VET) sectors so that students can find their niche and develop appropriate skills.

f) Provide opportunities for students to gain work within the minerals sector while they are studying to assist them to develop their skills.

g) State Government investment in research in a counter cyclical manner so that during the lean times in the minerals sector, research is able to continue and provide the basis for innovation during the next upswing in the sector. The Government can also provide sufficient tax incentives for companies to maintain their R&D work.

h) State Government investment in pre-competitive R&D as this is the area where companies hesitate to invest because of the long pay-back period. The Government investment should be accompanied by co-investment strategies that encourage key industry players to become involved and to create real outcomes for the WA economy.

4.2.1 Role of the WA Government

In response to the question, "What is the role, if any, of the WA government to address the strengths and weaknesses identified above?", the following ideas were presented:

a) Provide a proactive and strategic approach to the development of the State over the medium to long term so that it can articulate a vision for the future in relation to sectors such as the minerals sector and engage the key players of the sector in moving toward that vision.

b) Understand that mining is a key part of WA's future and to articulate this clearly to the State, the country and international markets.

c) Take a leadership role in articulating priorities in the minerals and energy sectors.

d) Fund pre-competitive R&D. Understand and support basic research that underpins applied R&D.

e) Assist the minerals sector in the marketing and positioning of its commodities and associated services nationally and internationally.

f) Facilitate the creation of a world class minerals precinct with the appropriate development of infrastructure as well as the attracting and developing the capacity of the sector's human capital.

g) Advocate on behalf of the minerals sector with the Federal Government and international governments.

h) Advocate for the sector in education and provide leadership in ensuring that appropriate knowledge and skills relating to the resources sector are embedded in the primary, secondary and VET curricula.

i) Coordinate the efforts of government that impact on the sector so that there is reduced fragmentation and duplication.

4.2.2 Priority Actions for State Government

The following ideas were presented in response to the question, "What do you think the State Government should do as a matter of priority?":

State Government Actions	Support
a) Work to create WA as a global hub for mining R&D and innovation	9
b) Establish a WA Minerals Institute	7
c) Appoint a Minister to champion mining R&D	4
d) Coordinate the key players in the sector to cooperate in relation to common	4

	goals and facilitate the necessary cooperation across government portfolios so that progress can be made in pursuing minerals sector goals	
e)	Create a future fund for long-term research which transcends the political cycle	4
f)	Invest in the core skills that underpin the mining industry at the primary, secondary and tertiary levels	4
g)	Identify and promote the skills needed for the future mining industry	1
h)	Invest in the necessary infrastructure and people to enable the R&D hub to emerge	1
i)	Market WA as a mining R&D hub	0
j)	Work with key trading partners in the research and development of technologies for the mining industry	0

4.3 Opportunities from the NBN Roll Out

Reponses to the final question, "What opportunities do you see in this sector from the implementation of the NBN broadband roll out?", are summarised as follows:

a) The provision of online training and education to staff, particularly in remote locations, but also more broadly

b) Enhanced communication possibilities including providing a more competitive broadband environment for enabling automation from a long distance e.g. Perth

c) The opportunities for the minerals sector will depend on the scope of the roll out and the degree to which remote communities and operations are included in this roll out

d) Data for resource companies will be like oxygen for human beings in the next 10 years so the NBN will open up more opportunities for data sharing and processing and make this more accessible to the small and medium players in the minerals sector

e) The opportunity to utilise Australia's largest super computer located in Perth and notionally allocated to the geosciences community as Radio Australus. There may be opportunity for the NBN to facilitate the minerals sector using the super computer for research and development.

5 Comments

Participants received a copy of the draft Minerals Forum Report for the TIAC Stakeholder Consultations and were asked to respond to the report as to its accuracy as a summary of the views put forward in the forum and also to make any comments they wished in relation to the ideas put forward. Where the comments were to do with the accuracy of the summary of ideas presented during the forum, changes have been made to the draft forum report. Other comments have been summarised in this section of the report. 8 of the 12 participants who attended the forum provided comments or feedback about the forum and/or report.

5.1 Reaction to the Forum/Report

Most of the feedback on the forum and the report was positive but one of the participants was disappointed with the forum and outlined his reasons for this.

> "In general I was disappointed with the forum, with little industry representation, it quickly declined into a wish list for researchers. My biggest criticism is that the record taking was very poor – with verbal grabs written on the boards and many comments ignored (an example I recall relates to item 4.1.1 c) – when it was pointed out that the examples were all from UWA and Curtin and an example from Murdoch could be added, this was simply ignored.* This is one small example but overall I don't think the forum (and the report) achieved anything worthwhile.

So I applaud the attempt and would support similar initiatives in the future, but on this occasion we failed to deliver much of value."

*Note: During the forum we were running short of time and so did not pursue the contribution of Murdoch University at that point. However, the details of Murdoch's contribution to relevant education and research for the sector has been provided and this has been included in the report.

5.2 Particular Content

5.2.1 Research Strengths

a) Western Australia is home to the undisputed world-leading centre of hydrometallurgical research which directly supports more than 25 billion dollars worth of minerals exports from Australia. This is because of 20 years of continuous investment by industry and Government through the Parker Centre. It is an extraordinary strength and should be highlighted - a powerful testament to what can be done when government, industry, research institutions and academia combine forces in a focused and sustained manner.

   This R&D and training is why Alcoa's global R&D is located in WA – and why they as a company have more PhDs than any other company in WA.

   Murdoch University contributes to, and benefits from, this powerful alignment of research, industry and government. Murdoch University is the only university in Western Australia and one of only two universities in Australia (the other being University of Melbourne) to achieve a 5 (highest rating) for resource engineering and extractive metallurgy and for physical chemistry – the two discipline areas that underpin the field of hydrometallurgy.

5.2.2 Actions to Address Current Issues

a) WA's strengths in exploration and exploration geo-science and research [4.1.1 a)] and in processing and metallurgy [4.1.1 b)] suggest the need for an integrated strategy that seeks to enhance discovery of new deposits (which should be of "average" grade), but also provides the insurance of developing more cost effective processing and mining methods that will offset the higher cost of mining existing deposits deeper, as well making marginal (lower grade) ore more economic.

6 Conclusion

WA has a thriving minerals sector that includes major international organisations, a host of other mining companies, a broad range of mineral commodities, a developed R&D and services sector, and a State Government that is keen to take advantage of the State's mineral wealth for the benefit of its people. At the same time, the State's ore body is becoming more difficult to find or access. WA needs to make use of its exploration capacity and research to find new deposits of at least average grade while also developing more cost effective processing and mining methods that will offset the higher cost of mining existing deposits at deeper levels and make lower grade ore more economic.

In light of this situation, participants recommend that the State Government facilitate the development of a strategic vision and plan for the minerals sector in WA which enables the State to build on its strengths outlined above. Key actions relating to the plan include creating WA as a global hub for mining R&D and innovation and establishing a WA Minerals Institute. To drive the change involved in pursuing these objectives, participants suggested that the State Government appoint a Minister to champion the mining sector and mining R&D. The State Government should play a key role in coordinating key players in the sector to cooperate in formulating key priorities and goals for the sector and in facilitating government departments to streamline their interaction with mining companies. Additionally, participants recommended that State Government create a fund for long-term research to meet priority needs and invest in the core skills needed in the mining industry at the primary, secondary and tertiary level.

7 Appendix A – List of Forum Participants

Name	Position	Area	Organisation
Mr Richard Borozdin	A/Deputy Director General Strategic Policy	Government	Department of Mines and Petroleum
W/Prof Michael Dentith	Deputy Director Centre for Petroleum Geoscience and CO2 Sequestration	Research	School of Earth and Environment, UWA
Mr Stevan Green	Managing Director	Consultant	Sustainable Operations Pty Ltd
Professor Stephen Hall	Director West Australian School of Mines	Research	Curtin
Dr Steve Harvey	Deputy Chief, CSIRO Exploration & Mining	Research	CSIRO
Professor Peter Lilly	Executive Director of Minerals and Energy Strategy	Research	Curtin
Professor Peter May	Extractive Metallurgy Chair	Research	Murdoch
Dr Steve Rogers	Managing Director	Research	Parker CRC
Nicole Roocke	Director	Other	Chamber of Minerals and Energy WA
Dr Jim Ross	TIAC Member	TIAC	Chairman Earth Science WA
Sarah Russel	General Manger Technology and Innovation	Industry	Rio Tinto
Laurie Stonehouse	Vice President, Technology and Manufacturing	Industry	Alcoa Global Refining

Please note that the views and opinions contained in this report are not necessarily those of the individuals or organisations listed above.

8 Appendix B – Forum Discussion Questions

Within the context of industry, science and innovation for the mining sector, participants were invited to share their views and provide feedback on the following discussion questions:

1. What are the current issues facing the minerals sector?
    a. What strengths/ competitive advantages does WA have in this sector?
    b. What weaknesses/ market failures/ gaps currently exist for WA in this sector?

2. What actions need to be taken to address the current issues identified above?
    a. What is the role, if any, of the WA government to address the strengths and weaknesses identified above?
    b. What do you think the State Government should do as a matter of priority?

3. What opportunities do you see in this sector from the implementation of the NBN broadband roll out?

Appendix 4

TIAC Stakeholder Consultations – Gas (and Petroleum) Sector Report

INTEGRAL DEVELOPMENT

TIAC
Technology and Industry Advisory Council

TIAC STAKEHOLDER CONSULTATIONS

Gas Sector Report
for Department of Commerce
April 2011

Contents

1. Executive Summary

The Western Australian Technology and Industry Advisory Council (TIAC), as the State Government's advisory body on industry, science, innovation and technology, undertook consultations with stakeholders in identified value-creating sectors. The Council commissioned Integral Development to facilitate stakeholder consultation forums for the gas and other sectors to identify opportunities to build on existing strengths, or address market gaps or failures. The aim of these consultations was to gain feedback from key stakeholders regarding their views on the role of the State Government in addressing issues in the sector and to recommend priority actions for the State Government, particularly in relation to encouraging innovation and using science and technology in the gas and petroleum industry sector. TIAC also wished to capture participants' views on the opportunities they saw in the sector from the National Broadband Network (NBN) roll out.

Integral Development invited the TIAC nominated persons (or their delegate) from the gas and petroleum industry sector to a stakeholder consultation forum on 31 March 2011. Michael Fox and Karina Huang facilitated the forum using the methodology described in the body of the report. Participants identified some priority issues relating to the gas and petroleum industry sector including the need for:

- research institutions to take a longer term view and encourage corresponding investment from industry and government;
- greater collaboration between government, industry and researchers in relation to pre-competitive research relevant to the sector's long-term issues;
- managing the impact of this sector on the environment and maintaining high levels of safety (especially in the light of events in the Gulf of Mexico);
- addressing the cost pressures and capacity constraints in realising the potential growth of gas, considering that WA LNG projects already sit at the high end of the cost curve, and
- enhancing the skills, capabilities and competitiveness of local service industries to enable them to benefit from the growth of the industry.

The participants identified significant strengths and competitive advantages in WA's gas and petroleum sector including:

- a demonstrated world class development of a province of oil and gas offshore;
- the involvement of many global oil companies bringing significant expertise and experience to the sector;
- the foundation of a first-rate R&D hub in WA making a significant contribution to the industry;
- an open and transparent environment for national and foreign investment;
- Perth being seen as an attractive location for businesses and for researchers;
- a strong history of Civil and Electrical Engineering in the State;
- good Australian standards;
- a healthy relationship between oil and gas companies and WA universities; and
- a developed stance toward assessing and monitoring the environmental impact of projects which is supported by a good level of education in this area.

The participants also identified key weaknesses in this sector including:

- a lack of leadership and an articulated strategy for industry and state development from the State Government;
- insufficient support for marketing the positive outcomes from research or for the spin-off service industries that flow from this research;
- a lack of companies taking advantage of the good research being conducted and applying it to meet industry needs;
- WA being viewed as a small economy and consequently often finding it difficult to attract top researchers to the state; and
- the lack of promotion of the excellent oil and gas research centres in the state, which prevents the relatively small research community from growing in reputation and attracting other key people to their hubs.

Participants emphasised the important role that the State Government has in raising the profile of research and innovation in science and technology in the oil and gas sector. They suggested that for this to happen in a sustainable way, the government and politicians of major parties need to build

and maintain relationships with industry and the research community so that their policies reflect a commitment to long-term needs of the sector. The State Government has a key role in providing funding for R&D in the sector but, it also has an important role in leveraging funding with the Commonwealth government and industry players. Additionally, it can assist researchers and niche service companies to gain access to key industry players so that cooperative relationships and projects can result from this process.

Participants recommended the following priority actions for the State Government:

- build on the success of bodies like WA:ERA and MERIWA (Minerals & Research Institute of WA) by continuing to co-invest in these and other projects, to build on the State's thriving oil and gas research community and broaden the scope and profitability of the oil and gas industry in WA;
- develop a long-term vision and plan for the sector and proceed to invest in priority areas and provide leadership in a way that ensures thriving oil and gas companies, collaborative R&D hubs and the growth and establishment of Small and Medium Enterprises (SMEs) that spin off these hubs and provide valued services for the industry;
- leverage Commonwealth Government funding and encourage key industry players to assist in funding these initiatives.

Finally, key opportunities that participants identified from the NBN roll out included its role in the provision of skills development and education of staff and communities, the management of remote operations, the transmission of huge data sets associated with exploration and environmental monitoring and the enabling of students to gain onsite work experience while they continue their studies online, while still able to attend lectures and interact with tutors and other students.

2. Introduction

TIAC is the State Government's advisory body on industry, science, innovation and technology in Western Australia. TIAC's role is to provide advice to the Minister and deliver recommendations to support the development and growth of Western Australia's key sectors.

With the intent of stimulating industry-research-government collaboration within specific sectors TIAC commissioned Integral Development to undertake stakeholder consultation forums for these sectors in order to identify opportunities to build on existing strengths, or address market gaps or failures. The Council aimed to gain a good overview of the needs and opportunities in some key sectors, including the gas and petroleum sector, and to consult key players within these sectors, so that it could provide advice to the State Government and deliver recommendations and activities that support the development and growth of these key areas.

Through the stakeholder consultation forums TIAC aims to:

- stimulate industry-research-government collaboration in these key sectors;
- increase their understanding of the issues in each of the sectors and of stakeholder views and opinions;
- gain an improved understanding of the role that the State Government could have in stimulating activity in these areas and how this could be achieved; and
- obtain feedback from stakeholders to assist with the development of policy advice for State Government decision making.

3. Methodology

The methodology of the Stakeholder Consultation Forums was as follows:

a) Invited the TIAC nominated members of the sector (or their delegate) plus a few TIAC members to the Stakeholder Consultation Forum and provided participants with the objectives of the forum and the questions that we were to consider.

b) Welcomed participants, introduced the facilitators and the TIAC member, and provided the context for the forum, in conjunction with the TIAC member, as well as a brief description of how we would conduct the session.

c) Participants were asked to respond to questions either in a whole group context or in two sub-groups with the facilitators leading the discussion and summarising key points on the white board or large Post-it sheets (the full list of forum questions are shown in Appendix B)

d) For Questions 1 and 2 b) the facilitators gained an indication of the priority of the issues raised by asking participants to raise their hand in support of their top three issues/actions and recording the issue/action scores on the whiteboard (where this prioritisation technique was used, in this report the level of support for an idea is indicated by the number in the 'Support' column, indicating that this number of people saw this idea as being in their top three ideas of those recorded)

e) Where the group split into two subgroups to address different sub questions for Questions 1 and 2, the whole group came back together to hear the input from the subgroup who discussed the other question and each subgroup had an opportunity to add to the other subgroup's displayed summary.

f) The facilitator outlined what would happen next and told participants that they would receive a copy of the draft report from the forum. They would be asked to comment on the draft report which would then be amended in the light of their comments and submitted to TIAC via the Department of Commerce. Participants were thanked for their contribution.

4. Key Themes and Reponses to Forum Questions

The key themes and responses from participants to the forum questions are listed below. In two of the tables the level of support for individual ideas is specified based on the prioritisation technique detailed in 3 e).

4.1. Current Issues facing the Gas and Petroleum Industry Sector

In response to the question, "What are the current issues facing the gas and petroleum industry sector?", the following were the key ideas presented:

	Issues	Support
a)	Research institutions need to be focused on longer term issues, e.g. dealing with the issue of bringing gas from deep water wells which will become increasingly important, as well as the shorter term industry and government demands and draw support for the longer term view, and corresponding investment, out of industry and government Some aspects of oil and gas technology (e.g. LNG) have not changed very much in the last 20-30 years but there has been significant innovation in relation to construction and assembly of rigs and pipelines, remote operations, subsea installations, etc Opportunity for greater collaboration in relation to pre-competitive research and for raising the bar on what is considered pre-competitive research, especially in relation to working together on longer-term issues Opportunity for R&D initiatives involving government and industry e.g. like Norway Cross fertilisation of ideas across industries (e.g. Oil and Gas with Mining and Minerals)	9
b)	Managing long-term environmental liabilities in line with societal expectations Safety and environmental performance are crucial to the industry – the licence to operate has been challenged by what has happened in the Gulf of Mexico	7
c)	Perth being a very isolated city and WA having a high cost centre with a lack of resources in some areas means that there are some strong disincentives for investment in the gas sector in this State The biggest impediment to maximising the value of WA's gas and petroleum resources is the high cost of the oil and gas projects – they are some of the	6

	most expensive oil and gas projects in the world, which in itself is a great incentive to be innovative in reducing the cost of these projects	
d)	Workforce issues: skill shortages, the impact of Fly In Fly Out (FIFO) arrangements on the durability of relationships and the well-being of families Opportunity to ensure that local businesses/labour get a greater share of the work that flows from major projects, which keeps the local community onside with these projects Service industries associated with the gas and petroleum go through peaks and troughs – difficulty of maintaining skill supply	5
e)	The need to look more globally at our situation and not to be so Australia-centric, to see our advantages in the international context	4
f)	Opportunity to contribute to the control of CO_2 emissions through Carbon Capture and Storage and geothermal initiatives and related research	2
g)	Attracting R&D onshore	1
h)	The culture within the petroleum industry of leveraging off WA innovation, both within the broader mining industry as well as within the gas and petroleum industry, and yet most people are unaware of WA's innovative standing in this area.	1
i)	Security of supply of domestic gas	0

4.1.1. WA Strengths/Competitive Advantages

The following ideas were presented in response to the question, "What strengths/ competitive advantages does WA have in this sector?":

a) Strong history of Civil and Electrical Engineering in the State along with the Australian standards in those disciplines and the developed relationship with WA universities (the universities meeting skills needs and companies providing scholarships)

b) World class development of a province of oil and gas offshore

c) Not nationalised – an open and transparent environment for investment

d) WA's isolation and the cost of development of the oil and gas fields are strong drivers for innovation and for the strong collaborative and innovative R&D sector that has developed

e) Good understanding of organisational behavior and using this in the pursuit of safety and dealing with the impacts of the Fly-In Fly-Out regime on workers and their families

f) Most of the global companies in this sector have a presence in Perth which is an advantage for WA in that they bring industry experience and resources to the state

g) Perth is an attractive location and although it is seen as an expensive place to live, the lifestyle here is a appealing
WA has a competitive advantage in being relatively close to key markets in a growth region and its timezone is compatible with doing business with Asia

h) The size of WA's coastline is such that the sophisticated sensing technologies being developed to monitor and police the coastline have potential to be used for the oil and gas sector and for marine science

i) WA's environmental monitoring associated with activities such as dredging has potential to be provided as a service internationally or at least used to assist other nations with environmental issues similar to our own

j) Environmental impact in WA is recognised and embedded in education which is good for our oil and gas developments and something that we can offer to developing nations

k) WA has established the foundation of a world-class R&D hub in the state (e.g. through CSIRO, WA:ERA, ARRC, MERIWA) that will make a significant contribution to the industry and there is a good level of cooperation between WA universities involved in oil and gas research

l) Some large savings to industry have resulted from oil and gas R&D and innovation in WA, ensuring projects are executed locally

m) Centre for Offshore Foundation Systems (UWA) is involved with major companies in the design of offshore platforms.

4.1.2. WA Weaknesses/ Market Failures/ Gaps

In response to the question, "What weakness/ market failures/ gaps currently exist for WA in this sector?", the following ideas were presented:

a) WA is a small economy and it is not easy to bring people here

b) Perth is pleasant to live in but the cost of living is very high

c) WA has some excellent research centres which have started from need but are often not marketed well

d) Relatively small research community which means that researchers need to collaborate more, even more than is currently happening

e) Lack of companies who take the research and apply it or exploit it for contracting and consulting

f) The State Government has a laissez-faire approach to the oil and gas sector, does not provide enough strategic leadership for industry and state development, and is not sufficiently supportive of the spin-off industries that can flow from oil and gas research

g) WA researchers do not market themselves well, have a presence as 'Team WA' and do not export their ideas, skills and technologies well

h) Need for the operators of oil and gas facilities to interact more with the suppliers, technical people and contractors (the latter group tend to be unwilling to get involved because they wish to protect their intellectual property and their competitive advantage) to work on the issues that they are facing.

i) Lack of financial support for WA researchers to participate in international networks where they are able to influence the right people to encourage research being done in this state.

4.2. Actions Needed to address Current Issues

The following ideas were presented in response to the question, "What actions need to be taken to address the current issues identified above?":

a) The State Government needs to develop a longer term strategy for the sector (e.g. looking 15-20 years ahead) that is based on an analysis of WA's strengths and gaps and put resources into priority areas rather than trying to spread few resources very thinly.

b) The State Government also needs to plan for the short term (within the context of its longer term plan) to ensure that WA maintains its competitiveness and markets and to engage with the Federal Government to gain its support and sufficient resources so that its plan can be realised.

c) Create mechanisms (e.g. hubs) that encourage collaboration among those involved in the oil and gas sector.

d) Market the WA research capability e.g. at international conferences part of the responsibility in attending is to raise people's awareness of the WA research profile in the interests of attracting quality people to the State.

e) Government needs to support the development of specialised small businesses that provide services to the oil and gas industry and assist them to link to appropriate research expertise so that their services meet real needs and are of a high quality. The support needs to be for a long enough period to be effective.

f) Work with the Federal Government to encourage the development of onshore petroleum resources.

4.2.1. Role of the WA Government

In response to the question, "What is the role, if any, of the WA government to address the strengths and weaknesses identified above?", the following ideas were presented:

a) Raise the profile of research and innovation in science and technology and the government's contribution to this profile.

b) Important for government and politicians of major parties to build and maintain relationships with industry and the research community so that policy reflects long-term needs and is sustained.

c) Engage with industry and researchers where the decisions are being made and build long term partnerships with them.

d) The State Government has a limited capacity to directly provide funding for research and therefore it needs to play a key role with the Commonwealth Government and industry players in leveraging funding as is being conducted in Queensland, Victoria and South Australia.

e) Politicians/government departments need to play the role of assisting researchers by helping them to target the right people and organisations and by opening the doors to industry players so that researchers can develop relationships and put forward their case as to the ways in which their research can assist the organisation(s) in question.

f) Assist small niche companies that provide oil and gas services to raise their profile and proceed with further innovation.

4.2.2. Priority Actions for State Government

The following ideas were presented in response to the question, "What do you think the State Government should do as a matter of priority?":

State Government Actions	Support
a) Build on success e.g. WA:ERA (which involves contributions from research and industry) by the State Government continuing to co-invest in this and other such projects e.g. MERIWA	6
b) Work with other levels of government to facilitate the development of key hubs (cooperative bodies involving researchers, industry and government) and invest in such bodies in their budgets	6
c) Create a long-term vision for the oil and gas sector which results in a long-term plan for the sector	5
d) Find a mechanism whereby Small and Medium Enterprises (SMEs) spin off research hubs	3
e) Focus on leveraging and attracting Commonwealth Government funding in the R&D area	3

f) The plan needs to be generated in a way that it is co-sponsored by the major players in the sector 3

g) Government view R&D as an investment, rather than a cost, that could generate (or save) additional government revenue over time 0

4.3. Opportunities from the NBN Roll Out

Reponses to the final question, "What opportunities do you see in this sector from the implementation of the NBN broadband roll out?", are summarised as follows:

a) The provision of skills development in staff and communities and not just through lectures but also through remote controlled laboratories

b) Remote operations can be more easily managed

c) Ability to handle and transmit huge data sets associated with exploration, environmental monitoring and facilitating technical R & D transfer from Perth to somewhere like China

d) Students able to work onsite in industries but still be able to study, attend lectures and interact with their tutors and other students

e) Take advantage of the political dimensions of the developments like the ABN that have emerged through the election process and link key sector agendas to such developments

f) Because of the costs associated with FIFO approaches, the NBN can lead to cost reduction in the provision of safety, environmental education and monitoring, and assisting in meeting the social needs of workers and their families.

5. Comments

Participants received a copy of the draft Gas Forum Report for the TIAC Stakeholder Consultations and were asked to respond to the report as to its accuracy as a summary of the views put forward in the forum and also to make any comments they wished in relation to the ideas put forward. Where the comments were to do with the accuracy of the summary of ideas presented during the forum, changes have been made to the draft forum report. Other comments have been summarised in this section of the report. 7 of the 12 participants who attended the forum provided comments or feedback about the report.

5.1. Reaction to the Forum/Report

Participants made positive comments about the report capturing the key ideas from the forum. However, one participant lamented the lack of business participation and the consequent diminishment of the business perspective in the report.

5.2. Particular Content

The following comments were made in relation to aspects of the draft report. Some of the wording of the report has been altered in the light of these and other comments and the reference has been provided, in brackets, to the section(s) of the report to which the comments refer.

5.2.1. World Class Oil and Gas Province? [4.1.1. b)]

a) At the beginning of the report, the often made statement is repeated – "With regard to its strengths and competitive advantages, WA's gas and petroleum sector has significant strengths in that it has a world class province of oil and gas offshore." Please be careful in what is being written here. Reality is, Australia in total has barely two (2) per cent of the world's gas reserves – that's Australia as a whole, never mind WA. As for oil, we currently have to import around half to meet our needs. Therefore, to label our oil and gas assets as "world class" is a misnomer. Yes, we are an important, strategic supplier into the Asian region and yes, we have a non-national, low sovereign risk business environment in which to

explore and develop these resources. But our reserves, in absolute terms of size are globally insignificant and telling someone in for example, Europe or the Middle East that our reserves are “world class” may be greeted with polite laughter.

5.2.2. Change in Oil and Gas Technology [4.1. a)]

a) Not sure that we'd get a lot of support for the statement that the technology hasn't changed much in 30 years - read as it is currently presented, changes in construction of rigs and pipelines is significant (and remote operations/not normally manned), subsea installations, 4D seismic, unlocking unconventional gas plays, etc. There is a point about the longevity of these large, capital intensive projects and a fairly mature global market for R&D in which WA must compete.

5.2.3. Perth – an Isolated City [4.1. c)]

a) "Perth being a very isolated city" is a statement I want to temper - some people may currently view Perth as isolated, however we are in a growth region and have location advantages - one of the reasons there is major LNG project investment now and in the pipeline.

b) Being able to attract world experts to Perth and WA – it is difficult to compete with the US and Europe in relation to the overall packages that other institutions can offer.

5.2.4. International Networking [4.1. i)]

a) Active participation does a lot to ensure that WA is recognised in influential forums and other decision making centres (e.g. Houston).

b) At UWA we have great international networks and can mobilise tremendous international support when required – our recent *In The Zone* conference shows this.

5.2.5. Government’s laissez faire approach [4.1.2. f]

a) With regard to R&D, the upstream industry itself generally supports a market-based and commercial approach to R&D rather than one depending on government intervention, hence the suggestion that it is only “some” participants who thought that the State Government had a fairly laissez faire approach.

5.2.6. WA Researchers Marketing Themselves [4.1.2. g)

a) WA researchers could do more marketing to industry in WA as well as try to export their ideas, skills and technologies, as some industry people are unaware of what they have to offer industry within the state.

5.2.7. Long Term Business Plan [4.2. a)]

a) We were talking about a vision that goes beyond one or two terms of Government and that provides some sort of State vision that enables investment and focus.

5.2.8. Onshore Gas Exploration [4.2. f)]

a) One participant wished to delete the action to encourage the development of onshore petroleum resources.

5.2.9. Investing in WA R&D a Contract KPI [4.2.1. d)]

a) The State Government should endeavour to include investment in R&D in WA as one of the contractual elements when negotiating new oil and gas contracts.

5.2.10. State Government Buy-In for Research [4.2.2. a)]

a) As much of the Federal funding for research is based on a 1/3, 1/3, 1/3 model of State, Federal and industry support, a good number of research projects fail to gain Federal and industry support because the State Government does not buy-in and support these projects.

6. Conclusion

WA has a significant and expanding province of oil and gas offshore and the potential to develop its onshore program as well. The expansion of this industry is occurring at a time when there is

increasing public consciousness of the need for the government and the oil and gas industry to manage its impact on the environment and the safety of all who are affected by the industry. The WA oil and gas sector needs to remain conscious of the cost pressures and capacity restraints that the industry is facing if it is going to realise the benefits from growth. The sector has established the foundation of a world class R&D hub in WA that will make a significant contribution in WA and beyond to the efficiency, safety and environmental impact of the industry.

In light of this situation participants recommend that the State Government develop a long term vision and plan for the oil and gas sector in WA, in concert with the major players in the industry, which enables the State to create an environment where not only oil and gas companies prosper, but also where the R&D hubs and the Small and Medium Enterprises (SMEs) that provide valued services for the industry can develop and grow. To enable research bodies like WA:ERA and MERIWA to thrive the government needs to continue co-investment in these institutions and projects and leverage their contribution by assisting these bodies to attract Federal and industry funding. These actions, if pursued over the longer term, have the potential for creating not only a prosperous and safe oil and gas industry with a reduced impact on the environment, but a developed service industry and research sector that can offer its services in a way that improves its contribution to the Western Australian oil and gas sector and facilitates improved service provision nationally and internationally.

7. Appendix A – List of Forum Participants

Name	Position	Area	Organisation
Mr Colin Beckett	TIAC Member	TIAC	General Manager of the Greater Gorgon Area, Chevron Australia
Mr Richard Borozdin	A/Deputy Director General Strategic Policy	Government	Department of Mines and Petroleum
Gary Bowtell	Executive VP Engineering	Industry	Clough Ltd
John Dell	Winthrop Professor, Dean of Engineering, Computing and Mathematics	Research	Centre for Electro-Optic Propagation and Sensing: UWA
John Donovan	Director Policy and Planning	Government	Department of Commerce
Mr Stedman Ellis	Director WA	Other	Australian Petroleum Production and Exploration Association Limited
Dr Edson Nakagawa	Director, Petroleum and Geothermal Research	Research	CSIRO
Mr Will Pulsford	CEO	Other	Risc International
Dr Thomas Rufford	Chevron Chair in gas processing engineering	Research	UWA/ Chevron
Jill Stajduhar	Business Development Manager	Research	Energy and Minerals Institute: UWA
Mr Mark Stickells	CEO	Research	Western Australia: Energy Research Alliance
Mr Tim Walton	Director Resources & Sustainability	Research	Curtin

8. Appendix B – Forum Discussion Questions

Within the context of industry, science and innovation for the mining sector, participants were invited to share their views and provide feedback on the following discussion questions:

1. What are the current issues facing the gas and petroleum industry sector?
    a. What strengths/ competitive advantages does WA have in this sector?
    b. What weaknesses/ market failures/ gaps currently exist for WA in this sector?

2. What actions need to be taken to address the current issues identified above?
    a. What is the role, if any, of the WA government to address the strengths and weaknesses identified above?
    b. What do you think the State Government should do as a matter of priority?

3. What opportunities do you see in this sector from the implementation of the NBN broadband roll out?

Appendix 5

TIAC Stakeholder Consultations – Environment Sector Report

INTEGRAL DEVELOPMENT

TIAC
Technology and Industry Advisory Council

TIAC STAKEHOLDER CONSULTATIONS

Environment Sector Report
for Department of Commerce
April 2011

Contents

1. Executive Summary

The Western Australian Technology and Industry Advisory Council (TIAC), as the State Government's advisory body on industry, science, innovation and technology, undertook consultations with stakeholders in identified value-creating sectors. The Council commissioned Integral Development to facilitate stakeholder consultation forums for the environment and other sectors to identify opportunities to build on existing strengths, or address market gaps or failures. The aim of these consultations was to gain feedback from key stakeholders regarding their views on the role of the State Government in addressing issues in the sector and recommended priority actions for the State Government, particularly in relation to encouraging innovation and using science and technology in the environment industry sector. TIAC also wished to capture participants' views on the opportunities they saw in the sector from the National Broadband Network (NBN) roll out.

Integral Development invited the TIAC nominated persons (or their delegate) from the environment sector to attend a stakeholder consultation forum on 31 March 2011. Michael Fox and Karina Huang facilitated the forum using the methodology described in the body of the report. Participants identified some of the priority issues in the environment sector including:

- the need to set up an appropriate information platform so that environmental and other research can be shared therefore making it more efficient, effective and sustainable;
- the need for R&D to be driven by the requirements of industry, government and the broader WA community to better place priority research outputs in receiving necessary funding. Currently the bulk of the research being undertaken in WA is aligned to existing regulatory frameworks. These regulatory and policy frameworks need to evolve so that they address key environmental issues of our time and region. This should include research into how our ecosystems function and ways of preserving and sustaining them into the future.

Participants identified strengths and competitive advantages in WA's environment sector including:

- quality environmental research centres operating in the State;
- an excellent history of research and education in many aspects of the environment at the tertiary level;
- a strong in-house science research capacity in State agencies;
- Perth being an attractive location for researchers and for those who wish to set up SME's addressing environmental issues in a State which has enormous environmental diversity;
- a range of environmental groups who are active in raising public consciousness about the State's environmental issues;
- the State's major mining companies and other industries having environmental teams that focus on environmental assessment, minimising the environmental impact of their industry and rehabilitating sites where this is needed; and
- the State Government has a range of departments with a strong environmental focus.

Key weaknesses that participants identified in the environment sector included:

- the State Government not having a clear sense of its priorities in relation to sustaining the environment. As a result, in facilitating environmental R&D, the State Government tends to spread a small amount of funding and support thinly across a wide range of initiatives;
- the lack of an appropriate information platform that encourages efficient R&D to be shared across government, research, industry and community sectors;
- much of WA's environmental research being tied to environmental regulatory processes and often not being shared with other parts of the research community and not tied into meeting regional research priorities;
- the lack of remote infrastructure for research which impedes environmental research being conducted in a cost effective manner.

Participants emphasised the important role that the State Government has in promoting a view of the environment as an ecosystem that we are all part of and need to sustain. Participants suggested that the State Government has a role in establishing collaborative relationships between government, industry and the community to assist in more effective environmental management including the revision of current environmental legislation. This could involve stimulating public-public and public-private collaboration in outcome-focused investment at State, sector and regional levels. Participants also suggested a role for government in setting up an enabling information environment, in this and

other sectors, to encourage greater efficiency and sharing of research data and information across this platform. Additionally, participants suggested that the State Government has a role in analysing the economy to discover the 'sweet spots' of potential convergence between public and commercial interest in relation to the environment and to encourage the development of businesses in these areas.

Participants recommended the following priority actions for the State Government:

- develop a whole of government approach to using science and innovation in relation to the environment;
- conduct a stock take of environmental data gathered by WA researchers and, after strategic analysis of this data, create State and regional research plans, based on environmental assets, community values and targeted research. These plans should articulate State and regional priorities for R&D and reflect a collaborative approach to R&D whereby the government, industry, researchers and the community will jointly create a shared information platform to store and share research data as a base for decision making in the environment and other sectors;
- design an integrated approach to facilitating development and maintaining the environment to provide the basis for formulating policies that address WA's key environmental issues;
- develop a research fellowship scheme to attract the best interstate and international researchers to the State;
- establish an 'Innovator in Residence' role for WA; and
- create programs that have a bias toward the work being undertaken in WA.

Finally, key opportunities that participants identified from the NBN roll out included greater access to education possibilities in schools, universities, VET and adult education wherever the NBN exists and using high speed video conferencing to encourage collaboration and overcome the problems associated with distance in our country and world. The NBN makes it much simpler to set up regional centres for the environment and other needs and to exchange data with these centres, for research, development or operational matters. It also makes it simpler to access aspects of our national capability and to utilise information and a greater range of online services when it suits users' needs and lifestyles.

2. Introduction

TIAC is the State Government's advisory body on industry, science, innovation and technology in Western Australia. TIAC's role is to provide advice to the Minister and deliver recommendations to support the development and growth of Western Australia's key sectors.

With the intent of stimulating industry-research-government collaboration within specific sectors, TIAC commissioned Integral Development to undertake stakeholder consultation forums for these sectors to identify opportunities to build on existing strengths, or address market gaps or failures. The Council aimed to gain a good overview of the needs and opportunities in some key sectors, including the environment sector, and to consult key players within these sectors, so that it could provide advice to the State Government and deliver recommendations and activities that support the development and growth of these key areas.

Through the stakeholder consultation forums TIAC aims to:

- stimulate industry-research-government collaboration in these key sectors;
- increase their understanding of the issues in each of the sectors and of stakeholder views and opinions;
- gain an improved understanding of the role that the State Government could have in stimulating activity in these areas and how this could be achieved; and
- obtain feedback from stakeholders to assist with the development of policy advice for State Government decision making.

3. Methodology

The methodology of the Stakeholder Consultation Forums was as follows:

a) Invited the TIAC nominated members of the sector (or their delegate) plus a few TIAC members to the Stakeholder Consultation Forum and provided participants with the objectives of the forum and the questions that we were to consider.

b) Welcomed participants, introduced the facilitators and the TIAC members, and provided the context for the forum, in conjunction with the TIAC members, as well as a brief description of how we would conduct the session.

c) Participants were asked to respond to questions either in a whole group context or in two sub-groups with the facilitators leading the discussion and summarising key points on the white board or large Post-it sheets (the full list of forum questions is shown in Appendix B).

d) For Question 1 the facilitators gained an indication of the priority of the issues raised by asking participants to raise their hand in support of their top three issues/actions and recording the issue scores on the whiteboard (where this prioritisation technique was used, in this report the level of support for an idea is indicated by the number in the 'Support' column, indicating that this number of people saw this idea as being in their top three ideas of those recorded).

e) The group split into two subgroups to address different sub questions for Question 2, and the whole group came back together to hear the input from the subgroup who discussed the other question and each subgroup had an opportunity to add to the other subgroup's displayed summary.

f) The facilitator outlined what would happen next and told participants that they would receive a copy of the draft report from the forum. They were asked to comment on the draft report and indicate their top three priorities for Question 2 b). The report was amended in the light of their comments and submitted to TIAC via the Department of Commerce.

4. Key Themes and Reponses to Forum Questions

The key themes and responses from participants to the forum questions are listed below. In the first table the level of support for individual ideas is specified based on the prioritisation technique detailed in 3 e). A level of support column has also been included for Question 2 b) which contains the results of participants' response to the draft report and their indication of their top three actions from this table.

4.1. Current Issues facing the Environment Sector

In response to the question, "What are the current issues facing the environment sector?", the following were the key ideas presented:

	Issues	Support
a)	Lack of adequate baseline data re biodiversity. The data collected is not aggregated into a useful form and often needs to be made more available to researchers and the public. Inefficiencies in collecting, managing and sharing data/information e.g. information collected for regulatory purposes which is useful to others but not made available beyond its regulatory purpose Need to set up an appropriate information platform so that information sharing becomes possible and yet this type of objective, which has the potential for making research much more efficient and enduring, can be difficult to gain funding for. Lack of experienced data analysts	6

	Lack of regional focus and plans	
b)	There is not enough market pull behind the research being done – research should be more needs driven with the needs defined by industry or the relevant group(s) interested in the research outputs Need to engage SMEs with scientists so that they become more aware of how they can do something about the environment through the way that they operate as well as become more efficient Need to find ways to enable scientists to engage with industry in meeting their needs (often they are lacking the financial basis for doing this)	6
c)	Need to take a global approach to innovation and capitalise on research from all around the world if it is relevant to our needs	4
d)	The bulk of the research being done in WA in the environmental area is driven by, and being done under, the existing regulatory frameworks which are creating a body of science which tends to reinforce the current regulatory framework. There is a need to evolve the regulatory and policy frameworks so that they can enable us to respond to the broader environmental issues that we are facing.	4
e)	Duplication of effort in research	3
f)	Need to understand the functionality of our ecosystems and how our research can assist us to preserve the continued functioning of these ecosystems	3
g)	Need for remote infrastructure for research e.g. current boat for research on the NW coast, but no marine research stations like on Australia's East coast. Science is conducted on a Fly-in Fly-out (FIFO) basis, at times without adequate linkage to local communities.	2
h)	Lump funding from the Commonwealth often results in the State being asked to take responsibility for the research related to 'one off' funding for a specific need. This approach tends to result in the data and research having no sense of continuity. States often see the process as a cost shifting exercise where they are being asked to provide funding for the research if it is to continue. Researchers often feel hamstrung by the lack of ongoing funding.	0
i)	Need a clear understanding of what we understand before we start doing research and a clear grasp of the purpose of the envisaged research so that we do not use lowest common denominator methodologies A huge amount of research is being done but often without a clear plan or rationale behind it	0
j)	Need to look at other environments beside just those associated with issues of biodiversity e.g. urban and regional environments. In urban environments need to examine systems e.g. transport, water and building systems to see how sustainable they are.	0

4.1.1. WA Strengths/Competitive Advantages

Although forum participants did not get to address this question directly due to lack of time, the following ideas were discussed during the forum, or have emerged in the other two forums conducted to date, and enable us to present responses to the question, "What strengths/ competitive advantages does WA have in this sector?":

a) Strong history of research and education at the tertiary level on many aspects of the environment

b) The presence in WA of environmental research centres such as the CSIRO Centre for Environment and Life Sciences (CELS), the Australian Housing and Urban Research Institute

(AHURI), the Centre for the Built Environment and Health (C BEH) and the Australian Resources Research Centre (ARRC)

c) A range of environmental groups within the State who raise the public's consciousness about environmental issues that the State is facing

d) WA's isolation and size, along with the cost of the development of environmental strategies and technologies, are strong drivers for innovation

e) Perth is an attractive location for many researchers and professionals in the environmental field due to its weather and appealing lifestyle

f) WA's major mining companies have developed strong environmental teams that deal with environmental assessment, plans to minimise environmental impact and processes to rehabilitate mine sites after mining is completed

g) The State Government has a range of departments that have an environmental focus and produce legislation, policies, programs and research aimed at environmental sustainability.

4.1.2. WA Weaknesses/ Market Failures/ Gaps

As with the previous question, forum participants did not have sufficient time to discuss the question, "What weakness/ market failures/ gaps currently exist for WA in this sector?", directly, but the following ideas were discussed during the forum, or have emerged in the other two forums conducted to date, and participants have added further weaknesses in the comments section of the report:

a) WA is a small and isolated economy and it is not easy to bring people here

b) Perth is pleasant to live in but the cost of living is very high

c) WA does a lot of environmental research but much of it is tied to environmental regulatory processes and the data is often not maintained or shared with other researchers

d) A major research gap is the lack of an appropriate information platform to encourage the conditions for government, industry and the community to contribute and collaborate. Research should be accessible to a wide pool of researchers making it more efficient and sustainable

e) The State Government has not established a system for clarifying WA's key research outputs and thus its R&D priorities in the environmental and other sectors. This makes it difficult for the Government to play a lead role in pursuing these priorities through funding and by leveraging Commonwealth government funding and industry support. This lack of focus tends to lead to a scatter-gun approach to funding and support

f) The lack of a regional approach to the development of R&D where research and development activities are directed, in a cooperative fashion between government, researchers and industry, toward key regional issues

g) The State's large land mass means that researchers often have to travel great distances to research sites. The lack of remote infrastructure for research increases the cost of conducting research, making it very expensive.

h) The lack of companies who apply research so that SMEs and consulting businesses that address key environmental issues develop.

4.2. Actions Needed to address Current Issues

The following ideas were presented in response to the question, "What actions need to be taken to address the current issues identified above?":

a) Align the monitoring and research that is being undertaken with regional plans so that regulatory bodies can access research from a broader regional research base

b) Set up some research facilities at, for example, mine sites which will increase government and industry cooperation in the scientific endeavour

c) Establish a global view re data and information so that researchers are contributing to the same data set

   Conduct a stock take of the environmental data in WA and do a strategic analysis of this data to get clear direction about what are the strengths and weaknesses of this data set in relation to the task of formulating policies that address our key environmental issues. This analysis will provide a good basis for generating a research plan for regions and the State, including ways of connecting current and future information to meet the plan's objectives.

   Treat information as an enduring infrastructure

d) Look at the best practice for managing the data from different industries and turning it into useful information

   Adopt a multi-disciplinary approach and create an information system that is flexible and adaptable to meet the needs of different industries

   Develop a consistent form of data storage so that different groups are easily able to access and use the research information that is stored

e) Recommend to the Minister that he facilitates the creation of an enabling information environment as discussed above

f) Facilitate agreement between industry, organisations and government regarding the roles and responsibilities inherent in data collection which include how people collect, manage and share the data that is collected e.g. this is the approach adopted by Landgate's *Location Information Strategy.*

4.2.1. Role of the WA Government

In response to the question, "What role do you think the State Government should play in stimulating this sector?", the following ideas were presented:

a) Write or rewrite legislation that relates to the environment (and also environmental research) that needs to be created or that is out of date e.g. create a Biodiscovery Act and update the Wildlife Conservation Act 1950

   Update legislation using a consistent approach

   Take a different and innovative approach to changing this legislation

   Budget to spend significant resources in enabling the legislative change to happen

b) Facilitate the freeing up of data in government and the private sector through a process of working with industry, researchers and the community to demonstrate the long term benefits and value of creating an enabling information environment and sharing information across that environment – use a demonstration project to show the possibilities inherent in this approach

c) Provide the leadership to set up a public-private partnership which involves the government letting go to get more control

   Encourage large mining companies to be responsible for environmental management of large sections of the environment that they work in. Government regulators can then monitor Key Performance Indicators to ensure that they are met.

d) Analyse the economy to discover the 'sweet spots' of potential convergence between public interest in relation to the environment and commercial interest and pursue these e.g. develop renewable and clean energy technologies for WA – this has the potential to be an industry with great growth prospects

e) Call for tenders on research and development projects that are directed to meeting targeted community outcomes in priority areas (rather than open calls for research proposals)

f) Encourage industry players to invest in environmental science and innovation by demonstrating the benefit to them and by specifying target areas to be addressed

g) Stimulate public-public and public-private collaboration in outcome-focused investment at State, sector and regional levels

h) Promote a view of the environment, not as something separate, but as something that we are all part of and need to sustain

i) Set real, measurable and accountable targets.

4.2.2. Priority Actions for State Government

The following ideas were presented in response to the question, "What do you think the State Government should do as a matter of priority?":

State Government Actions		Support
a)	Articulate clearly the value proposition for science and research to underpin environmental management and decision making and identify the role of government in setting priorities	3
b)	Facilitate a process for identifying and articulating State and regional priorities for R&D to provide a scientific basis for environmental management	3
c)	Create a clear point of contact with government (by sector) and a whole of government approach in relation to science and innovation	2
d)	Develop a research fellowship scheme in environmental research that attracts the best researchers from interstate and overseas	2
e)	Commit to support collaborative R&D with the private sector	1
f)	Develop regional plans based on environmental assets and community values for targeted research that promotes an integrated approach to facilitating both development and environmental sustainability	1
g)	Create programs that have a bias toward the work being done in WA	0
h)	Gather data of case studies to underpin the collaborative R&D approach	0
i)	Leverage the *Location Information Strategy* to assist in developing a sustainable approach to interacting with the environment	0
j)	Set up an 'Innovator in Residence' role to influence government, industry and the community in relation to working with, and as part of, the environment in new ways that address the big issues that we are facing as a state and society.	0

4.3. Opportunities from the NBN Roll Out

Reponses to the final question, "What opportunities do you see in this sector from the implementation of the NBN broadband roll out?", are summarised as follows:

a) Development of regional centres and data rollout to these centres

b) Establish networks for data collection

c) Access to national capability

d) Access to greater and more equitable education possibilities in schools, universities, VET and adult education wherever the NBN exists

e) Allows the consumption and use of information to suit the needs and lifestyles of the users

f) Enables members of the community to engage in science and data collection (in conjunction with scientists or independently) which helps to overcome the limited and short term nature of much research funding

g) Good high speed video conferencing encourages collaboration and to overcome the huge distances in our State and country.

5. Comments

Participants received a copy of the draft Environment Forum Report for the TIAC Stakeholder Consultations and were asked to respond to the report as to its accuracy as a summary of the views put forward in the forum and also to make any comments they wished in relation to the ideas put forward. Where comments were to do with the accuracy of the summary of ideas presented during the forum or improvements in the expression of ideas, changes have been made to the draft forum report. Other comments have been summarised or incorporated verbatim in this section of the report. 6 of the 9 participants who attended the forum provided comments or feedback about the report.

5.1. Reaction to the Report

Participants made the following comments about the report:

a) The report summarised the expressed thoughts of the forum participants well even though it was difficult to cover all of the forum questions in the two-hour forum period

b) There is a fairly substantial disconnect between Sections 4.2.1. and 4.2.2. The introductory paragraph to sections 4.2 and Section 4.2.1 highlight the key actions and roles which were identified by the group to address the weaknesses set out in Section 4.1.2. However Section 4.2.2 seems to be a collection of additional actions which are less directly related to the weakness identified/ and state government roles and actions listed previously. The Group ran out of time and steam near the end and failed to ensure that the final list in 4.2.2 was directly able to address the main issues.

5.2. Particular Content

The following comments were made in relation to aspects of the draft report. Some of the wording of the report has been altered in the light of these and other comments and the reference has been provided, in brackets, to the section(s) of the report to which the comments refer.

5.2.1. WA Strengths [4.1.1. b)]

a) It was suggested that the report avoid naming research centres as naming some and not others seems somewhat arbitrary (I decided not to go along with that suggestion as the examples at least provide some indication of the reality of the research strengths in this sector and the text does not pretend to be comprehensive with regard to the examples given)

5.2.2. Additional WA Weaknesses [beyond those in 4.1.2.]

a) Lack of State Government funding for environmentally focused research in the public interest

b) Most environmental research is commercially driven in WA and the public interest part of the picture is poorly developed and articulated

c) Environmental legislation and regulation in WA is several generations old and the substantial research imperative created by this legislation is a poor fit with the public interest as it relates to improving the state of knowledge about our environments, or how natural resources could be sustainably used for commercial or non-commercial purposes

d) While there is a lot of research into site /species-specific / short term environmental trends there is very little macro research looking at broad long term environmental trends in WA

e) Lack of dedicated funding for many areas of science in WA. The funding in many cases is not available or is pre-committed to certain schemes and is inflexible to reallocate.

f) The Centres of Excellence program allowed the building of capacity for science but did not seed project funding which would have allowed better engagement with industry and greater success for many of the centres

g) Lack of mechanisms to assist science to engage with businesses (especially SMEs), especially to apply it to commercial circumstances.

5.2.3. Comment on Issues and Weaknesses [4.1. & 4.1. b)]

a) As a leader of an in-house research capacity within a State agency I found the comments relating to lack of engagement between scientists and industry, research being conducted without a clear plan or rationale, and lack of regional approach to R&D to be at odds with my experience in my area (biodiversity and conservation). This suggests that there is variability in these aspects across the sector and/or room for improved communication in these areas.

5.2.4. Priority Actions for State Government [4.2.2.]

a) I would like to have seen legislative reform in the list as that would have been my clear #1.

6. Conclusion

WA is a state with enormous environmental diversity and one where the issue of climate change and the development of, for example, agriculture, oil and gas, mining and fisheries means that there are always going to be a huge range of environmental issues that need to be attended to by the State and Federal governments, industry, the research community and the broader community of the State. Much of the current environmental research that is being undertaken to assist with decision making in this area is driven by regulatory processes and so it is often not shared with other parts of the research community. Indeed, the lack of an appropriate information platform that encourages efficient R&D that is shared across government, research, industry and community sectors is a major gap. Nevertheless, WA has an excellent history of research and education in many aspects of the environment, a range of environmental groups and industry teams active in pursuing vital environmental goals, and a State Government with a number of departments providing a strong environmental focus.

In light of this situation, participants recommend that the State Government conduct a stock take of the environmental data gathered by WA researchers and generate a research plan for regions and the State to provide the basis for formulating policies that address WA's environmental issues. A key part of this plan would be the establishment of an environment information platform where government, researchers, industry and the community can store and share research data as a base for decision making. Participants also recommend that the State Government facilitate a process for identifying and articulating State and regional priorities for R&D that provide a scientific basis for environmental management. Additionally, participants feel that the State Government has a key role in revising and updating environmental legislation and finding ways of supporting environmental research in the public interest. They recommend creating a whole of government approach in relation to science and innovation, developing a research fellowship scheme in environmental research to attract the best researchers from interstate and overseas, and committing to support collaborative R&D with the private sector as well as the broader community.

7. Appendix A – List of Forum Participants

Name	Position	Area	Organisation
Mr Mike Bradford	Chief Executive	Government	Landgate
Dr Margaret Byrne	A/Director of the Science Division	Government	Department of Environment and Conservation
Mr Rob Delane	Director General	Government	Department of Agriculture and Food
Mr Bob Kinnell	Manager Water Strategy, Sustainable Development	Industry	Rio Tinto
Dr Jamie Oliver	Science Leader, WA	Research	Australian Institute of Marine Science
Mr Neil Prentice	Advisory Services Manager	Research	Sustainable Energy Association of Australia
Mr Piers Verstagen	Director	Community	Conservation Council
Professor Lyn Beazley	TIAC Member	TIAC	Chief Scientist of Western Australia
Winthrop Professor Shaun Collin	TIAC Member	TIAC	WA Premier's Research Fellow-UWA Oceans Institute, The University of Western Australia

8. Appendix B – Forum Discussion Questions

Within the context of industry, science and innovation for the environment sector, participants were invited to share their views and provide feedback on the following discussion questions:

1. What are the current issues facing the environment sector?
    a. What strengths/ competitive advantages does WA have in this sector?
    b. What weaknesses/ market failures/ gaps currently exist for WA in this sector?

2. What actions need to be taken to address the current issues identified above?
    a. What role do you think the State Government should play in stimulating this sector?
    b. What do you think the State Government should do as a matter of priority?

3. What opportunities do you see in this sector from the implementation of the NBN broadband roll out?