Underpinning Australia's Industrial Growth

Report to Government

Chemicals and Plastics
Action Agenda Steering Group

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INDUSTRY
SCIENCE
RESOURCES

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Executive summary

The chemicals and plastics industry is a diverse grouping….

The chemicals and plastics industry is a diverse grouping. Its participants include major petrochemical facilities, producers of household and industrial chemicals, and plastics makers and processors of all shapes and sizes – from innovative small businesses to leading multinational enterprises. The industry has very broad interests and needs which reflect the diversity of its operations. For instance, issues of raw material feedstock are critical to large chemical and petrochemical facilities, whereas a key concern for the plastics sector is finding staff with appropriate skill levels.

The Chemicals and Plastics Action Agenda reflects this diversity and seeks to identify, and address, the key issues that will shape the industry's future success. The recommendations contained within this report are designed to be implemented as a suite to maximise the potential benefits to the various sectors of this industry.

…but it provides the building blocks for Australia's economy.

The products and services of the chemicals and plastics industry are fundamental to the commercial and social well being of Australia. They are, in fact, the building blocks for all sectors of the economy.

Nonetheless, the chemicals and plastics industry faces a range of problems. These include: the low (and declining) level of reinvestment in existing plant; a lack of investment in new facilities; the growing share of the domestic market supplied by imports; reduced spending on innovation and low rates of uptake of new technology; and a shortage of appropriately skilled employees. Urgent steps need to be taken to address these problems.

Even so the industry's health and future are not assured.

If nothing is done the industry expects that the 32% of domestic demand for chemicals and plastics currently supplied by imports will grow to 53%. As a result, the chemicals and plastics deficit (the difference between the value of exports and imports) will increase from the current $8 billion to reach almost $16 billion by 2010.

The global chemicals and plastics market is intensely competitive. Australian exporters face a variety of both direct and indirect trade barriers. Yet, domestically the market in Australia is comparatively small, and Australian firms are competing against imports, which are subject to low tariffs. The industry is not seeking to create or raise tariff barriers, but rather seeks a level playing field to assist it to compete in the international market.

While Australia has ample supplies of major feedstocks, they are located in remote areas. The lack of infrastructure in these remote areas impedes development by multinational investors, especially when compared to,

other regional governments such as Singapore, Thailand, Malaysia and Taiwan who are offering more attractive policies and incentives for locating there.

The Action Agenda is an ambitious plan to turn this situation around.

The Commonwealth Government initiated the process to create an Action Agenda for the industry because it recognised the importance of the chemicals and plastics industry to the health of the economy and all Australians. This report is intended to form the basis of the Action Agenda. It has been developed by the industry in consultation with Commonwealth, State and Territory governments.

This report identifies the impediments facing the industry and proposes an action plan to overcome these. As well, it proposes a suite of actions to realise the industry's opportunities and to build upon its competitive advantages. These include the industry's ready access to raw materials and energy, and the existing strong linkages and interdependencies between the chemicals and plastics industry and most other sectors of the Australian economy.

The industry's vision is a challenging one.

The chemicals and plastics industry's vision for the future is the driving force behind the plan to capture domestic markets and expand its share of global markets. That Vision is:

"To be a sustainable, dynamic and innovative industry underpinning Australia's industrial growth capturing significant domestic and export markets."

The industry believes that its vision will be achieved by the pursuit of the following goals:

The Chemical and Plastics Industry's Goals

A. Being recognised by the community and Governments as a critical element of Australia's economy, supporting a wide range of manufacturing and service industries.

B. Maximising industry growth by:
   - increasing the value adding capabilities of the existing Australian chemicals and plastics industry. A key to this will be ensuring that the decline in investment in existing plant is halted and reversed; and
   - using the competitive advantage provided by Australia's ample resource and energy base as a springboard for growth, particularly in exports.

C. A revised and streamlined regulatory system that is more timely, accountable and cost-effective and that is consistent with national and international best practice, particularly enabling the rapid use of overseas technology to facilitate growth of chemicals and plastics manufacturing opportunities.

D. Expand and strengthening industry linkages, including with:
   - the automotive industry (export and domestic);
   - Australia's food export industry;
   - the building and allied industries;
   - the medical and bioprocessing industries; and
   - the mining and mineral processing industries.

E. Increasing the level of industry R&D through:
   - building alliances with the public sector research base, and
   - strengthening the incentives to conduct R&D in Australia.

F. Developing a highly skilled, well-qualified and flexible workforce.

G. Being recognised by the community and Governments for contributing to Australians' quality of life through environmentally, socially and economically responsible practices.

Required Actions are grouped under four overarching themes.

The Steering Group's recommendations are the means for industry and government to work together to help the industry realise its vision and achieve its goals.

The required actions are grouped under four broad overarching themes:

- **Regulatory reform;**
- **Investing and re-investing in growth;**
- **A culture of innovation; and**
- **A highly skilled workforce.**

Regulatory Reform

Regulatory systems must be made more effective and efficient.

Governments properly regulate the industry on behalf of the community. However, government policy, although well intentioned, has sometimes worked to discourage the introduction of new technology that in some cases would have provided a clear environmental advantage over the status quo. For example, one company wanted to introduce a better performing and less toxic chemical in the manufacture of their powder coatings. The alternative chemical has been widely used in Europe for a number of years with no adverse side effects. However, the company has been unable to find any way of introducing the substitute chemicals into Australia other than through a full assessment process, costing up to a quarter of a million dollars.

Attachment A4 lists a number of other examples where the costs of regulatory compliance for both products and processes have been prohibitive.

The Steering Group recommends a number of changes to the existing regulatory system that are designed to improve the accountability and efficiency of regulatory bodies while preserving the protection that regulation affords to the Australian community.

Greenhouse policy is also an important competitive factor for the chemicals and plastics industry. The industry welcomes the Government's commitment to ensuring that future greenhouse gas abatement policies and measures will promote cost-effective actions, being mindful of the competitiveness of Australian manufacturing. The industry is keen to be involved in the ongoing development of greenhouse gas abatement policies and strategies.

Key Recommendations:

Governments should adhere to the 1997 COAG principles and guidelines.

- **Regulatory approaches to be brought into line with the 1997 Council of Australian Governments (COAG) principles and guidelines[1].**
- **Annual auditing of all agencies regulating the chemicals and plastics industry to ensure they comply with the 1997 COAG principles.**
- **Regulatory bodies to:**
  - **Recognise data from overseas sources that test to accepted international standards;**
  - **Recognise chemical approvals from specified countries including substances "grandfathered"[2] in those countries; and**

1 See page 26 for a list of the COAG principles.

- **Ensure consistency of international definitions/classifications.**

- **Development of a National Chemicals Policy by Commonwealth, State and Territory governments, industry, unions, environmental organisations and consumer groups.**
- **Subject regulatory agencies that use cost recovery to enforceable productivity targets.**
- **Government funding of the public good aspects of regulatory agencies' activities.**
- **Open up regulatory assessments to alternative service providers.**
- **The Government to involve industry from the inception to the implementation phase of greenhouse gas abatement policies and strategies that impact on industry.**
- **Only implement a mandatory domestic emissions trading scheme if all developed countries ratify the Kyoto Protocol and there is an established international emissions trading regime.**
- **Avoid greenhouse gas abatement policies that would distort investment decisions.**

Investing and Re-investing in Growth

There are significant impediments to attracting investment and re-investment in this industry.

Investment in new plant and re-investment in existing facilities is one of the key drivers for ensuring the future of the chemicals and plastics industry. The Steering Group believes that the government has a vital role to play in encouraging the industry to invest in growth.

The focus should be on two critical areas:

1. Strengthening the existing industry base through the creation of new linkages between the chemicals and plastics industry and other industry sectors. This will assist in the realisation of profits in the medium term, which can subsequently facilitate the introduction of new technology and further investment; and
2. Using the competitive advantage provided by Australia's ample resource and energy base as a springboard for growth, particularly in exports.

2 When various jurisdictions introduced regulations requiring the testing of chemicals prior to their acceptance for use, those chemicals currently in use were exempted from retrospective testing under the regulations, or "grandfathered".

Key Recommendations

Potential investors will base investment decisions on an overall assessment of available incentives.

To assist existing industry, in particular small and medium sized enterprises, to improve the competitiveness of their businesses, Government should initiate a series of actions to encourage investment in import replacement and export oriented investment. The government should:

- **Amend the Tariff Concession Scheme to ensure that Australian manufacturers are able to source imported goods not made in Australia at a zero tariff rate.**

Creating a climate that encourages investment is a critical part of the Action Agenda.

In addition, import replacement incentives are important for growth of existing industries. The Steering Group therefore recommends:

- **That the Government provide support for a study of the product types in which the Australian industries could succeed in import replacement and/or increased exports considering the growth of other linked industries.**

In terms of the exporting and transport interests of the industry, the Steering Group considers it imperative to:

- **Take a pro-active role in international trade fora in order to remove international trade barriers. It should also continue its efforts to negotiate bilateral trade agreements. The government should actively involve the industry in this process; and**
- **Identify and reduce some cost imposts that make coastal shipping in particular so expensive (this might include allowing international vessels to provide coastal shipping services).**

The full suite of recommendations needs to be implemented for the Action Agenda to be fully effective.

The Steering Group emphasises that implementing its *Regulatory Reform* and *Culture of Innovation* recommendations will be another critical input to ensuring that the climate for re-investment is a positive one. Similarly, encouraging a culture that values education and the development of a skilled work force, particularly with regard to the plastic fabricating sector, through the implementation of the *Highly Skilled Workforce* recommendations, is also an important component of any package of measures to promote re-investment in existing industry.

To achieve major new investment requires a strong commitment from governments.

The findings of the 1997 Access Economics study[3] demonstrated that investment in a new world-scale fully integrated petrochemical project would bring significant benefits to the economy. However, there are a number of key impediments that discourage overseas investment in such an export oriented project. The Steering Group has provided some salutary evidence from a benchmarking analysis comparing Australia with several regional countries (see Section 4.2). This clearly shows how

3 Access Economics, Economic impact of chemicals and plastics investment prepared for the Plastics and Chemicals Industries Association, June 1997, page 2.

governments of countries with relatively small domestic markets and little in the way of natural resources using generous investment incentives to attract major revenue generating projects.

Decisions on the location for investment in upstream processing will primarily depend on the availability of significant low cost gas reserves. If the Government elects to take significant revenue at the well head, the cost of reserves is increased. One way of overcoming this would be to have a lower tax regime applied to gas that is used in local processing industries compared to gas that is exported as a fuel source. This would encourage the development of gas resources and investment in a local processing industry with flow-on benefits for the economy as a whole.

The Steering Group recommends that the Government:

- **acknowledge that the chemicals and plastics industry is integral to the health of the Australian economy and commit itself to the long term viability of the industry; and**
- **consider mechanisms to address feedstock cost / price impediments, including by providing for a different tax treatment for gas used as a feedstock in local processing industries.**

An important impediment to such an investment taking place is the need for investment in infrastructure on a scale that goes beyond what is commercially feasible for any single project. In recognising this, the Steering Group recommends that:

- **The Commonwealth takes the lead in developing mechanisms to provide common use infrastructure with the cost to be repaid through user fees over a specified time period. For example, the Commonwealth's role could initially include bringing the stakeholders together and assisting with resolving cross-jurisdictional issues.**

As was the case for encouraging re-investment in the existing industry, investment in new projects will be highly dependent on developing a package of measures to create the right framework for such investment. This includes the implementation of the *Regulatory Reform* recommendations, particularly those relating to greenhouse policies. In addition, implementation of the *Culture of Innovation* recommendations will be an important contributor to any package of measures.

A Culture of Innovation

Implementing the Innovation recommendations will boost the competitiveness of the industry.

Innovation is a major determinant of enhanced productivity and competitive advantage at both the firm and national level. It strengthens linkages with suppliers and leading edge customers and collaborative research arrangements. Having an appropriate policy framework in place, which creates a partnership between industry, education, research and government agencies, enhances innovation. If adopted these recommendations could help move the chemicals and plastics industry significantly away from its current downward trend.

The measures announced in the Prime Minister's statement on innovation *Backing Australia's Ability* on 29 January 2001 are an important contribution to improving the policy framework for encouraging innovation. Nonetheless, the Steering Group believes that there are a number of areas where additional measures should be introduced.

Key Recommendations

- **Establishment of an innovation liaison office with representatives in each State and Territory, which could act as an innovation contact and coordinating point for industry.**
- **That levels of R&D expenditure, particularly by the chemicals and plastics industry, should be closely monitored over the next two years to determine the impact of the policies contained in the Innovation Statement and if necessary, supplementary measures should be introduced.**
- **That the Government create a mechanism to ensure better linkages between the private industry and those relevant public research institutions.**
- **In establishing biotechnology centres of excellence, the Government should provide scope to include an element of the emerging bioprocessing industry.**

A Highly Skilled Workforce

A skilled workforce is a crucial requirement for innovation and continued competitiveness in both global and domestic markets.

The industry is very technically oriented and requires skilled personnel in order to be competitive. However the industry's failure, in particular to attract school leavers, has serious implications for its future. So too does the evidence emerging over recent years of a retreat from science based learning in education generally. This retreat, if it is not reversed, will adversely affect the stock of suitably skilled and qualified people to work in these technology intensive industries.

The Steering Group's view is that the training arrangements in place for the chemical industry are relatively better than those provided for the plastics industry. In view of this, both industry and governments need to

place special emphasis on improving the vocational education and training arrangement for the plastics industry, particularly the downstream processing elements – fabricators and converters of the raw material into such products as milk bottles, plasma bags, and automotive parts.

Key Recommendations

- **Industry, Commonwealth and State training and education authorities work together to accelerate the implementation of a nationally consistent vocational education and training (VET) system.**
- **The creation of an industry led National Training Council to facilitate implementation of the ANTA Ministerial Council resolutions of 30 June 2000, and particularly to improve the vocational education and training arrangements for the downstream processing and broader elements of the plastics industry**.
- **Introduce the AQF1 as a mandatory minimum employment condition standard.**
- **The Commonwealth government should provide further incentives to promote and reward organisations and individuals undertaking training and skill acquisition.**

Implementation

An industry led Chemicals and Plastics Leadership Group is needed to oversight the implementation of the Action Agenda.

The Steering Group realises that the completion of this Report and agreement between the Government on a shared vision is only the start of the process to get the industry back onto a strong growth path. To oversee that process, the Steering Group recommends that:

- **A Chemicals and Plastics Leadership Group (CPLG) should be created and tasked with implementing the agreed actions arising from the Action Agenda.**

The CPLG should be an industry led, hands on group that would translate the strategies and actions into concrete and measurable activities. The membership of the CPLG should be drawn from senior executives from industry, relevant Commonwealth, State and Territory government departments, research bodies and industry associations. The Minister should invite appropriate level stakeholders to participate in the CPLG.

The CPLG would report to the Minister at appropriate intervals on progress by stakeholders in implementing the Action Agenda[4]. The CPLG would also provide an excellent mechanism for on-going high-level dialogue between industry and government on policy issues.

Part of the Leadership Group's tasks will be driving the industry's required image change.

The Steering Group is concerned that the chemicals and plastics industry (in comparison with some other industries) has a relatively poor image. This negative image affects the industry's relationships with both users and producers, as well as with prospective employees, governments and the broader community.

While the industry plays a critical role in contributing to the health of Australia's economy, its growth and continued existence cannot be taken for granted. The industry needs to develop and implement a strategy to promote its commitment and contribution to society.

The Steering Group considers that the CPLG is the appropriate body to address the factors contributing to the poor perception of the industry, and recommends that:

- **The CPLG devise strategies for the industry and individual companies to drive the objective of altering the industry's image in order to contribute to achieving the key goals of the Action Agenda**.

4 It is expected that in the early stages the CPLG would report more frequently, perhaps six monthly. Reporting frequency could reduce to annually after the first 18 months. The need for the CPLG should be reviewed after two years.

1. Introduction

1.1 Background to this Report

Action Agendas are joint effort by government and industry……

The Chemicals and Plastics Action Agenda was announced following a meeting between the Minister for Industry, Science and Resources, Senator the Hon Nick Minchin, and senior industry representatives in February 1999.

Action Agendas are a key part of the Commonwealth Government's industry strategy. They are designed to build a dynamic partnership between industry and government, with the common goal of promoting sustainable economic growth for Australian business and changing cultural expectations. In essence, Action Agendas are designed to move industry onto a higher and sustainable growth path. Each Action Agenda achieves this via the following steps:

- Undertaking a strategic analysis of the industry's competitive position;
- Developing and agreeing an industry vision, that is, the goals and objectives for the industry to 2010;
- Identifying impediments and opportunities for the industry's sustainable growth; and
- Developing a set of strategies and actions with clear responsibilities and implementation paths.

…. but outcome is strongly industry driven.

The Commonwealth Government acts as a catalyst by providing the framework for the Action Agenda process, however the outcome of the process is very much an industry driven one. Hence, the result strongly depends on the level of effort and input provided by the industry stakeholders.

1.2 Preparation of the Industry's Report

Consistent with the intention for Action Agendas to be industry driven, this Report has resulted from a high level of industry involvement through an extensive process of consultation with stakeholders.

The process of developing this Action Agenda began with a series of over sixty interviews with a wide range of stakeholders including companies, industry associations, educational and research bodies and government representatives. The Department of Industry, Science and Resources conducted the interviews during the period June - September 1999.

The outcomes of those interviews provided a snapshot of the industry and identified a number of key market drivers and barriers to growth.

A Steering Group of senior executives from the industry provided strategic direction, leadership and focus for the Action Agenda process. A list of Steering Group members is provided in Attachment A1.

In addition, four Working Parties were set up to examine a range of issues that industry considers important. These were:

- The Scenario Planning Working Party;
- The Regulatory Reform Working Party;
- The Innovation and Emerging Technologies Working Party; and
- The Education and Training Working Party.

These Working Parties provided the industry with an opportunity to discuss, identify and develop the vision and goals that are the central purpose of this Report. Attachment A2 provides a list of Working Party members.

1.3 The Industry's Vision

The starting point for this Action Agenda was the development of the industry's vision of its future. The vision identifies what the industry stakeholders consider is the desirable broad direction for the industry. It sets a target for where industry wants to be at some specified point in the future, in this case 2010. The agreed vision is shown in Box 1

The industry's vision is the starting point.

Underpinning that vision, and also shown in Box 1, are the key underlying goals the Steering Group considers to be crucial to achieving its vision.

Much of the responsibility for growing chemicals and plastics markets properly rests with the individual businesses that make up the industry. Clearly, many chemicals and plastics companies are already taking steps to achieve such an outcome for their own businesses. Collectively, these efforts will make a strong contribution towards achieving the industry's vision and goals.

However, there remain a number of areas where the Government and industry can work together to implement actions aimed at addressing matters of common interest. This category of actions forms the focus of this document.

Box 1 The Chemicals and Plastics Industry Vision and Goals

VISION

"To be a sustainable, dynamic and innovative industry underpinning Australia's industrial growth capturing significant domestic and export markets."

This will be achieved by the pursuit of the following goals:

GOALS

A Being recognised by the community and Governments as a critical element of Australia's economy, supporting a wide range of manufacturing and service industries.

B Maximising industry growth by:

- increasing the value adding capabilities of the existing Australian chemicals and plastics industry. A key to this will be ensuring that the decline in re- investment is halted and reversed; and
- using the competitive advantage provided by Australia's ample resource and energy base as a springboard for growth, particularly in exports.

C A revised and streamlined regulatory system that is more timely, accountable and cost-effective and that is consistent with national and international best practice, particularly enabling the rapid use of overseas technology to facilitate growth of chemicals and plastics manufacturing

D Expanding and strengthening industry linkages, including with:

- the automotive industry (export and domestic);
- Australia's food export industry;
- the medical and bioprocessing industries;
- the mining and mineral processing industries; and
- building and allied industries.

E Increasing the level of industry R&D through:

- building alliances with the public sector research base, and
- strengthening the incentives to conduct R&D in Australia.

F Developing a highly skilled, well-qualified and flexible workforce.

G Being recognised by the community and Governments for contributing to Australians' quality of life through environmentally, socially and economically responsible practices.

2. The Chemicals and Plastics Industry Today

The industrial revolution brought with it the chemical revolution, where chemistry moved out of the laboratory and into the factory. The last 50 years have seen the rapid growth of the chemical and plastics industry that produces the substances that now play such an important role in modern life.

Chemicals

Chemicals are an integral part of our lives……

Today, chemicals create the world in which we live. We use chemicals to:

- preserve, colour and flavour the food we eat,
- make the appliances and furnishings in our homes and offices, the clothes we wear, the cars we drive,
- make the medicines, cosmetics and cleaning aids we use, and
- produce the dyes and paints that create the colours around us.

Chemicals can be formulated to provide personal care and hygiene products; disinfectants and sanitisers; general cleaning and coating formulations; metal treatment and water treatment products. These formulated products are vital to industry sectors such as the household and commercial cleaning industry; medical and medical device industry (sterilants and disinfectants); and food hygiene applications in the food industry.

Synthetic fibres now account for just on half the world demand for textiles. The chemicals industry produces these fibres from polymers derived from oil and gas. The versatility of these and other synthetic fibres is demonstrated by their use in specialised surgical devices such as artificial blood vessels, patches for arteries and interlinings for artificial hearts, and in flame-resistant fabrics in clothing for fire fighters, welders and racing car drivers.

Some of the most significant developments include new substances such as synthetic textiles, colourants, medicines, and agricultural products. But undoubtedly one of the most dramatic achievements of the chemical's industry has been the development of the entirely new family of materials we know as plastics.

Plastics

…. as are plastics.

Plastics are essentials part our society. They are used in:

- Packaging - about 50% of all packaging, and about 25% of all food packaging. Because plastic is lightweight, goods can be wrapped

without adding significant weight. Typically, plastics packaging accounts for as little as 1-3% of a product's weight. Keeping product weight down in turn minimises the amount of fuel required for transport.

- Cars - in safety applications such as air bags and seat belts; as a lightweight product in bumpers, fascias, fuel tanks and dashboards.
- Building - as insulation to deaden noise and protect against heat loss in winter and heat gain in summer; in various pipe systems to replace heavier and more fragile pipes made of clay.
- Electronic and white goods - they can be moulded into many shapes, are lightweight, unbreakable and strong.
- Agriculture - plastic sheeting protects crops from insects and weeds and, therefore, reduces the need for spraying.

Other uses include medical applications (artificial joints, coronary valve replacements), optical aids, aerospace and sports and leisure.

So what is the state of the industry?

With such a significant role, it is pertinent to investigate the health of the chemicals and plastics industries. To do so we need to examine a range of economic statistics. We need to consider these in terms of the industry's comparative size, growth rates, employment productivity and absolute size as well as the value it adds to Australia's GDP and its impact on the trade balance. These data, as well as how the chemicals and plastics industry compares in terms of investment rates and R&D are set out below:

- It has an annual turnover averaging $20 billion, or a little less than 10% of the total manufacturing sector;
- It employs over 77,000 people, or just over 8% of the total manufacturing industry workforce;
- It adds nearly $7 billion in value annually to the economy, more than 10% of the total value added by the manufacturing sector;
- Value added per employee in the chemicals and plastics industry is on average a healthy 25% greater than the figure for the manufacturing sector as a whole;
- It imports well over $10 billion of goods and services annually, averaging just under 12% of the total manufacturing sector's import bill. Imports are growing at an average rate of 8.6% annually, slightly less than the 9.1% growth rate of imports of the total manufacturing sector;
- A significant balance of trade deficit for the industry results from an annual export level of less than $2.5 billion
  - representing just under 5% of exports from the total manufacturing sector

  - which despite the industry's export growth rate of just under 8% (exceeding the 6% growth rate in exports for the total manufacturing sector)
  - results in the chemicals and plastics industry contributing a quarter of the total deficit of the manufacturing sector;
- Domestic demand for chemicals and plastics is growing at an average annual rate of 3.3%, just below that of the total manufacturing sector's 3.8%
  - both growth rates are below annual GDP growth;
- It invests on average just under $1 billion annually, or about 13% of investment in the total manufacturing sector
  - however capital investment levels are extremely volatile fluctuating between falls of 20% and increases of 50% from year to year
  - nonetheless, average investment per employee is two thirds greater than the rate for the total manufacturing sector; and
- R&D is low in this sector, averaging around $140 million annually, or less than 7% of R&D taking place in the total manufacturing sector.

2.1.2 The picture for the chemicals industry

Overall, indicators for the chemicals sector have been static to declining.

Turnover has decreased by an average of 1.5% over the last three years, and employment rates have been showing a tendency to drop slightly. While some sub-sectors within the industry are experiencing stronger growth rates, the overall picture is not encouraging.

Domestic demand for chemicals has been virtually static for the last three years in sharp contrast to the rest of the manufacturing sector which has seen domestic demand grow steadily by over 3% each year.

Export growth rates have halved over the last three years. Imports have consistently grown at rates greater than exports. Again, there some sub-sectors within the industry where their experience has been different, but overall the outlook is relatively gloomy.

Investment levels are growing at just over half the rate for the total manufacturing sector and have dropped by nearly 4% over the last three years. Onshore R&D spending is highly volatile and well under the levels seen elsewhere in the manufacturing sector.

The realities for the chemicals industry are:

- The domestic market is comparatively small;
- Australia has no world scale export plants;
- While Australia has ample supplies of major feedstocks, they are located in remote areas where the lack of infrastructure discourages multinational investors;

- Australia is geographically removed from major markets, and
- Tariff protection levels are still high in many countries.

Investment as a % of turnover is low by global standards.

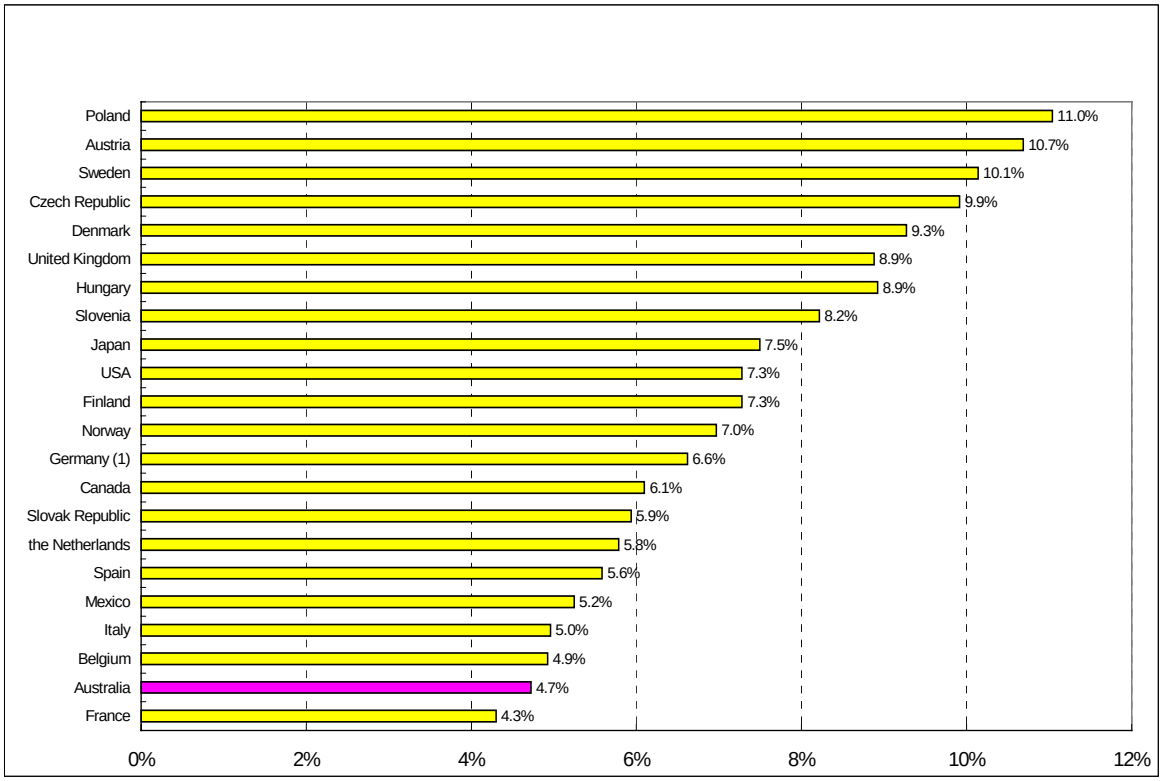
Investment rates in the Australian chemicals industry do not compare well when you considering capital spending as a percentage of turnover in chemical industries around the world. The value for Australia is 4.7% whereas the average for the countries shown in Figure 1 is 7.1%. The values for Asian countries, which are not shown, are orders of magnitude greater than Australia's as those countries develop their industries.

Part of the reason for the high level of investment in Asia is that production of high volume chemicals is shifting towards developing countries. The United States chemical manufacturers expect to increase the portion of total plant and equipment investment committed to locations such as Latin America, Central and Eastern Europe, China and Asia (excluding Japan) [5].

While there are opportunities for world scale petrochemical plants in Australia based on natural gas reserves, the industry also recognises that there are significant opportunities in value added chemical production. In particular, Australian firms have an opportunity to play a key role in emerging areas such as bio-processing and food packaging. Importantly, such value added chemical manufacturing does not have to be world scale to be competitive.

5 Chemical Manufacturers Association (1998). The CMA Economic Survey: Outlook for 1999 and beyond.

Figure 1 Capital spending in chemicals industry as a percentage of turnover



Source: EUROSTAT-SBS & CEFIC-Ecostat

2.1.3 The picture for the plastics industry

There are 2,200 plastics manufacturing plants in Australia employing an average of 16 people each. Turnover at between 2 and 3%, and employment at around 1% have both been growing steadily over the last seven years, in contrast to the drop in both, at least in the last three years, for chemicals.

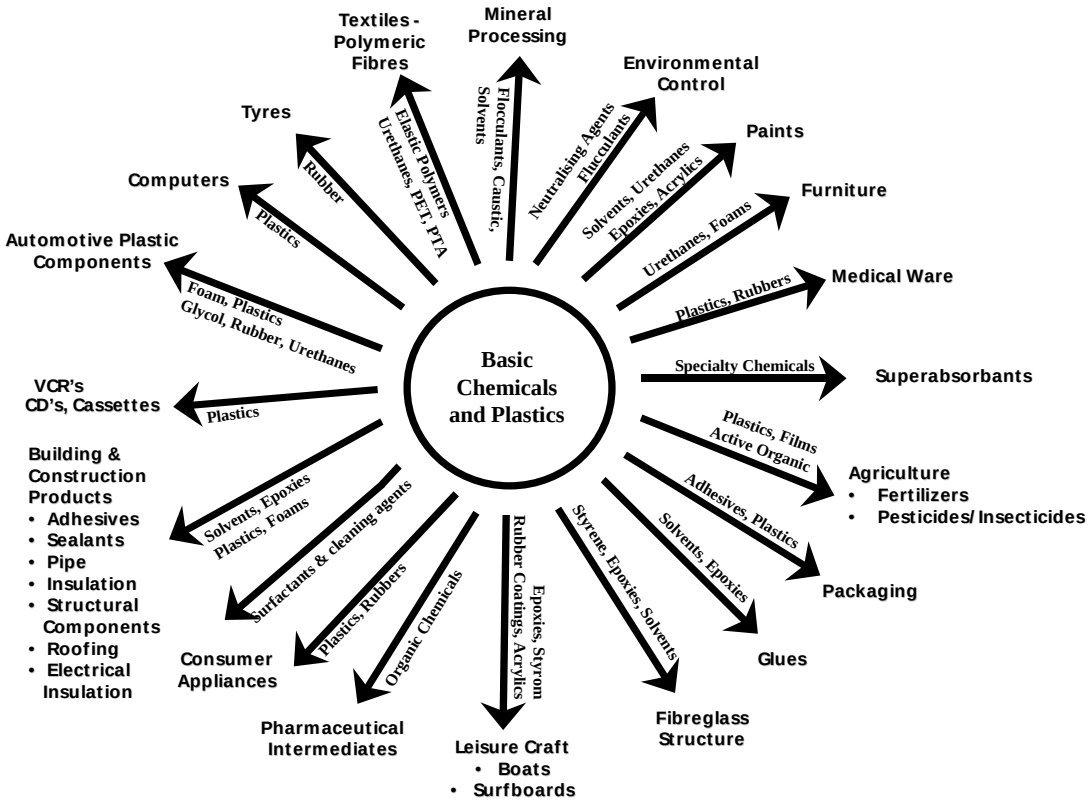
Domestic growth in demand for plastics has persistently been greater than the growth in the local supply. While the rate of growth in imported products has fallen to much lower levels in the last three years than in the previous four, it is still averaging over 5%. While exports have come off an extremely small base, they have averaged growth of nearly 11% in the last seven years.

But the plastics industry is not investing in itself. Over the last seven years investment levels have fallen by an average of nearly 3% a year.

2.2 The role of chemicals and plastics in the Australian economy

The products of the chemicals and plastics industry are absolutely fundamental to the commercial well being and viability of a wide range of other economic sectors in Australia (see Figure 2).

Figure 2 Linkages between the chemicals and plastics industry and other industries



The chemicals and plastics industry is highly integrated with the rest of the economy.

The basic chemical industry, for example, provides $9 billion of inputs to the automotive, mining, non-ferrous metals, printing, paints, agriculture, construction, pharmaceuticals, water and sewerage and textiles and footwear sectors. Indeed, the industry is one of the largest sources of manufactured inputs for Australian industry as a whole. The sector's importance is only surpassed by iron and steel, petroleum and coal products. However, the chemical and plastics industry's integration within the domestic economy and its markets is, however, far higher than is the case for either the iron and steel, petroleum or coal products industries.

Consequently, a serious implication of the characteristics embodied in the current state of the chemicals and plastics industry is the real or potential

disintegration of the value chain across several key sectors that rely on these industries for their own health

The Steering Group has found that in general, the plastics and chemicals industry:

- has not kept pace with other manufacturing sectors, by at least some of the key macro economic measures; and
- operates an aging and increasingly less competitive asset base, and that future investment intentions fall below annual depreciation charges.

The key question for the industry then is how can the industry bring about a major shift in its fortunes to ensure that it achieves its vision and goals? The industry recognises that it operates in a global environment where it must be competitive in order to survive. In such an environment, government subsidies to inefficient industries are not only a waste of scarce public resources, but would also only serve to delay and make the necessary industry adjustments more difficult in the long term.

However, this does not mean that the government does not have a vital role to play in ensuring the business environment is competitive.

2.2.1 Industry linkages

As was shown in Figure 2, the chemicals and plastics industry is highly integrated with the rest of Australia's industry.

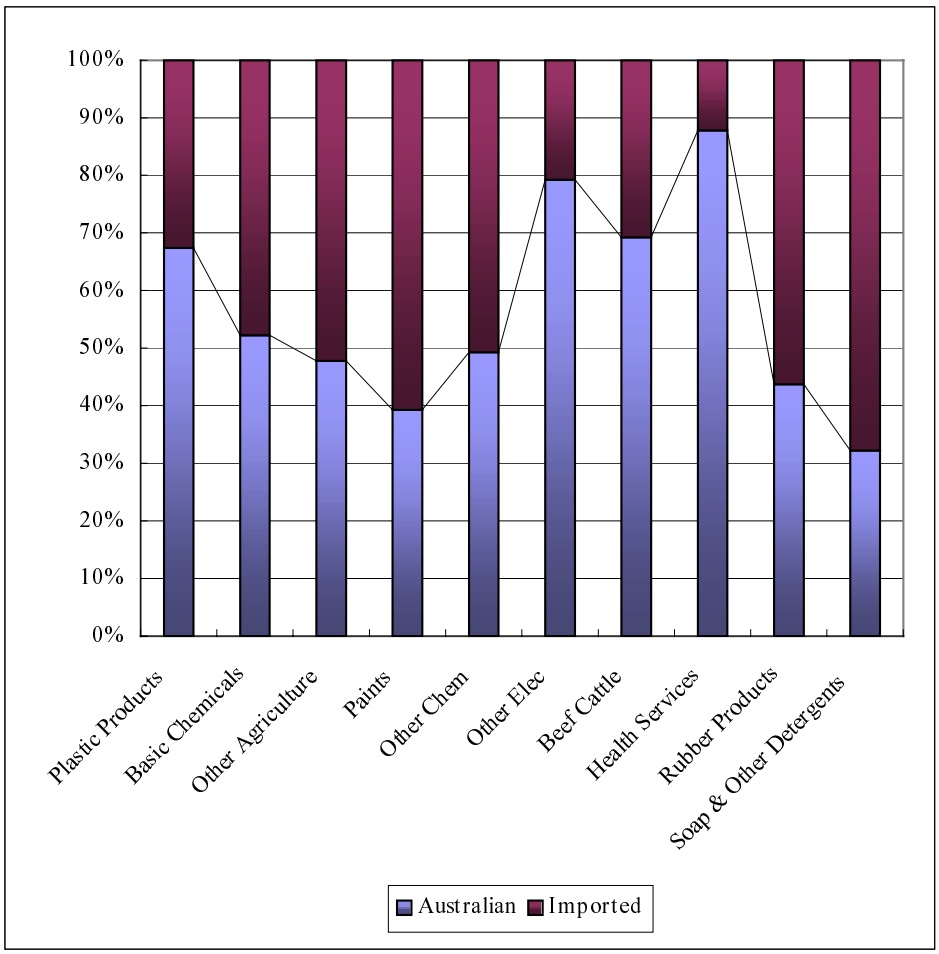
The existence of these linkages and the resultant ability to service domestic clients flexibly provides the industry with a potentially significant advantage over imports, although competitive pricing will always remain the critical factor.

Strong industry linkages can of course work both ways. It needs to be recognised that an over reliance on any particular sector of the Australian market exposes the chemicals and plastics industry to any cyclical downturns that may occur in that sector.

Conversely, growth in customer industries can have a dramatic impact on demand and often require substantial capital investment in order to satisfy the market. Significant fluctuations in the markets do not occur frequently enough for this to be a major issue but it is reflective of the constraints that niche marketing places on the capacity of a company and the need for reasonably long term certainty of customer stability to warrant investment in expansions.

Figure 3 shows the relative shares of demand met by imports and domestic suppliers for the top ten Australian customers of the basic chemicals sector in 1994/95.

Figure 3 Relative shares of imports and exports for top ten customers of chemicals sector

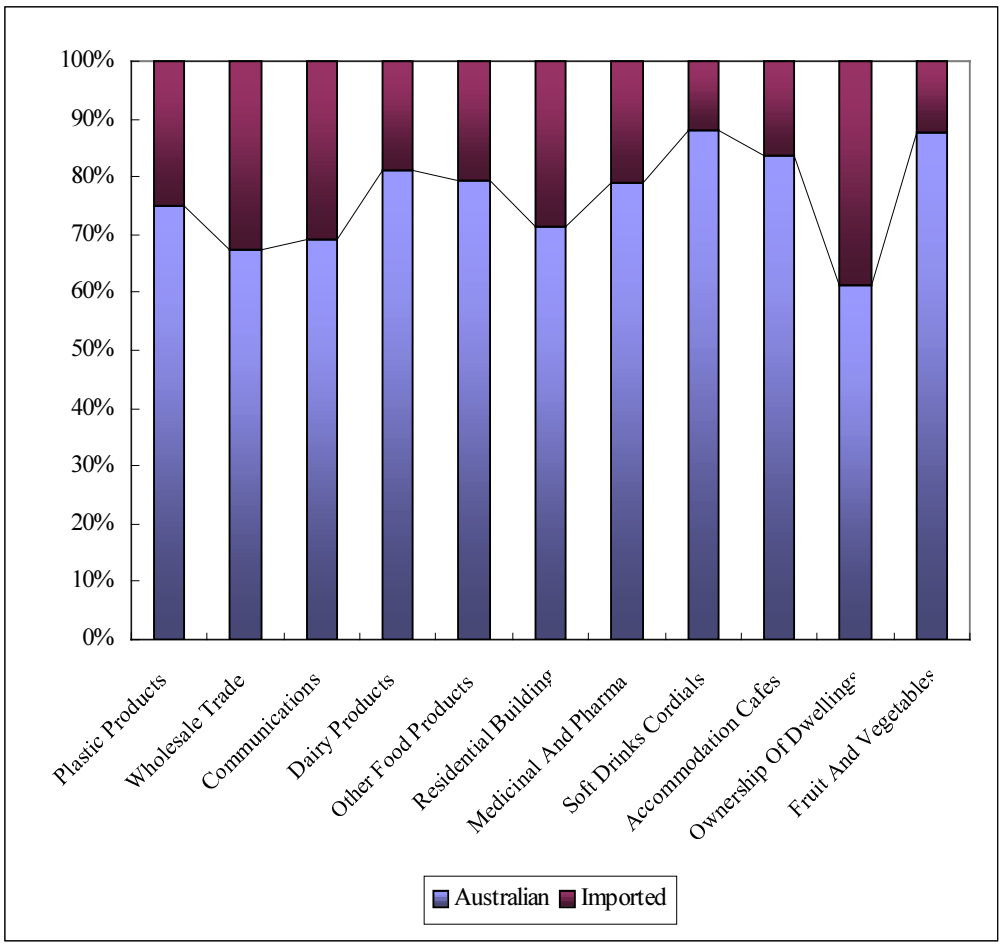


Source: ABS

As indicated in Figure 3 there are several industries where the domestic suppliers still supply almost all of the local market. However, there are also markets where imports have made significant inroads.

Figure 4 shows the same information for the plastics component of the industry. The data certainly suggests that the plastics industry has been more successful in protecting its share of the domestic market.

Figure 4 Relative shares of imports and exports for top ten customers of plastics sector



Source: ABS

By their very nature, building and expanding industry linkages is an area where individual companies must take the primary responsibility for action. Certainly, the Steering Group believes that it is good business for companies to do so.

3. The Chemicals and Plastics Industry Tomorrow

The Steering Group has considered what the industry's drivers are and the industry's integration with the rest of the manufacturing sector in particular, but also more generally on the Australian economy as a whole. Of concern are the implications for the future that this picture holds, not just for the chemicals and plastics industry, but also for other industries. We address here what these implications are.

3.1 What do the statistics suggest?

The business as usual scenario presents a gloomy picture.

Under a "business as usual" (BAU) scenario we would expect to see the following happen:

- Assuming the domestic market continues to increase, there would be an increasing reliance on imported chemicals and plastics products as the domestic industry's market share declines;
- Producers become less and less able to satisfy the volumes required for the domestic market;
- Aging plants would become less and less competitive and come under increasing pressure from imports. Particularly since more advanced technologies and decreased international transport costs would make imported products more attractive;
- More downstream products are imported. While some products have a natural competitive advantage, more products previously not imported such as car parts could now begin to compete with the domestic product;
- Low take up rates for new technologies will reduce the export competitiveness of domestic products;
- A shrinking industry will concentrate on survival. Levels of innovation and R&D expenditure will fall even further and increasingly be taken offshore;
- A shrinking industry will require fewer employees and this will be reflected in a reduction in the tertiary and vocational training required; and
- Reductions in quality and technology will impact down the supply chain putting pressure on industries reliant on inputs from the chemicals and plastics industry.

Table 1 shows the expected outcomes in 2010 for a range of key data under a business as usual (BAU) scenario.

Table 1 Key data under business as usual (BAU) conditions: Total chemical and plastic manufacturing industry

	Average to 1998/99	2010
Domestic demand $m	$26,419	$42,028
Exports $m	$2,369	$6,342
Imports $m	$8,630	$22,272
Turnover $m	$20,158	$26,098
Turnover less exports $m [3]	$17,789	$19,756
Exports as a proportion of turnover %	12%	24%
Imports as a proportion of domestic demand %	32%	53%
Turnover less exports as proportion of domestic demand %	68%	47%

1. *The table's data excludes medicinal & pharmaceutical sectors.*
2. *The data assume there are no changes to rates of growth in domestic demand and the key indicators, that is, what is traditionally termed, business as usual, or BAU*
3. *That is, domestic producers successfully capturing the domestic market.*

There is a key message from the above data. If the conditions that have prevailed over the last seven years continue without change, while domestic demand will continue to grow slowly, imports over the next ten years will increasingly displace local production leading to a situation where Australian producers are supplying less than half of the domestic market. That is, despite domestic demand increasing by over $15 billion in the 10-year period to 2010, domestic producers will capture less than $2 billion of this increase, with the bulk of it going to more globally competitive imports.

A graphical view of the above data for the chemicals and plastics sectors under BAU conditions are shown in Chart 1 and Chart 2 respectively.

Chart 1 The chemicals industry 10 years on (BAU scenario)

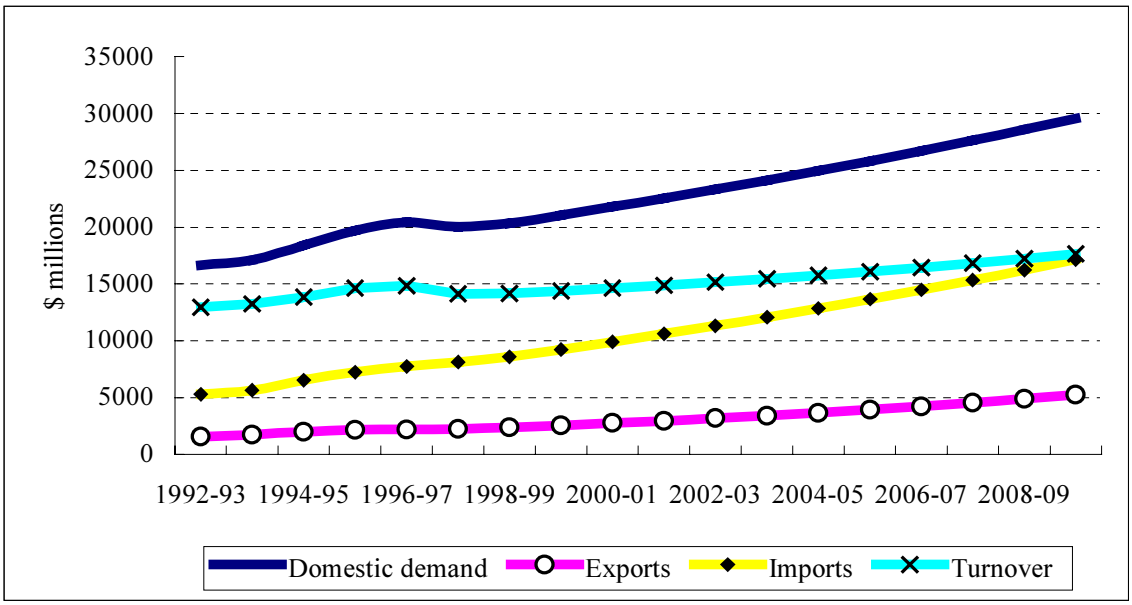
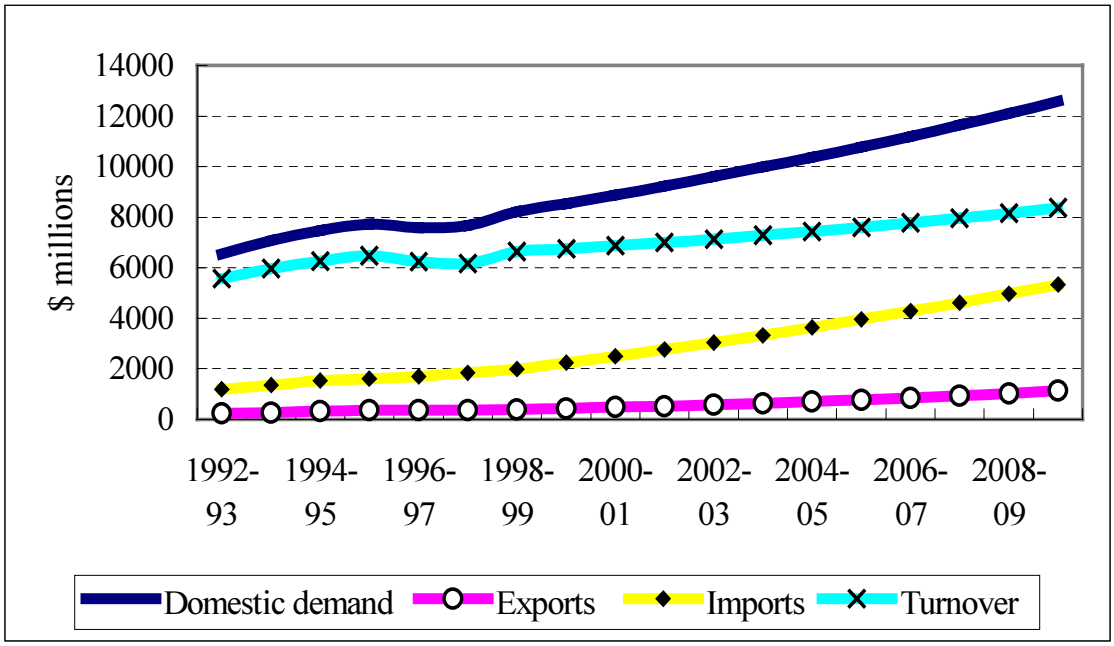


Chart 2 The plastics industry 10 years on (BAU scenario)



The poor outlook that is illustrated in the charts above is not confined to the plastics and chemicals industry; they imply serious impacts on other manufacturing sectors and more broadly on the Australian economy as a whole, particularly the impact on the balance of payments deficit. Doing nothing would be just as serious for the rest of the Australian economy as it would be for the chemicals and plastics industry itself.

3.1.1 Alternative development paths for the future

However, there are alternative paths.

In addition to the "business as usual" (BAU) approach, the industry has considered a number of possible development paths for the future. These are:

Path 1 Halve the increased share of the domestic market that imports would gain under the BAU scenario.

Path 2 The Australian industry maintains its current share of the domestic market.

Path 3 This is the same as Option 2, but also includes a doubling of average rates of export growth

The key assumptions for the three development paths are listed in Table 2.

Table 2 Key assumptions for development paths

Scenario	Assumptions
Path 1	Reduce average growth rates for imports of chemicals from 8.5% to 4.5%, and for plastics from 8.9% to 6.4%. This would mean that in 2010 chemicals imports would be 47% of domestic demand, rather than the 58% we would see under a BAU scenario); plastics imports would be 31% of domestic demand - not 42%.
Path 2	Reduce average growth rates for imports of both chemicals and plastics to approximately 3%. This would mean chemicals imports maintained their 37% share of domestic demand, and plastics imports maintained their 21% share of domestic demand.
Path 3	The same as for Path 2, but includes a doubling of annual export growth rates, to 14.8% for chemicals and to 20% for plastics.

Key economic outcomes under the various development paths are listed in Table 3, and graphically represented in Figure 5 and Figure 6.

Table 3 Key data for chemicals and plastics industries under BAU and development paths 1, 2 and 3

Position in 2010 under different development paths				
	Chemicals		Plastics	
	Average 1992-93 to 1998-99	2010	Average 1992-93 to 1998-99	2010
	$M	$M	$M	$M
Exports				
Business as usual	$2,042	$5,251	$327	$1,137
Path 1	$2,042	$5,251	$327	$1,137
Path 2	$2,042	$5,251	$327	$1,137
Path 3	$2,042	$10,963	$327	$2,971
Turnover less exports				
Business as usual	$11,926	$12,404	$5,863	$7,243
Path 1	$11,926	$15,660	$5,863	$8,683
Path 2	$11,926	$18,614	$5,863	$9,942
Path 3	$11,926	$18,614	$5,863	$9,942
Turnover				
Business as usual	$13,968	$17,655	$6,190	$8,381
Path 1	$13,968	$20,911	$6,190	$9,821
Path 2	$13,968	$23,865	$6,190	$11,079
Path 3	$13,968	$29,578	$6,190	$12,913
Imports				
Business as usual	$7,023	$17,143	$1,608	$5,341
Path 1	$7,023	$13,887	$1,608	$3,901
Path 2	$7,023	$10,932	$1,608	$2,643
Path 3	$7,023	$10,932	$1,608	$2,643

Figure 5 Key data under BAU and development paths 1, 2 and 3 conditions: Chemicals industry

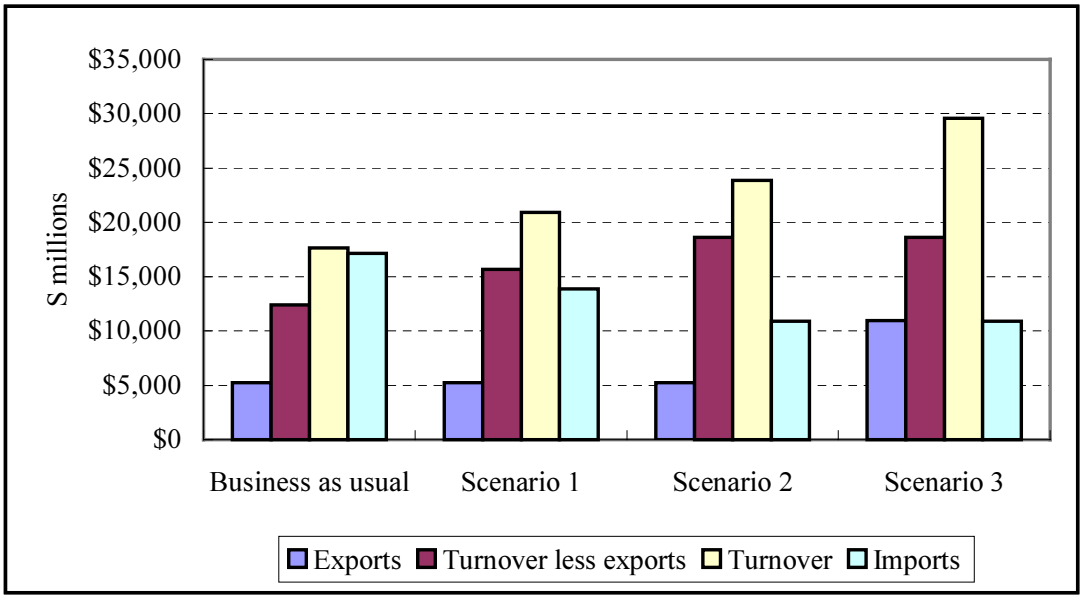
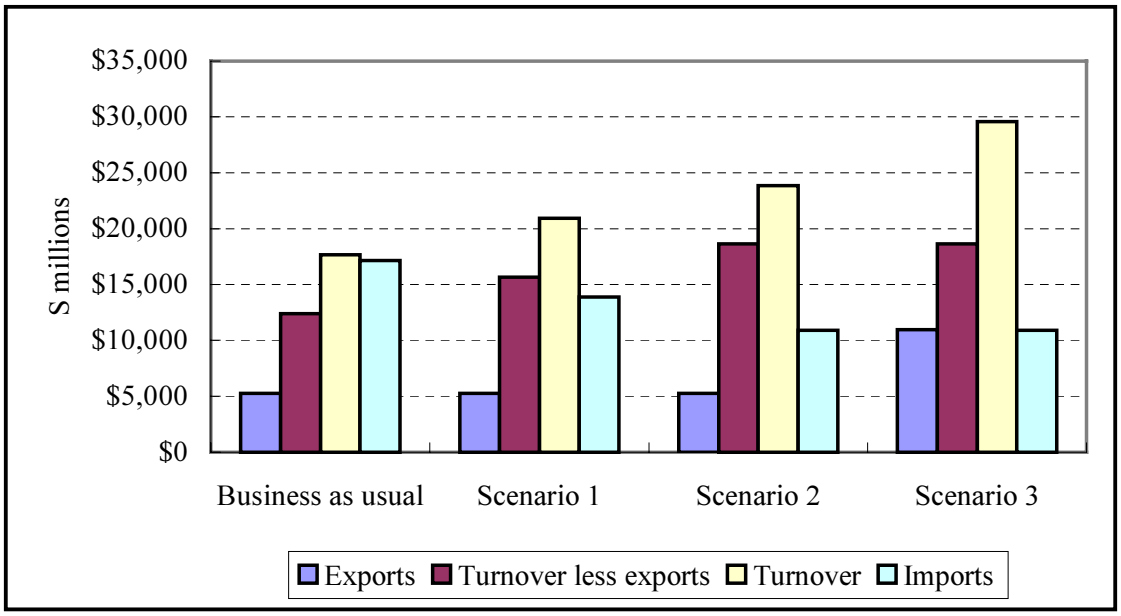


Figure 6 Key data under BAU and development paths 1, 2 and 3 conditions: Plastics industry



In developing this report, the Steering Group, via the Scenario Planning Working Party, examined a range of hypothetical case studies of what different parts of the industry might look like should various economic and external factors be changed. The three development paths above are closely related to these case studies. In effect, the development paths

express the case studies in terms of the broader economic key indicators of domestic production, sales and exports.

Development paths 1 and 2 would both move the industry some of the way towards achieving its vision for the future for the industry. Only development path 3 would achieve the Steering Group's vision and goals.

3.2 The industry's view of the future

Development path 3 best reflects the ambitious vision and goals that the industry has agreed on.

The industry is committed to an optimistic but realistic development path. The industry strongly desires a future that transforms it to being sustainable, dynamic and innovative. Such a transformed industry would underpin Australia's industrial growth, capturing significant domestic and export markets.

The industry's focus is on the goals of increasing its value adding capabilities, reversing the trend towards rising imports and recapturing Australian market share, enhancing its linkages across Australia's economy, increasing industry R&D and significantly increasing the level of industry investment.

Were these goals to be realised, the industry would see expansions of small to medium sized enterprises with vastly increased capture of both domestic and export niche markets. It would see much more competitive developments particularly in the medium-sized enterprises expanding and investing in existing plants as well as new developments. It would also see Australia finally realise its long-held dream of capitalising on its competitive advantages resulting from abundant energy and mineral resources through major integrated synergistic infrastructure investments.

If these changes envisaged in the industry's vision of the future succeed, the extrapolation of key industry data into the future would appear very different from those provided in Chart 1 and Chart 2. For example, if the industry were able to transform itself so that it was far more price competitive against imports, holding them to current levels, while doubling their own average rates of export growth, the picture would drastically alter. Chart 3 and Chart 4 show the outcomes that result under development path 3.

Chart 3 The industry's vision for the chemicals sector (development path 3)

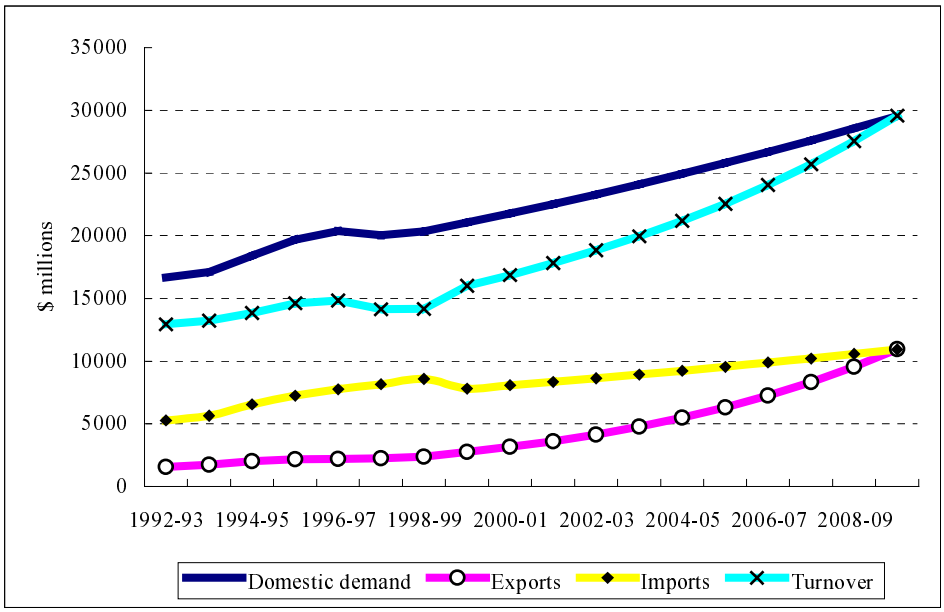
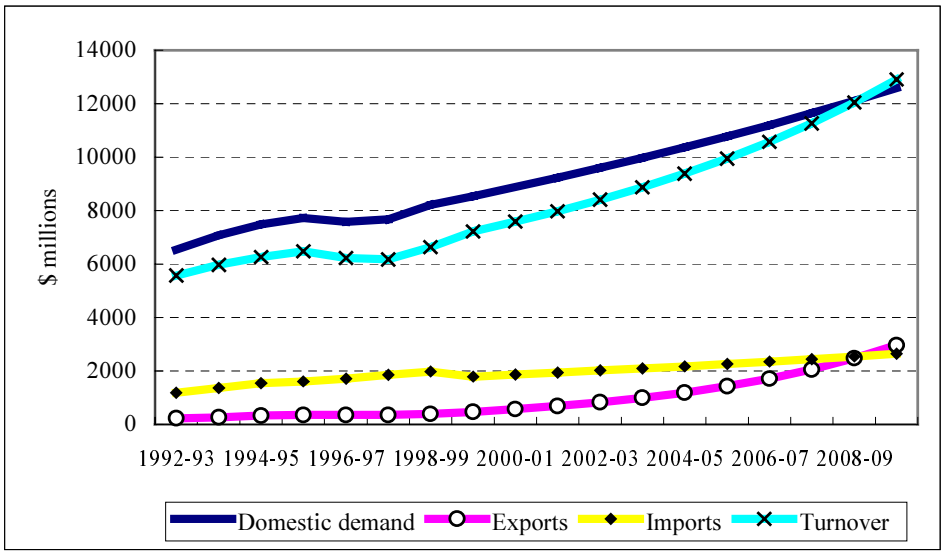


Chart 4 The industry's vision for the plastics sector (development path 3)



Path 3 would significantly improve Australia's balance of payments.

These charts illustrate that if the industry's vision is realised, the impacts would extend well beyond the chemicals and plastics industry into key areas of the Australian economy. Eliminating the chemicals and plastics industry deficit, would dramatically reduce (or indeed eliminate) the Australian economy's deficit. Those industry sectors reliant on chemicals and plastics production in Australia would be looking at a more cost

competitive, healthy, and growing industry, increasingly able to underpin their own robust growth.

However, realising the industry's vision and goals presages quite a number of changes taking place.

One key determining factor for future industry growth will be the extent to which Commonwealth, State and Territory governments are committed to achieving and retaining a viable chemicals and plastics industry in Australia. These things cannot and will not happen by themselves. For example, they require an internationally competitive regulatory environment that balances development needs and environmental policies.

They also require a well-qualified and trained workforce. This is an area where all governments and the industry have parts to play. They require concerted and committed joint efforts to focus on priority developments where Australia has a comparative competitive advantage.

However, at the end of the day, the responsibility for success is very much in the hands of industry. It must be able to supply the high quality products and services that customers want. Customers' purchasing decisions will be centred on:

- Price, design, quality and service;
- Industry's willingness to provide customers and markets with a wide range of options and specifications;
- Products with an internationally and domestically respected image due to:
  - better service and technical support;
  - higher technology materials utilised;
  - cost competitiveness; and
  - credibility and reliability.

Section 4 sets out the Steering Group's strategies and actions that it recommends be adopted in partnership with governments with the ultimate aim of achieving not just the industry's vision and goals, but also what would sensibly be the vision and goals of governments for the chemicals and plastics industry.

4. Strategies and Actions

This Action Agenda provides an opportunity to turn the industry around

The Steering Group recognises that the industry has been in decline for too long and believes that this Action Agenda is an ideal opportunity for the industry to work with governments to bring about a change in the status quo. Consequently, it has agreed on a vision that challenges the industry to build on its current position and to become a major driver for economic growth in Australia. The industry has also decided on a set of ambitious goals, which if realised, will set the industry on a strong growth path.

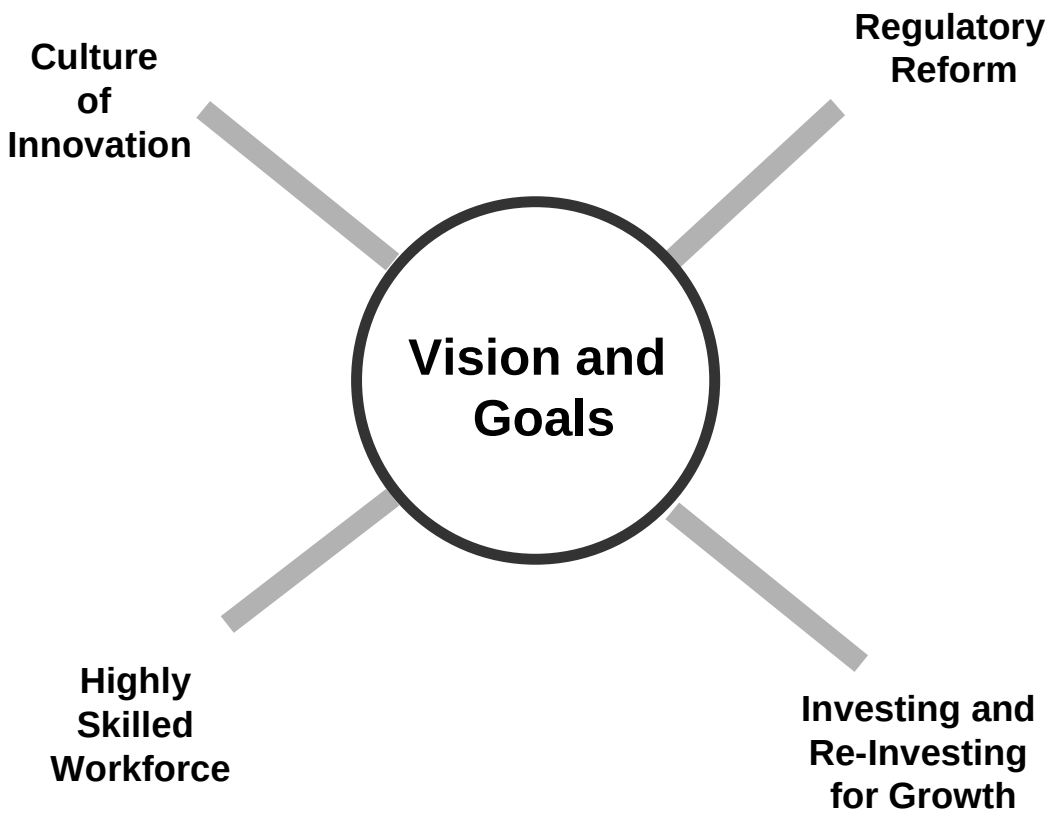
The strategies and actions discussed below are the means for stakeholders (and in particular industry and government) to work together to help the industry to achieve its vision and goals. They are designed to take advantage of the strengths and opportunities of the industry while overcoming the weaknesses and threats it faces.

The actions can be grouped under four broad overarching themes, namely:

- Regulatory reform;
- Investing and re-investing in growth;
- A culture of innovation; and
- A highly skilled workforce.

Figure 7 provides a graphical interpretation of how the four themes relate to the industry's vision and goals. Each of the themes is an important component of the overall effort to achieve the vision and goals. The themes can be considered as distinct elements that once linked, work to form a whole that is greater than the sum of the parts.

Figure 7 A graphical interpretation of the industry's strategies and actions



4.1 Getting the Regulatory Framework Right

Establishing a sensible regulatory framework that underpins the sustainable development of the chemicals and plastics industry is a complex but important component of this Action Agenda. The nature of, and approach to, government regulation of industry together with government policies themselves form the environment within which industry operates[6].

It is worth acknowledging the positive aspects of regulation. Appropriate regulation can ensure that those companies operating at best practice in areas such as product stewardship, occupational health and safety and environmental responsibility are not disadvantaged, and regulation can provide confidence to consumers.

Furthermore, Australian produced chemicals may derive export advantages from being manufactured in a country with a rigorous regulatory framework.

The Steering Group acknowledges that significant work on regulatory reforms has been done. This includes work conducted by the Small Business Deregulation Task Force, the National Competition Policy Review of the NRA and the work program of the Office of Regulation Review. As well, it includes the development of the COAG principles (see below) and the current Review of Administrative Arrangements for Health and Safety Regulation and the National Review of Drugs, Poisons and Controlled Substances Legislation.

Nonetheless, the Steering Group believes that important changes are needed particularly in how the industry is regulated if it is to grow significantly in the future. The changes proposed are not revolutionary; in fact they rather are a reconfirmation and recommitment to decisions all Australian governments have made in the past half-decade.

Both government and industry have an interest in maintaining high standards of health and safety and protecting the environment. Industry recognises that regulation can also provide for increased consumer confidence. However, regulations must be both cost effective and efficient. In this context, it is worth noting that efficient and effective regulations can provide an important contribution to the competitiveness of the industry.

The industry is a mature, responsible and responsive part of the Australian economy and community. Many self regulatory initiatives have been put in place that demonstrate this maturity as well as the

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industry's commitment to the community and environment within which we live and work. PACIA's Responsible Care policy is a good example.

The principles of the industry's Responsible Care policy are shown in Box 2:

Box 2. PACIA's 'Responsible Care' Policy and its operations

PACIA's 'Responsible Care' policy

- Recognise and respond to community concerns about chemicals and our operations.
- Operate our plants and facilities in a manner that preserves the environment and protects the health and safety of our employees and the public.
- Develop and produce chemicals that can be manufactured, transported, used and disposed of safely.
- Give health, safety and environment considerations priority in our planning for new products and processes.
- Report information on relevant chemical related health or environmental hazards promptly to appropriate authorities, employees, customers and the public and to recommend protective measures.
- Give advice to customers on the safe use, transportation and disposal of chemical products.
- Increase knowledge by conducting and/or supporting research on the health, safety and environmental effects of our products, processes and waste materials.
- Co-operate with customers, authorities and affected groups and individuals to resolve problems created by the handling and disposal of chemical substances considered hazardous.
- Co-operate with government in developing laws and regulations to safeguard the community, the workplace and the environment; to endeavour to ensure that such laws are based on scientifically supported data and/or expert opinion.
- Promote these principles and practices by sharing experience and offering assistance to others who produce, handle, use, transport or dispose of chemicals.

Responsible Care in operation

Responsible Care has eight codes that cover best practice requirement for the management of hazards of chemical operation and products. These codes complement existing legal requirements and in essence constitute a serious attempt by a major Australian industry at co-regulation. The Codes of Practice are reproduced in Attachment A7.

Companies who participate in the program have Responsible Care coordinators who oversee the implementation of codes of practice. Through regular meetings, site coordinators share successful experiences and explore ways of linking codes of practice with health, safety and environment programs already in place. Internal company auditors monitor compliance with the codes of practice. Verifiers drawn from Standards Australia, the National Association of Testing Authorities, and Lloyds Register provide external verification of these company assessments.

The results after the first six years of operation of the program have been most encouraging. These include a 32 per cent decrease in employee lost time due to injuries and a 35 per cent fall in the frequency of transport incidents. Seventy per cent of industry sites now have waste reduction plans covering the generation of greenhouse gases and the discharge of liquids into sewers and solids to landfills. Eighty per cent have emergency response preparedness plans.

Encouraged by the success of the program, the plastics industry is currently in the process of introducing a similar system called Plascare. This program is aimed principally at manufacturers of plastics products, since most manufacturers of plastic monomers already subscribe to Responsible Care.

4.1.1 Regulatory reform

Agencies responsible for registering or assessing chemicals or chemical products are:

- National Industrial Chemicals Notification and Assessment Scheme (NICNAS);
- Therapeutic Goods Administration (TGA) - (primarily medicines but also includes specialty chemical products with a therapeutic claim such as household disinfectants); and

- National Registration Authority (NRA) for Agricultural and Veterinary Chemicals (NRA) including household pesticides, antifouling paints, household, pool and farm chemicals.

Each of these agencies has more or less clearly defined areas of responsibility, although some overlap does occur.

In addition, there are State based agencies responsible for the control of use of chemicals, pollution, transport/storage of dangerous goods and chemical hazard communication (labelling and material safety data sheets).

Environment Australia conducts environmental risk assessments for NICNAS and NRA, while the Therapeutic Goods Administration evaluates potential impacts on public health.

Products considered to present risk of poisoning if improperly used are examined by the National Drugs and Poisons Scheduling Committee.

Some chemical companies manufacture food additives or ingredients that must be manufactured in accordance with standards developed by the Australia New Zealand Food Authority (ANZFA).

Other agencies involved in the regulation of the industry in a more general sense include:

- Environment Australia (through project approvals, management of the National Pollutant Inventory and phasing out of Ozone Depleting Substances);
- state-based agencies responsible for environmental and workplace health and safety regulation (based on advice from National Occupational Health and Safety Commission); and
- Department of Transport and Regional Services/National Road Transport Authority – dangerous goods transport.

COAG has agreed on principles of good regulation….

Australian governments, through the Council of Australian Governments (COAG), have agreed on a set of principles[7] of good regulation recognising that both industry and government have certain needs, including certainty of approach, transparency and predictability, efficiency and cost effectiveness. These principles are:

- **Minimising the impact of regulation** – legislation should entail the minimum amount of regulation to achieve the objectives. Any assessment process for the development of regulations and/or standards should be scientifically rigorous, including, where appropriate, a risk assessment process which takes into account public health and safety, and environmental protection;

7 Council of Australian Governments (1997), Principles and Guidelines for National Standard Setting and Regulatory Action by Ministerial Councils and Standard-Setting Bodies. Second Edition.

- **Minimising the impact on competition** – regulation should be designed to have minimal impact on competition and especially entry, exit or innovation;
- **Predictability of outcomes** – regulations should have clearly identifiable outcomes and be focussed on performance based outcomes unless there is a justified need for highly prescriptive regulation to protect health, safety and the environment.;
- **National Uniformity** - Where possible, regulations should be the same in all States and Territories of Australia;
- **International standards and practices** – regulatory measures should be harmonised or at least compatible with international or internationally accepted standards or practices and be consistent with international obligations;
- **Regulations should not restrict international trade** – regulations should not be applied in a way that creates unnecessary obstacles to international trade;
- **Regular review of regulation** – regulations should be reviewed at least once every five years;
- **Flexibility of standards and regulation** – standards and regulatory measures should be capable of revision to enable adjustment as circumstances change; and,
- **Exercise of bureaucratic discretion** – regulation should attempt to minimise the potential for bureaucratic interpretation as it adds to the potential for uncertainty and increased compliance costs.

Departures from COAG principles

…. however, governments have not always adhered to the COAG principles.

There are some serious instances where regulatory systems that govern the chemicals and plastics industry transgress these COAG principles. Attachment A4 provides a series of case studies compiled by the Steering Group to illustrate clearly the types and prevalence of inconsistencies with COAG agreed principles of the activities of the regulatory entities governing the chemicals and plastics industry. These departures from COAG principles cause concern because of their capacity to impact on the continuing viability of companies, and ultimately on the capacity of industry to grow, maintain and capture new markets and be internationally competitive.

The departures from COAG principles take various forms. They include:

- Inefficient regulatory systems imposing inappropriate costs;
- Systemic inflexibility and complexity impeding innovation and growth; and
- Inconsistent treatment and overlapping responsibilities between regulatory agencies and across jurisdictions.

The Steering Group, therefore, recommends actions in a number of areas. The driving strategy behind the recommended actions is to ensure that COAG principles are both implemented and adhered to appropriately.

Regulations impeding the adoption of improved technologies

Existing regulations impose significant costs on industry….

The costs associated with introducing a new chemical, particularly in the context of the smaller, Australian niche markets, is a significant impediment to companies that need to introduce new technology in order to remain competitive.

In some cases, particular regulations have acted as an impediment to the introduction of products that may have contributed to an improvement in environmental quality or public health and safety, and/or reduced the ability of Australian manufacturers to develop world class technology.

….often to the detriment of better environmental outcomes.

Because of the very large number of chemicals available worldwide, sometimes used in relatively small quantities in formulated products, and our small chemical manufacturing base, Australian chemical production relies heavily on input chemicals from overseas. There are many examples where regulation-related costs have prevented chemicals in use overseas from being introduced in Australia, despite their potential to improve the performance of a product, and/or lead to an improvement in either environmental quality or public health and safety.

A lack of access to available technology can also have serious implications for downstream industries that are attempting to break into export markets.

The high cost of regulation

Industry has identified regulatory costs….

The industry has collected evidence on the actual regulatory costs incurred by companies. There are cases (and these are by no means isolated) where the total cost of introducing new chemicals, including the cost of provision of information to government regulatory bodies, has exceeded $200,000[8].

There are many instances where commercialisation opportunities have been lost because of the unique requirements of some Australian registration schemes for data generated in accordance with local regulations, and the very high cost of generating this data in Australia.

In particular:

- High cost of assessment for substances used in small quantities;
- Degree of testing and assessment required for substances that are seen as of low concern in the US or Europe and, therefore, not required to be assessed in those places;

8 Where figures for costs of regulation have been quoted these have been provided by individual companies.

- Assessments by recognised overseas authorities not accepted in Australia. Similarly, non-recognition of chemicals approved for use by those authorities;
- Under-estimation of the impact of new legislation and regulations at the time of drafting, and unanticipated consequences both in resources needed and costs required to implement them; and
- non-uniformity of regulation across jurisdictions.

Inappropriate or unnecessary regulation

The industry has identified examples of regulations that have led to unintended consequences or underestimated compliance costs, and where those costs bear no relation to the supposed benefits.

Inconsistent regulation

Some differences exist between product definitions used by Australian regulatory agencies, and those used by agencies overseas. These uniquely Australian requirements impose significant barriers, delays and costs to introducing new products or upgrading existing products which forces extra costs onto consumers. This imposes a significant cost on these companies, with no balancing benefit for the consumer.

Different regulatory requirements between the various States and Territories impose further additional costs on industry, again with no apparent offsetting benefits to consumers. In November 1998, Environment Australia released a report that identified 144 separate pieces of Commonwealth, State and Territory legislation for the management of chemicals for the environment, public and workplace health and safety[9]. Meeting the requirements of all these Acts requires significant resources.

A number of companies in the industrial chemical, agricultural and veterinary chemicals sectors dedicate the equivalent of at least four full-time staff to meeting the various regulatory requirements of Commonwealth, State/Territory and local government agencies. In addition, many companies use external consultants to assist them, with use of consultants ranging from the equivalent of 20 days per year to the equivalent of 2-3 full-time staff.

The Federal, State and Territory Governments have done significant work to improve uniformity of regulation across Australia. However, there have been instances where the implementation of these agreements in the individual States and Territories has been different to what was agreed by the Parties.

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9 Environment Australia

…. and regulatory overlap.

New regulations appear to be developed on an ad-hoc basis at all levels of Government, which can impact on or overlap with, similar legislation in place. There needs to be recognition of the overlap between regulations for the environment, workplace and consumer health and safety, and a greater understanding of the impact of regulation on industry competitiveness.

Cost recovery

Closely related to the issue of overlapping and inconsistent regulations are concerns from industry about the cost recovery mechanism, which is increasingly being used to fund regulatory agencies. In recent years, Australian governments have sought to identify the cost of administration, enforcement and management, and where appropriate to transfer this cost from the general community back to the individuals or groups that directly benefit from the utilisation of the resource or the regulated activity. The term used for this transfer of costs is cost recovery.

The Productivity Commission is currently holding an inquiry into cost recovery in order to understand the nature and extent of cost recovery arrangements across Commonwealth Government regulatory, administrative and information agencies and develop guidelines for the future application of cost recovery. An Issues Paper has been made available by the Commission and can be accessed at http://www.pc.gov.au/inquiry/costrecovery/issues.pdf. The Paper is a useful source of guidance on what constitutes the principles behind cost recovery as well as the issues that arise from it. While the inquiry is focused on Commonwealth arrangements, the issues are identical across all governments.

Cost recovery is not occurring on an equitable basis.

Industry fully supports cost recovery principles provided they are administered appropriately and fairly, with equity established between those incurring the costs and those receiving the benefits. However, the industry is of the view that, unfortunately, the current cost recovery practices do not always follow these equity principles.

The Productivity Commission's draft report is expected to be released in April 2001 with the final report due by 16 August 2001. The Steering Group suggests that the recommendations in relation to cost recovery are re-visited once the Productivity Commission report is available.

Recommended regulatory strategies and actions

Three broad strategies identified. These are:

There are three broad strategies the Steering Group recommends be included in the Action Agenda, namely:

- Foster regulatory best practice in all legislated regulatory regimes governing the use of chemicals and plastics across all Australian jurisdictions by requiring them to be brought into line with the 1997

COAG Principles and Guidelines for National Standard Setting and Regulatory Action, with adherence to these principles assured through mandated auditing of productivity improvements;

- Development of a national chemicals policy, and
- A systematic application by all governments to cost recovery principles or approaches, which does not recover from industry the public good costs of regulation.

The Steering Group believes these measures outlined in more detail below will enable the current regulatory system to operate more efficiently and more effectively. This will protect the fundamentals of the regulatory system, thereby enhancing the safety and health of Australia's community, its workers and the environment.

A. Instituting best practice regulation

A. More efficient and cost effective regulation;

Critical spotlights need to be focused on both the costs and the benefits sides of the regulatory equations. The industry supports the public's need to be satisfied that environmental health and safety requirements are met. It believes that the COAG principles on regulation provide an excellent framework for developing regulatory structures and ensuring an appropriate balance between the costs and ultimate benefits to be gained.

1. Recommendation (Goals B and C)[10]

The Steering Group recommends that governments should restructure their approaches to regulation to align them with the National Competition Policy framework. The regulatory regimes administered by NICNAS, TGA, and the NRA, as well as relevant State and Territory regulatory entities that impact on the chemicals and plastics industry, should be brought into line with the 1997 COAG Principles and Guidelines for National Standard Setting and Regulatory Action.

The industry recognises that there has already been an NCP review of the NRA, with a number of the recommendations subject to ongoing work by the Commonwealth. Industry would hope that in furthering that work the government would bear in mind the above recommendation.

2. Recommendation (Goals B and C)

Further to this, the Steering Group recommends that mechanisms be put in place to ensure that all regulatory agencies regulating the chemicals and plastics industry comply with these principles and that annual compliance audits be conducted.

Best practice includes industry involvement in the conduct of regulatory agencies that heavily impact on industry activities. The NRA (Board of Management), TGA (consultative committees) and NICNAS

10 The side comments for each draft recommendation identify which of the goal(s) as shown in Box 1 that the recommendation is principally designed to address.

(consultative committees) have different structures. A consistent approach should be considered that delivers the greatest efficiency.

3. Recommendation (Goals B and C)

The Steering Group recommends that a review be conducted of NRA, TGA and NICNAS comparing their approaches to consultative/control mechanisms and identifying a common efficient structure. The review should take into account outcomes from the Productivity Commission inquiry into cost recovery.

4. Recommendation (Goals B and C)

The Steering Group recommends that the relevant regulatory bodies be required to alter their assessment processes to ensure:

- **Recognition of data from overseas sources that test to accepted international standards;**
- **Recognition of chemical approvals from approved countries including substances "grandfathered"[11] in those countries; and**
- **Consistency of international definitions and/or classifications.**

B. A National Chemicals Policy

B. A National Chemicals Policy; and

The industry believes that a sound precedent was established when the pharmaceutical industry instigated the development of a National Medicines Policy[12]. The Australian Pharmaceutical Advisory Council (APAC) coordinates the National Medicines Policy. APAC includes representatives from industry, government, health care practitioners and consumers. The objectives of the medicines policy include:

- Medicines that meet appropriate standards of quality, safety and efficacy;
- Quality use of medicines, and
- Maintenance of a responsible and viable medicines industry.

A similar framework could be devised to guide the development and review of Commonwealth, State and Territory chemicals legislation.

5. Recommendation (Goals A, B,C and G)

The Steering Group recommends the development of a National Chemicals Policy by Commonwealth, State and Territory Governments, industry, unions, environmental organisations and consumer groups.

The Steering Group recommends such a policy should focus on mutual commitment to a consistent national approach to the following areas of chemicals management:

- **Environmental quality;**
- **Workplace and consumer health and safety;**

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11 When various jurisdictions introduced regulations requiring the testing of chemicals prior to their acceptance for use, those chemicals currently in use were exempted from retrospective testing under the regulations, or "grandfathered".

12 www.health.gov.au/haf/docs/nmp2000

- **An internationally competitive chemicals industry, and**
- **Consumer education.**

Such a framework would ensure that overlapping or inconsistent regulation is minimised, by providing a partnership approach to addressing these issues. It would assist in identifying where regulations are necessary, and aid in the development of regulations or standards that encourage innovative solutions to identified problems.

Relevant regulatory agencies could complement these efforts through the development of a coordinated community awareness program to foster a greater awareness in the general community about chemicals management activities undertaken by Commonwealth and State/Territory agencies.

C. A review of cost recovery principles and approaches

C. A review of cost recovery principles.

The industry regulators, primarily NICNAS, NRA and the TGA, currently fully recover their costs through a mixture of company levies and new chemical or product assessment fees. The Steering Group recognises the value of regulation to the industry. Regulation can engender public confidence in the industry and the products that are produced. Accordingly, the Steering Group believes that cost recovery is a reasonable principle to pursue. However, the policy of full cost recovery fails to recognise 'public good' benefits provided by regulation. In addition, there has been little incentive to ensure efficient administration of regulations.

6. Recommendation (Goal C)

The Steering Group recommends that regulatory agencies that recover their costs, either in part or full, should be independently assessed for productivity, with enforceable productivity targets (including cost reduction targets where necessary) put in place for each agency.

7. Recommendation (Goal C)

The Steering Group further recommends that appropriate monitoring systems should be implemented to measure productivity on an on-going basis against these targets. Transparency could be improved through minimising fixed costs and basing all fees according to activities/services provided.

NICNAS, the NRA and the TGA conduct reviews of existing chemicals and products. While the industry gains some secondary benefits from these reviews, for example, from the consumers increased confidence that the products are safe, it is of the view that the wider public captures the bulk of the benefit. However, the cost of the reviews is currently fully funded by industry. This is clearly currently an imbalance in the allocation of the costs and benefits.

Well-designed regulation can encourage innovation in new production processes and products. While individual companies can benefit significantly from this innovation, the knowledge generated can spill over

into other companies and industries. In 1995, the then Industry Commission identified that the social rate of return on R&D spending in Australia was as high as 50 per cent[13]. The Commonwealth Government has recognised the value of encouraging greater innovation through a number of programs that provide financial support for business expenditure on research and development. The Steering Group believes that the 'innovation-driver' aspects of regulation should be recognised as a public good.

NICNAS, NRA and TGA dedicate resources to compliance monitoring and administration of full-cost recovery. The Steering Group does not believe that those companies who are complying with the regulations should be paying for the monitoring of companies who may not be in compliance, or that companies should be charged for the costs of administration of cost recovery.

The Commonwealth regulatory agencies also provide policy advice to the Commonwealth Government. This can also include participation and attendance at international negotiations. It is unclear whether the industry is subsidising these activities.

8. Recommendation (Goal C)

The Steering Group recommends that the Commonwealth should fund the public good aspect of relevant regulatory agencies' activities.

Chemical assessments are currently undertaken entirely by Government agencies. While there are some legislative timeframes for new assessments or registrations, there is certainly no competitive pressure on agencies to provide their services in a timely or cost effective manner. This can potentially lead to higher costs for assessments. The Steering Group recognises that restricting chemical approvals to Government agencies ensures high standards of health, safety and environment protection, however competition could be allowed in the actual assessment, while final approval would still be the responsibility of the relevant agency. An Australian National Audit Office audit and National Competition Policy review have previously recommended that the NRA accept alternative suppliers of assessment services.

9. Recommendation (Goal C)

The Steering Group recommends that assessments be opened up to alternative service providers, noting that agencies responsible for the final approval would need to clearly communicate the performance standards that the assessments should meet.

This would also increase the transparency of the regulatory process and reduce opportunities for bureaucratic discretion, thus bringing the agencies into line with the COAG principles of good policy and regulation. The Steering Group notes that this is one of the issues that the

13 Industry Commission (1995). Research and Development. Industry Commission Report No.44

government is investigating in response to the NCP review of the NRA.

4.1.2 Greenhouse Policy

Greenhouse policy is of critical importance to industry.

While Australia, like many other countries, has signed the Kyoto Protocol it has yet to ratify it[14]. However, once ratified and entered into force the Kyoto Protocol would mandate a limit to Australia's carbon emissions at an average of 108 per cent of 1990 emissions for the first five-year commitment period 2008-2012[15]. This would create an inherent price that would need to be paid for every ton of carbon produced[16].

Consequently, if the Kyoto Protocol is ratified it is likely to mean that the prices of all fuel sources will rise to reflect the environmental costs of carbon emissions associated with their use. This would significantly affect the competitiveness of Australian industries, particularly by comparison with developing countries' industries that would not be subject to the same restrictions as those placed on Australian industries.

Many Australian industries are subject to competition from industries located in developing countries which have no obligations reducing emissions under the Kyoto Protocol during the first budget period 2008-2012.

In view of this, the Government, through its greenhouse commitments in August 2000, assured Australian industry that any future greenhouse policies and measures will be implemented in a cost-effective manner that minimises the burden for business and the community, so that industry can remain competitive. The Prime Minister has reinforced this message, stating that the Government has an obligation to defend and protect Australian interests, Australian jobs and Australian industry.

The industry welcomes and supports the Government's commitment.

In particular, the industry believes Australia should only ratify the Kyoto Protocol on the basis of full Developing Country participation or the implementation of an environmental levy on non-participating countries.

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14 In 1998, Senator Hill outlined three conditions for Australia to ratify the Protocol: development of rules relating to the flexibility mechanisms; a more comprehensive treatment of sinks; and the engagement of developing countries. In addition, any such decision would include a National Interest Analysis under the Government's Treaty making process.

15 Current projections indicate that Australia will be approximately 118 per cent above 1990 levels in 2010 (excluding emissions from land use change). This does not include the impact of additional greenhouse measures announced as part of the Government's 1999 tax reform package or the possible contribution from use of the Kyoto Flexibility Mechanisms (international emissions trading, Clean Development Mechanism and Joint Implementation).

16 The Government has not yet decided whether it will or will not introduce a domestic emissions trading scheme at this time. What it has committed to, though, is that it will not introduce such a scheme unless: Australia ratifies the Kyoto Protocol; it comes into force; and there is an established international emissions trading scheme.

In addition, Australia should not ratify the Protocol until the Government has addressed how the competitiveness of Australian manufacturers will be maintained, particularly when they are competing against exporters who have been granted exemptions from greenhouse gas abatement measures in their country of production (for example, chlorine producers in the UK have been granted exemptions from the carbon tax).

The chemicals and plastics industry would welcome this additional commitment to preserving the competitiveness of Australian industry.

10. Recommendation (Goal B)

The Steering Group recommends that the Government should recommit itself to:

- **Involve industry from the inception through to the implementation phase of greenhouse gas abatement policies and strategies that impact on industry;**
- **Negotiate the implementation of the Kyoto protocol flexibility mechanisms so that they operate in an efficient and transparent manner;**
- **A mandatory domestic emissions trading scheme should only be implemented if all developed countries ratify the Kyoto Protocol and there is an established international emissions trading regime; and**
- **Avoid greenhouse gas abatement policies and measures that would distort investment decisions between particular projects and locations.**

It is worth noting that the chemicals and plastics industry is well represented among the industries participating in the Greenhouse Challenge[17]. Emissions savings have in some cases been substantial. For example, the Quenos Botany plant has made changes to its operations that have generated annual savings of over 100,000 tonnes of CO_2 based on 1998-99 production.

17 As at February 2001 502 companies were participating in the Greenhouse Challenge, 42 of these were from the Chemicals and Plastics industry.

4.2 Investing and Re-Investing in Growth

There are significant barriers to investment and re-investment.

Investing in new plant and re-investing in existing facilities are two key drivers for ensuring the chemicals and plastics industry's future. However, there are impediments to attracting investment to this industry. The Steering Group believes that the government has a vital role to play in assisting the industry to overcome these.

For the chemicals and plastics industry, the focus is on two goals:

- Strengthening the existing industry base; and
- Using the competitive advantage provided by Australia's ample resource and energy base as a springboard for growth, particularly in exports.

Building new linkages between the chemicals and plastics industry and other industry sectors will assist in the realisation of profits in the medium term, which can facilitate the introduction of new technology and further investment.

It is salutary to examine what other countries in our region who also have small domestic markets have done to encourage re-investment in existing industries as well as investment in new industries.

Other economies provide better investment incentives.

Table 4, Table 5 and Table 6 summarise the investment programs offered in three Asian nations at a glance. This information has been obtained from public sources and would be the starting point for companies wishing to establish plant or production processes in these countries. Experience has shown that even greater incentives can be gained from governments who are keen to encourage investment, for example assistance with recruiting a workforce, cheap land, etc.

The incentives listed below for Singapore are only one aspect of the method by which investment is attracted. They are part of a carefully developed industry plan, the latest stage is called Industry 21[18].

> "The Industry 21 vision is for Singapore to be a vibrant and robust global hub of knowledge-driven industries, which will leverage on other hubs for ideas, talent, resources, capital and markets. Singapore will be a base for industries that have a strong emphasis on technology, innovation, knowledge and skills."

To do this Singapore operates several departments and boards whose mission is to market Singapore and seek out large multinationals offshore – generally at CEO, senior bureaucrat or political levels. All Government agencies also work in conjunction with one another offering complementary programs and assistance to multinationals and investors.

18 Economic Development Board, The Investors Guide to Singapore, 2000 edition.

Under the economic blueprint of the Strategic Economic Plan released in 1991 which looks forward to 2030, eight strategic thrusts were identified:

- Enhancing human resources
- Promoting national teamwork
- Adopting an international orientation
- Creating a climate which supports innovation
- Developing core capabilities of industry and service clusters
- Promoting economic redevelopment tracking Singapore's international competitiveness
- Reducing Singapore's vulnerability by encouraging multinationals to treat Singapore as a home base, and
- Developing local enterprises to world class standards.

Of all of the above factors, the last three provide the clearest indication that Singapore will continue to actively seek global investment dollars.

One of the great advantages offered by Singapore is access to fully integrated world class infrastructure and factory complexes. Jurong Town Corporation (JTC) is charged with ensuring Singapore's industrial parks operate as self-contained business centres. It currently operates 35 industrial parks throughout Singapore.

Even though Singapore has a small local market for petrochemical products and a small base of natural resources when compared with Australia, they have been able to attract tens of billions of dollars in petrochemical investment. It has been able to do this through a range of incentives, including providing land and infrastructure, help with training, and assistance with improving linkages between local Singapore companies and multinationals.

Both Malaysia and Taiwan, have similar incentive schemes.

If Australia is to compete with Singapore and other countries in the region in attracting international chemicals and plastics investment, then we need to look at the investment strategy employed by competing governments and the performance of these strategies.

Table 4. Singapore investment incentives

Pioneer status	Exemption on corporate tax on profits arising from Pioneer Activities – initial period 5 years which can be extended
Development and expansion incentive	Corporate tax rate of 13%
Investment allowance incentive	Exemption of taxable income of an amount equal to a specified proportion (up to 50%) of new investment in productive equipment
Approved foreign loan scheme	Full or partial exemption of withholding tax on interest payments
Approved royalties	Full or partial exemption of withholding tax on royalty payments
Venture capital incentive	Losses incurred from the sale of shares, up to 100% of equity invested, can be set off against the investors other taxable income
Investment incentive and schemes	Tax Concessions Offered
Operational headquarters	Income arising from the provision in Singapore of approved services will be taxed at 10%. Other income from overseas subsidiaries and associated companies may also be eligible for effective tax relief.
Business headquarters	Incentives under the Economic Expansion Incentives (EEI) Act
Double deduction for R&D expenses	Double deduction of qualifying R&D expenses against income
Enterprise development fund	Assists SMEs to modernise, upgrade and expand
Local enterprise technical assistance scheme	Up to 70% of the cost of engaging external expertise for an approved activity.
Local enterprise finance scheme	Fixed interest rates financing scheme to encourage SMEs to strengthen, upgrade and expand their operations
Approved international trader scheme	Approved companies taxed at a concessionary rate of tax on income derived from offshore international trading activities. Qualifying commodities include building and industrial materials, machinery components, electronics and electronic components.
Accelerated depreciation allowances	Annual allowance of 33.3% claimed for capital expenditure on most plant and machinery for three years. 100% accelerated depreciation allowance for computers and other prescribed automation equipment, emergency power generators, efficient pollution control equipment and approved energy saving equipment

Source: The Investor's Guide to Singapore, 2000 published by the Singapore Economic Development Board

Table 5 Malaysia investment incentives

Pioneer status	Partial exemption from the payment of income tax. Pay only 30% of its statutory income for five years. In selected states companies will need only pay 15% of their statutory income during the five years
Investment tax allowance	Companies receive an allowance of 60% in respect of qualifying capital expenditure incurred within five years from the first qualifying capital expenditure is incurred.
Reinvestment allowance	Granted to companies in operation for more than 12 months and who wish to expand production capacity, modernisation / upgrade of existing facilities and diversification into related products and automation of production facilities. Allowance is 60% of capital expenditure incurred by the company and can be used to offset up to 70% of statutory income in the assessment year.
Industrial linkages program – large companies incentive	Expenditure incurred for training of employees, product development and testing and factory auditing is allowed as a deduction in the computation of income tax.
Export incentives: ▪ Double deduction for export promotion ▪ Double deduction of export credit insurance premiums ▪ Tax exemptions on the value of increased exports – manufacturing	▪ Companies must be resident. Expenses incurred in identifying export opportunities are eligible for double deduction. ▪ Export insurance premium expenses eligible for double deduction ▪ If exported goods attain at least 30% value added, exemption of statutory income equivalent to 10% of the value of increased exports. ▪ If exported goods attain at least 50% value added, exemption of statutory income equivalent to 15% of the value of increased exports.
Investment incentive and schemes	Tax concessions offered
Export credit refinancing scheme	Exporters can access short term credit at preferential rates of interest.
Double deduction for approved training expenses	Approved training expenses eligible for double deduction

Source: Malaysian Industrial Development Authority

Table 6 Taiwan investment incentives

Automation incentives	Expenditure on automated production technology and equipment can be deducted from income tax at a rate of 10% for automated production technology and imported equipment and 20% for domestically produced equipment.
R&D incentives	▪ Company expenditure on R&D and innovation can be used to a maximum 25% credit against income tax. ▪ Two year depreciation on equipment and instruments used exclusively for R&D, experiments or quality inspection. ▪ Machinery and equipment used for research, experiment and quality inspection that are not manufactured domestically can be imported duty free
Personnel training	Expenditure on training can be used for a maximum 25% credit against income tax

Source: Industrial Development Bureau, Ministry of Economic Affairs, the Republic of China

4.2.1 Re-investing in existing industry

The Steering Group considers that a range of measures are necessary to encourage reinvestment and underpin the growth of existing small and medium enterprises.

The Tariff Concession Scheme

The Tariff Concession Scheme represents an unnecessary impost on Australian business. The 3% tariff on imported goods serves no purpose (apart from generating a small amount of revenue) in cases where the imported good is not available in Australia. The Steering Group believes that the Tariff Concession Scheme be amended to ensure that Australian manufacturers are able to source imported goods not made in Australia at a zero tariff rate.

Import replacement study

With plastics and chemicals imports increasing rapidly there are good reasons to examine those imports and assess where it may be possible for local suppliers to replace those imports. The study should identify any impediments to such replacements occurring and recommend measures to address these.

Tariff barriers

The government should maintain its efforts to reduce the tariff and non-tariff barriers that Australian exporters face when trying to market their products overseas. The government should involve industry in these

efforts to benefit from their first hand experience in identifying these barriers and their impact.

Coastal shipping reforms

Australia is highly dependent on international transport and, in particular, the shipping trade. Moreover, Australia is a significant user of coastal shipping, particularly for transporting mineral products for local processing.

The international shipping industry is intensely competitive and this has kept international shipping rates at low levels. The same can not be said of coastal shipping where a system of licensing called cabotage has enabled Australian vessels to preserve their dominance of the coastal trade.

The annual operating cost premium for Australian ships compared with foreign flagged ships is significant.

As part of the tax reform package, the Commonwealth has acted to remove one cost impediment to the local shipping industry by announcing the provision of full rebates for excise paid on diesel and like fuels, such as light fuel oil and bunker oil, used for marine purposes. This will address a serious anomaly between Australian flagged vessels operating on the Australian coast and the foreign flagged vessels which do not incur this cost, and which also enjoy cost advantages through various forms of tax relief.

Maritime transport costs are often a key determinant in winning export markets and providing business inputs for competitive industry. It is therefore crucial that savings and efficiencies be realised as soon as is practicable.

The industry is concerned about the continued delays in the process of microeconomic reform in this sector, and their adverse impact on the ability of the industry to effectively compete internationally.

11. Recommendation (Goals B and D)

The Steering Group recommends that to assist existing industry, in particular small and medium sized enterprises, to improve the competitiveness of their businesses, Government should:

- **Amend the Tariff Concession Scheme to ensure that Australian manufacturers are able to source imported goods not made in Australia at a zero tariff rate;**
- **That the Government provide support for a study of the product types in which the Australian industries could succeed in import replacement and/or increased exports considering the growth of other linked industries;**

- **Take a proactive role in international trade fora in order to remove international trade barriers. It should also continue its efforts to negotiate bilateral trade agreements. The Government should involve the industry in this process; and**
- **Identify and reduce some cost imposts that make coastal shipping in particular so expensive (this might include allowing international vessels to provide coastal shipping services).**

The Steering Group emphasises that implementing the *Regulatory Reform* recommendations is critical to ensuring that the climate for re-investment is a positive one. Similarly, encouraging a culture that values education and the development of a skilled work force, particularly with regard to the plastics fabricating sector, through the implementation of the *Highly Skilled Workforce* recommendations, is also an important component of any package of measures to promote re-investment in existing industry.

4.2.2 Accessing Australia's energy and resource base

Australia is fortunate in having large natural gas reserves that could provide both energy and feedstock for the chemicals and plastics industry. We are, however, less fortunate in the location of those resources. Our major undeveloped natural gas reserves are offshore in the northwest of Australia. Consequently, there are major infrastructure constraints on the chemicals and plastics industry developing and utilising those resources. Certainly to do so would require huge investments.

To attract such investments today, there are a number of key factors that must be positive or at least provide an overall positive mix to underpin a globally competitive, economically attractive project:

- Equipment and construction costs;
- Infrastructure availability;
- Costs of delivery to market and a viable logistics scenario;
- Feedstock availability and cost;
- Energy cost;
- Integration with other existing or planned industries, and
- Scale.

In today's global marketplace, any major investment in a new plant must be both internationally competitive and able to provide a return on capital invested that is broadly in line with that enjoyed for similar investments elsewhere in the world. In the case of a plant aimed at exporting into Asian markets, Australia must compete with the Middle East, USA, and Canada for investment funds.

Investment in upstream processing is primarily attracted to the site of significant gas reserves to achieve the lower cost benefits that should flow from this energy and raw material base. However, if governments elect

to collect significant revenue at the well head, the cost benefits of the reserves are reduced. It could be argued that a lower tax regime should be applied to gas that is used in local processing industries versus gas that is exported as a fuel source. This would encourage greater development of the resources and the development of a local processing industry with its subsequent flow-on benefits to the economy as a whole.

The Steering Group recognises that a major infrastructure development in north west Australia has been the goal of many companies and various governments for decades. However, the scale and complexity of the requirements have precluded any significant advances being made to date. Details of the factors and impediments and potential locations that have been explored are included in Attachment A5. Through the Action Agenda process, the Steering Group has concluded that both industry and governments need to establish a more effective dialogue, and they need to focus their resources on measures aimed at facilitating the construction of integrated complexes.

The Steering Group considers that the findings of a 1997 study demonstrate the benefit that these investments, if they were to take place, would have for the industry and the Australian economy as a whole. The study concluded[19]:

> "Overall, real GDP (would) increase by $1.5 billion annually. Real consumption – the preferred measure of economic welfare –increases by $0.7 billion annually – or some $110 for each of the more than 6 million households in Australia…(It) provides a more efficient way – at the margin – of meeting Australia's import bill than the activities of the other Australian industries."

12. Recommendation (Goals A, B and C)

The Steering Group recommends the Commonwealth Government:

- **acknowledge that the chemicals and plastics industry is integral to the health of the Australian economy and commit itself to the long term viability of the industry; and**
- **consider mechanisms to address feedstock cost / price impediments, including by providing for a different tax treatment for gas used as an feedstock in local processing industries.**

The most important impediment to major infrastructure investment taking place is the need for it to be on a scale that goes beyond what is commercially feasible for any single project. In recognising this, the Steering Group recommends that:

19 Access Economics, Economic impact of chemicals and plastics investment prepared for the Plastics and Chemicals Industries Association, June 1997, page 2.

13. Recommendation (Goal B)

- **The Commonwealth takes the lead in developing mechanisms to provide common use infrastructure with the cost to be repaid through user fees over a specified time period. The Commonwealth's role could initially include bringing the stakeholders together, and assisting with resolving cross-jurisdictional issues.**

Industries within the complexes would share infrastructure and be sufficiently large-scale to enable them to compete effectively in the international market place.

The Steering Group believes that addressing these issues constructively would help reduce the chemicals and plastics industry deficit. This would in turn contribute to efforts to reign in any economy wide deficit.

As was the case for encouraging re-investment in the existing industry, investment in new projects will be highly dependent on developing a package of measures to create the right framework for such investment. This includes the implementation of the *Regulatory Reform* recommendations, particularly those relating to greenhouse policies. In addition, implementation of the *Culture of Innovation* recommendations will be an important contributor to any package of measures.

4.3 Culture of Innovation

It is widely accepted that innovation is one of the keys to success for the modern economy. It is the major determinant of enhanced productivity and competitive advantage at both the firm and national level. For instance, the OECD has estimated that innovation accounts for 50 per cent of long term economic growth in advanced industrial countries.

Innovation involves more than R&D.

It is, therefore, of little surprise that an increasing amount of policy development and competitive strategy is based around the notion of leveraging innovative capacity. It is also prudent to remember that innovation involves much more than R&D - it is the integration between R&D, manufacturing and marketing inputs. It also strengthens linkages with suppliers and leading edge customers, and collaborative research arrangements.

Innovation is also enhanced by having an appropriate policy framework in place, which creates a partnership between industry, education, research and government agencies. In some instances industry will need to take the lead, education institutions on others, while research and government agencies will also be expected to play their part.

4.3.1 The economic benefits of innovation

Strong evidence that innovation boosts company performance.

One of the more compelling reasons for firms to undertake innovative activities is that in the long-run it will produce significant economic benefits. The latest Australian Bureau of Statistics Survey of Innovation in Australian Manufacturing, 1996-97, found strong empirical data indicating that technologically innovative firms contribute significantly to the economy. For example, companies undertaking technological innovation have:

- larger numbers of employees;
- much greater turnover;
- a much higher turnover per employee ratio;
- positive effects on the profitability of the business.

Yet there are some worrying signs that the Australian manufacturing industry's commitment to innovation is starting to wane. The ABS survey revealed that only a quarter of manufacturing businesses in Australia had undertaken one or more technological innovation activities in the three-year period from 1994 to 1997, a drop from almost a third in the previous 3-year period.

4.3.2 The decline in business expenditure on R&D

Levels of R&D have been falling….

In comparison to the OECD average, public spending on R&D in Australia is relatively good. However, Australian business expenditure on R&D (BERD) remains well below average and has, according to the ABS, fallen for the third year in a row. In 1998-99, BERD was estimated to be $3,992M at current prices, a fall of 5% on 1997-98 and 9% lower than the record level of 1995-96. The manufacturing industry recorded a 7% decrease in R&D expenditure - the second largest decline after the mining industry.

Australia is a relatively small player within the global chemicals and plastics industry accounting for 1% of production, and it is impossible for it to compete in absolute terms on both R&D expenditure and R&D personnel in comparison with the major chemicals and plastics power houses of Europe and America. However, there has been a worrying relative decline in the amount of BERD undertaken by the Australian industry.

Table 7 chronicles this decline:

Table 7 Chemicals and plastics industry R&D trends

Turnover $m	18,516	19,199	20,115	21,105	21,073	20,309	20,790
Domestic demand $m	23,554	24,526	26,194	27,661	27,776	27,691	28,536
R&D Expenditure, business, $m	141	120	143	181	145	124	125
R&D to Turnover %	0.76	0.63	0.71	0.86	0.69	0.61	0.60
R&D to Domestic Demand %	0.60	0.49	0.54	0.65	0.52	0.45	0.44

It is of concern that the only subsectors to increase their R&D as expressed by the R&D to turnover figure over the time frame in question were the inorganic industrial chemical manufacturing, paint manufacturing, soap and other detergent manufacturing sub-sectors. Similarly the chemicals and plastics industry lags behind the overall manufacturing average over the period which is approximately 1% of R&D to turnover.

It is important to bear in mind that the benchmark figure for the chemicals and plastics industry, as a proportion of total manufacturing, for expenditure claimed under the tax concession is 10% - approximately equivalent to the sector's share of manufacturing GDP. Table 8 provides an overview of the chemicals and plastics industry R&D expenditure by claimants of the R&D tax concession over the past four years.

The drop in R&D investment may be the result of overseas companies with operations here, viewing Australia as a having a stable political environment and legal system, and abundant raw materials as opposed to being technologically sophisticated

The Government needs to give a clear message to international companies that it sees technological innovation and R&D in industry as a priority and a key selling point to get overseas companies to invest here.

Table 8 Use by the chemicals and plastics industry of the R&D concession

253 Basic Chemical Manufacturing ($m)	49.3	31.7	14.6	7.7
254 Other Chemical Product Manufacturing ($m)[20]	125.7	126.4	105.3	78.7
255 Rubber Product Manufacturing ($m)	5.6	7.1	7.4	6.8
256 Plastic Product Manufacturing ($m)	38.4	23.1	20.8	53.5
Proportion of chemicals and plastics as a % of Total Manufacturing (%)	8.65	8.49	6.52	5.05

…. But recent changes should help.

The industry believes that the R&D tax concession was in need of revamping if it was to remain as a viable mechanism and catalyst to spur companies to undertake R&D. The industry also acknowledges that under previous schemes, primarily the R&D Syndication Scheme, there was the potential for some abuse of the provisions to occur. Nonetheless, the most recent data would indicate that the mechanism in place prior to the recently announced changes by the Prime Minister in *Backing Australia's Ability* were not contributing to growth in innovation or R&D. The industry therefore welcomes changes to the R&D Tax Concession and other innovation programs.

The industry is also of the view that greater value may be derived from the R&D tax concession by giving higher priority to expenditure claims that were based around staff and personnel costs vis-a-vis capital expenditure. Principally because the greatest value adding is likely to be derived from enhancing the skills and utilisation of research personnel as opposed to the purchase of new analytical equipment. Consequently, the industry was pleased to see that the Prime Minister reflected this view in the *Backing Australia's Ability* statement.

Much of the picture that has thus far been painted has emphasised the decline in private sector and business expenditure on R&D and sought to

20 It is pertinent to bear in mind that ANZIC 254 also includes expenditure claimed by the pharmaceutical sector. While it is not possible to disaggregate the data, it is fair to postulate that the majority of ANZIC 254 is accounted for by that sector, and that the proportion of chemicals and plastics as a percentage of total manufacturing is inflated because of this inclusion.

explain some the reasons for this decline. Yet paradoxically the industry remains optimistic that this trend can be turned around and is encouraged by the capacity and skills of the public research base.

Australia has the capacity to do R&D of world class quality…

The Steering Group believes that there are "centres of excellence" in the public sector research base, and that these centres are not only examples of best practice in Australia but also of world class quality. Industry was particularly impressed by the fact that many of these centres such as the Ian Wark Research Institute at the University of South Australia and the Key Centre for Polymer Colloids, University of Sydney, obtain the bulk of their research funds from the private sector (in some cases up to 90%). In addition, they are undertaking research on behalf of many transnational corporations.

…but the framework must be right to realise the potential.

It is generally acknowledged that Australia does first class scientific work, and has the capability of developing new technologies in many areas. Within an appropriate framework encouraging industry, academic and research institutions to collaborate, there is potential for significant opportunities for innovation, development and growth.

Nonetheless, industry believes that more needs to be done to promote the innovative and R&D capacity of the public sector and use this as leverage both in terms of attracting more R&D activities to Australia, and where appropriate as a possible selling point for investment attraction purposes. The continued creation of new ideas requires a global outlook and the public sector research base by working with transnational corporations not only gains a revenue stream from such activities, but develops strong international linkages and international innovation partnerships and alliances which will strengthen the uptake of technologies and provide opportunities to enhance our knowledge base. Likewise, the creation of stronger linkages between the public sector research base and firms within the Australian chemicals and plastics sector needs further and urgent encouragement.

4.3.3 Government's key role in supporting innovation

The Commonwealth provides a significant degree of support for innovation activity in industry.

The Steering Group, however, believes that there are impeding administrative complexities involved with such programs, especially for smaller companies in the sector. Although a range of government programs to support innovation are available, they are not targeted at a sectoral level. Where firms have accessed such programs, the reception to them has been mixed. For instance, difficulties were experienced with the complexity of grant application forms and the time required to complete them. In some cases this necessitated utilising a specialist consultant to undertake this task, with the resulting fee seriously discounting the available grant funds.

The Steering Group recognises that public accountability requirements associated with government programs are necessary but believes they could be streamlined, and perhaps structured so that companies that had successfully met the requirements for previous grants, be given some credit and complete less cumbersome applications for subsequent grants.

In view of the above, the Steering Group generally supports the measures to streamline the R&D tax concession, announced by the Prime Minister in the *Backing Australia's Ability* statement on 29January 2001. A number of other key elements of that Statement are shown in Box 3.

However, the Steering Group believes that greater attention needs to be paid by governments to some of the "softer" elements of innovation and sources of innovation when implementing innovation support programs. For instance, the ABS Innovation in Manufacturing Survey found that businesses generally use both internal and external sources to obtain ideas and information when undertaking technological innovation with the internal or in-house sources being utilised more frequently than external sources.

14. Recommendation (Goals E and F)

The Government should assist smaller companies gain access to sources of innovation by designing programs that offset some of the costs associated with attendance at technical fairs and conferences. In return, the Steering Group believes that it is incumbent on sponsored entities to participate in nominated technology diffusion activities so that the spread of the technical data obtained from attendance at such conferences has greatest penetration throughout the industry. A precursor to designing such programs may be the requirement to undertake technology audits of the industry to better target the relevant conferences and trade fairs.

Box 3. Key Elements of the Innovation Statement

Improved Treatment of R&D Plant

Companies will be able to claim the full value of the plant or tangible items consumed in or associated with R&D activities. This means that companies which use an item of plant for only part of an income year for R&D will now be able to claim the R&D tax concession for that portion of use. All R&D plant will now be eligible for effective life depreciation deductions at 125% while it is used for R&D.

The adoption of effective life write off under the R&D tax concession is consistent with the approach taken to business tax reform and aligns the treatment of R&D plant with other capital items in the tax system. The reforms will also resolve issues associated with using R&D plant items for non-R&D purposes and provide greater certainty for business R&D planning and investment.

Definition of R&D activities

The Government has identified weaknesses in the definition of R&D activities through recent Federal Court decisions and Administrative Appeals Tribunal decisions that have unintentionally broadened the scope of the program beyond its policy intent. The Government will be addressing this situation by clarifying and enhancing the definition of R&D in the Income Tax Assessment Act 1936. In particular those changes will include:

- strengthening the eligibility criteria by requiring that all claims meet both the "innovation" and "high technical risk" tests;
- extending the application of the exclusion list which currently only applies to all "core R&D activities" to cover "supporting activities" ; and
- the introduction of a requirement that R&D activities, which are to receive the concession, are to be the subject of a plan approved by the controlling entity (CEO or board). Such a requirement will encourage Australian companies to think strategically about their research and development as a critical and ongoing part of their business.

The changes to definition of R&D activities will have effect from 29 January 2001

175% "Premium" R&D Tax Concession for additional R&D

While the base level of the R&D tax concession remains at 125%, it is being enhanced by providing a higher level of support for those companies that increase their level of R&D expenditure relative to their overall performance (ie turnover). Such companies will be eligible for to receive a 175% Premium R&D tax concession. To be eligible a company must be able to demonstrate an increase in R&D intensity (R&D expenditure/turnover) against its previous level. The additional R&D over and above the previous level (averaged over the past three years) will attract the premium rate. The new rate targets the labour-related components of R&D expenditure and excludes plant, equipment, pilot plant, leasing etc.

R&D tax rebate for small companies

Small companies, particularly those in tax-loss, will now be able to to get a rebate equivalent to the value of the R&D tax concession. This enhancement is available to all companies with an annual turnover of less than $5 million who spend up to $1 million per year on R&D. The initiative will foster the growth of companies by providing timely support by enabling access to about $30 million in R&D-related tax losses, when they need it most during the early stages of growth.

Centres of Excellence

The government will commit an additional $176 million for world class centres of excellence in the key enabling technologies of Information and Communications Technologies (ICT) and biotechnology.

Many of the issues that have been addressed bear a direct relationship to the impediments that face the Australian chemicals and plastics industry.

The Steering Group is disappointed that the general R&D concession has been left at 125% and has some concerns regarding the impact of the changes to the definition of R&D. However, it believes that the policy changes outlined in *Backing Australia's Ability* should be given a chance to work. The results of the new measures should be carefully monitored over the medium term.

15. Recommendation (Goal E)

The Steering Group recommends that levels of R&D expenditure, particularly by the chemicals and plastics industry, should be closely monitored over the next two years to determine the impact of the

Innovation Statement policies and if necessary, supplementary measures should be introduced.

4.3.4 Next steps

The Steering Group believes there is a need for additional research in relation to building better collaborative structures and linkages within the industry, between the industry and research institutions, and between the industry and other sectors of manufacturing. Furthermore, it believes some case study material on clustering[21] could further flesh out these issues.

A national and visionary research project may be one way of galvanising the industry around the key issue of innovation, and demonstrating that the industry is part of the solution to societal problems thus counteracting some of the negative perceptions of the industry. An excellent example would be the area of bioprocessing, where Australia's prospects are excellent and likely to be highly competitive. This would enable links to be built with Australia's agricultural/rural sector and add significant value to our primary production and could lead to the development of new processes for the extraction of particular specialist and high value added chemicals.

The government has much to offer industry but a "one stop shop" approach would aid uptake.

The Steering Group believes that in endeavouring to access Government innovation programs, there is still confusion as to where in Government such programs reside. At present there is no such central reference point, and it is left to industry to work through a myriad of government agencies with overlapping responsibilities, whenever an innovation issue needs to be addressed.

In conclusion, because of the critical part played by innovation in the healthy growth and international competitiveness of manufacturing companies the Steering Group recommends that a series of actions be taken. If adopted these recommendations will move the chemicals and plastics industry significantly away from its current downward trend. The recommendations are directed towards:

- Raising awareness, understanding and public recognition of innovation as a key economic driver;
- Ensuring an effective R&D tax incentive structure remains in place;
- Fostering private sector/public alliances; and
- Marketing and streamlining access to government innovation programs.

21 "Clustering" is an economic term referring to the way suppliers to: users of and; consultants to cluster around another Industry.

16. Recommendation (Goal E)

The Steering Group recommends the establishment of an innovation liaison office with representatives in each State and Territory, which could act as a innovation contact and co-ordinating point for industry.

17. Recommendation (Goal E)

To ensure better alliances are built between the chemicals and plastics industry and the public sector research base, the Steering Group recommends that better mechanisms be created to facilitate more interaction and create better linkages between the private industry and those relevant public research institutions.

18. Recommendation (Goal E)

To assist the industry in accessing the suite of Government innovation programs, the Steering Group recommends that the Government support a marketing and awareness raising campaign to lift the profile of innovation and R&D programs to the industry. In turn the various industry associations have a vital role to play in also promoting these programs to their members.

19. Recommendation (Goals D and E)

In establishing World Class Biotechnology Centres of Excellence, the Government should seek to include the chemicals industry in any centre that deals with bio-processing. Likewise interested industry stakeholders should be encouraged to form alliances with the research community and apply to form a relevant centre of excellence.

4.4 A highly skilled workforce

The Steering Group recognises the importance of investment in education and training. It acknowledges that a skilled workforce for the industry is in the first instance a crucial requirement for boosting innovation, and ability to maintain its global competitiveness. The Steering Group considers that these economic benefits are maximised if there is a strong and genuine commitment to continuous renewal of knowledge and skills (ie. life-long learning) by all industry participants.

4.4.1 Improve existing training delivery systems

Existing training does not always meet industry's needs.

Currently, training delivered at a national level does not necessarily address occupation specific requirements in the industry. Some States have tailored courses that address local needs with particular States operating in isolation and sometimes in conflict with national programs and benchmarks.

The Steering Group recognises that the existing Training Packages for the chemicals and plastics industry need on-going review. Those reviews should examine both the implementation and delivery aspects of the Packages for both sectors of the industry.

There needs to be increased collaboration by all participants involved and affected by the delivery of training and education in the industry (ie. employers, unions, training providers, Industry Training Advisory Bodies (ITABs), universities etc). The objective should be to tailor nationally consistent Training Packages that more effectively meet the needs of industry.

The ANTA Ministerial Council has made some good decisions.…

The Australian National Training Authority (ANTA) Ministerial Council which comprises all State, Territory and Commonwealth Vocational Education and Training Ministers, is a key decision-making body in developing Australia's training response to industry's need for a highly skilled workforce.

At the 30 June 2000 the ANTA Ministerial Council a number of ground-breaking decisions were made to ensure vocational education and training meets industry expectations of high quality irrespective of who delivers it or where it takes place. The Steering Group acknowledges that progress on these important vocational training and educational issues is being made. However, it believes all parties should continue to ensure the expeditious implementation of all Ministerial Council initiatives.

The decisions made at this meeting significantly set specific outcomes for many training administration processes that apply in each State and Territory. They also enhance or change responsibilities for some of the national bodies that oversee sound policy and management of Australian

training. These decisions have a major focus on consistency and quality. Current work which is in progress to back up these decisions, includes examining:

… particularly in relation to consistency and quality of training…

- How each State or Territory Training Authority quality assures and registers training providers;
- What information is made available to employers and potential trainees on New Apprenticeship arrangements (eg. what is the level of funding that is currently available for training; what training wage arrangements and employer incentives apply); and
- The timely introduction of national vocational qualifications defined in industry- developed training packages.

The overall objective of this approach is to ensure a well trained and capable workforce, as well as making national training more transparent, simple and easy to use for clients. Many of the current initiatives (eg. New Apprenticeships, training packages and national registration of training organisations) are specifically designed to be national in application.

Ideally, an employer anywhere in Australia should be able to find out what industry relevant training is available to them, what the skill outcomes are, who can deliver it and whether there is any supporting government funding available. In practice, however, this basic information for employers has frequently been hard to obtain or different depending on the source of the information.

…. these should be implemented.

The Steering Group strongly supports the ANTA Ministerial Council resolutions of 30 June 2000, that specific processes should be put in place to ensure that major training inconsistency issues are fully addressed. Issues highlighted in the Ministerial Council resolutions include:

- Providing clearer higher national standards for registered training organisations and consistent auditing practices and standards;
- Making training package qualifications available immediately upon national endorsement of the package;
- Amending user choice policies to ensure common regulatory arrangements between States and Territories, as well as providing a national information service on access arrangements for user choice; and
- Ensuring all States and Territories have necessary legislative provisions to underpin a consistent national framework.

The Steering Group also fully endorses the statement made by the Minister for Education, Training and Youth Affairs, the Hon Dr Kemp, on 10 July 2000 that, " States and Territories have essentially been put on notice to deliver – we just can't afford to lose any more time in delivering a fully implemented quality national training system for Australian

business." The Steering Group acknowledges that progress on these important vocational training and educational issues is being made. However, it believes all parties should continue to ensure the expeditious implementation of all Ministerial Council initiatives.

The Steering Group particularly welcomes the decision at the Ministerial Council meeting on 17 November 2000, to further strengthen the consistency within the National Vocational and Education Training System (for example, through implementing better reporting arrangements with Registered Training Organisations; introducing more flexibility in the choice of training providers).

20. Recommendation (Goal F)

The Steering Group recommends that industry and State and Commonwealth training and education authorities continue to work together to accelerate the implementation of a nationally consistent vocational education and training (VET) arrangement, within existing structures. This arrangement should:

- **Be in place as soon as practicable, to meet the current and future needs of the chemicals and plastics industries;**
- **Ensure consistent accreditation and recognition of skills within Australia and internationally, and**
- **Be established to ensure that the ANTA Ministerial Council resolutions are implemented by no later than six months from Cabinet review.**

4.4.2 Training culture

The industry in the second half of 2000, completed a survey of companies and industry associations to ascertain their views on what were the main impediments to professional development for individuals pursuing a career in the chemicals and plastics industries. The key impediments identified in that survey, ranked by priority, were:

- The lack of a training culture – and a lack of recognition for skill acquisition;
- The inability of staff to get away from work to attend study; and
- A shortage of students being attracted into courses related to process industries.

A summary of the responses and findings of the survey is at Attachment A5.

21. Recommendations (Goal F)

The Steering Group recommends that the Government should:

- **Introduce Australian Qualification Framework level 1 (AQF1) as a mandatory minimum employment condition standard for employees working in the industry, so that in future new entrants to the industry would be required either to hold an AQF1**

qualification or be enrolled in a course leading towards achieving AFQ1 (this would also address some of the safety issues faced by the industry);

- **Provide funding for the Australian Student Trainee Foundation to provide a coordinator to promote Certificate I of the Plastics, Rubber and Cablemaking Training Package in the VET program in schools;**
- **provide further incentives to promote and reward organisations and individuals undertaking industry accredited training and skill acquisition; and**
- **Fund industry associations that wish to offer industry specific training, subject to demonstrated need and priority.**

The Steering Group after considerable deliberation concluded that an alternative approach is warranted to arrest the serious decline in industry training standards. The Steering Group proposes that a new National Training Council should be created for the industry. The new Council would deviate from traditional training approaches where Government bodies have had primary responsibility for training matters. The Steering Group proposes that the new Council instead would be industry-led and would concentrate, as an important first step on arresting the decline in training standards in the plastics processing industry, where the decline is currently more apparent.

Ideally the functions of the National Training Council should not duplicate the functions currently carried out by existing industry education and training advisory structures (eg , Manufacturing Learning Australia (MLA), ITABs, TAFE). The Steering Group agrees that MLA should continue to act as the principle source of advice to Government on education and training matters, until such time that a viable alternative body is created.

22. Recommendation (Goal F)

The Steering Group recommends the creation of an industry led National Training Council to facilitate implementation of the ANTA Ministerial Council resolutions of 30 June 2000.

The Steering Group envisages the National Training Council would be set up along the lines shown in Box 4.

Box 4: Proposed National Training Council

Council Membership and Structure

Membership of the Council is to be inclusive of all industry participants, with the industry, as opposed to Government bodies, primarily responsible for managing its affairs. It is envisaged membership would be industry led and include employers, Government, training providers and union representatives. This body would also work extensively with for example, ANTA, to ensure Council objectives are fulfilled and relevant resources allocated. It is envisaged that a re-alignment of existing responsibilities within current Training System structures (ie., MLA, ITABs, TAFE, DETYA) may be required to ensure that Council objectives are achieved.

Objectives

- Establish a training culture within industry
- Provide skills requirements for current and future industry needs
- Provide consistency of high standard delivery
- Ensure accreditation/recognition of skills
- Provide career opportunities and professional development
- Provide nationally consistent yet flexible approach to training and delivery mechanisms
- Provide adequate funding to implement National Training Packages

Scope

- Incorporate all participants under the ABS definition of the plastics and chemical industry (but not pharmaceuticals)

Activities

- Promote the development of a training and development culture
- Ensure national recognition of courses and delivery standards
- Encourage consistency of training delivery across all jurisdictions
- Ensure consistently high delivery standards
- Encourage a flexible approach to training systems and outcomes, for example, online delivery mechanisms
- Support professional recognition and development
- Facilitate a forum for regular consultation and discussion on issues and problems affecting industry participants
- Review existing facilities support with a view to supporting facilities focussed on developing centres of excellence in training in each State/Territory
- address the current difficulty in recruiting operators with higher level skills and review the current definition of skill shortages.

Role of Commonwealth, State and Territory Governments

- Ensure training resources and delivery conform to Council requirements
- Develop consistent and harmonious policies and systems for the management and delivery of training
- Promote, support and fund training and development initiatives
- Implement a national accreditation system
- Establish safety net regulation levy for non-signatory industry participants

The Steering Group's view is that training arrangements that are provided by existing facilities for the chemical industry are relatively better than those provided for the plastics industry.

23. Recommendation (Goals B and F)

The Steering Group considers all interested parties should work together and place specific emphasis on improving the vocational education and training arrangements for the downstream processing

and broader elements of the plastics industry, in particular through the National Training Council by:

- **Using more flexible training delivery systems and mechanisms;**
- **Provision of adequate funding;**
- **Consolidating supporting facilities focussed on developing centres of excellence; and**
- **Implementing and promoting New Apprenticeships for the plastics industry.**

4.4.3 Difficulty in recruiting skilled operators

The Steering Group is also concerned at the difficulty in recruiting suitably skilled operators with computer literacy and high level operational and problem solving. It also noted that finding personnel with the appropriate levels of skills is essential for the industry to adjust to technological and workplace change, as well as global competitive pressures.

It noted that despite strong representations from industry, the Department of Employment, Workplace Relations and Small Business does not recognise these difficulties as meeting the departmental definition of a "skill shortage", which would in other circumstances attract more active labour market intervention. The Steering Group's view is that a skill shortage may not necessarily manifest itself in high levels of overtime being worked and/or job vacancies remaining unfilled for extended periods. In the chemicals and plastics industries, it is more usually characterised by large numbers of people working below optimal skill levels, and by failure to capitalise fully on niche marketing opportunities.

The Steering Group's view is that without more active intervention, it will be some years before the national training system is able effectively to redress this gap. Its view is that without more active intervention, the future viability of the chemicals and plastics industries is at risk.

24. Recommendation (Goals E and F)

The Steering Group considers that to facilitate and address the difficulty in recruiting personnel with higher level skills, the current definition of skills shortages, particularly as it applies in technical and science-based training areas should be changed to accommodate people working below optimal skill levels as an indication of a skills shortage.

The Steering Group considers that the industry's failure to attract skilled staff, particularly school leavers, has serious implications for its future. So too does the evidence emerging over recent years of a retreat from science based learning in education generally. This retreat, if it is not reversed, will adversely affect the stock of suitably skilled and qualified people to work in these technology intensive industries.

The Steering Group anticipates that the proposed National Training Council will also have a strong role to play in promoting a training and development culture amongst industry members. More broadly, the body the Steering Group recommends be responsible for implementing the Action Agenda (see below) will need to focus on establishing relationships with local educational institutions, recognising that opening communication channels with students can often lead to better contact with parents.

More innovative approaches are needed to address issues of career security, rewards and safety. The Government could be asked to assist through funding, for example, of a CD-ROM for distribution to schools, illustrating employment opportunities and case studies already developed[22]. Industry associations could target schools for advertising of trade shows such as Ausplas, which showcases the latest technology in plastics processing, similarly for Ausmate, and Auspack.

On a broader level, industry, together with ANTA and the State and Commonwealth education departments, could investigate the causes of the retreat in science based learning in Vocational Education and Training (and also in education generally) and identify strategies to counteract it. As part of this approach, social research, including focus groups with parents and teenagers, could be conducted through the National Centre for Vocational Educational Research, to determine what factors would make the chemical and plastics industries more interesting and appealing as a career choice.

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22 Another option might be expanding an existing website (or creating a new site) targeted at this particular issue.

5. Conclusions

Both industry and government must commit themselves to implementing the recommendations in this report.

The Steering Group regards this report, and the subsequent completion of an agreed Action Agenda, as merely the start of process aimed at restoring strong and sustainable growth for the industry. Ensuring the ultimate success of the strategies and actions that have been agreed will rely heavily on the commitment of both industry and government stakeholders to that process.

This section of the report:

- summarises and assigns priorities to the Steering Group recommendations;
- suggests a mechanism for monitoring and guiding their implementation; and
- addresses the industry's concerns about its image within the Australian community.

5.1 The Industry's priorities

The Steering Group has assigned priorities to the actions that are critical to the industry achieving its vision and goals.

The Steering Group believes that the highest priority objectives that will ultimately determine the success of the Chemicals and Plastics Action Agenda are:

- Regulatory reform ;
- Investing and reinvesting in growth;
- A culture of innovation; and
- Achieving a highly skilled workforce.

Implementation Timetable:
Immediate – 1 to 3 months
Short term – 3 to 6 months
Medium term – 6 to 12 months
Long term – 12 to 24 months

Table 9 provides a summary list of the recommendations in this report and provides detail on their priority, the implementation timetable, as well as who is primarily responsible for implementation.

Table 9 Summary of Identified Actions

Regulatory Reform	1. Regulatory approaches to be brought into line with the 1997 COAG principles and guidelines.	B and C	High	Immediate	Government
Regulatory Reform	2. That mechanisms be put in place to ensure that all agencies regulating the chemicals and plastics industry comply with the 1997 COAG principles and that annual compliance audits be conducted.	B and C	High	Medium-term for mechanism, then on-going	Government
Regulatory Reform	3. Carry out a review of NRA TGA and NICNAS, comparing their approaches to consultative/control mechanisms to identify a common efficient structure.	B and C	Medium	Medium term	Government
Regulatory Reform	4. Relevant regulatory bodies be required to alter their assessment processes to ensure: (i) Recognition of data from overseas sources that test to accepted international standards; (ii) Recognition of chemical approvals from approved countries including substances "grand-fathered" in those countries; and (iii) Consistency of international definitions and/or classifications	B and C	High	Short term	Government
Regulatory Reform	5. The development of a National Chemicals Policy. That policy to include a nationally consistent mutual commitment to: (i) Environmental quality (ii) Workplace and consumer health and safety (iii) An internationally competitive chemicals industry (iv) Consumer education.	A, B, C and G	High	Medium term	Government / industry
Regulatory Reform	6. Regulatory agencies that use cost recovery to be subject to enforceable productivity targets.	C	Medium	Medium term	Government

Regulatory Reform	7. Appropriate monitoring arrangements should be put in place to measure regulatory agencies' productivity against targets.	C	Medium	Medium term	Government
Regulatory Reform	8. The Commonwealth should fund the public good aspects of regulatory agencies' activities.	C	Medium	Medium term	Government
Regulatory Reform	9. Regulatory assessments should be open to alternative service providers.	C	High	Medium term	Government
Regulatory Reform	10. The Government should recommit itself to: (i) Involve industry from the inception through to the implementation phase of greenhouse gas abatement policies and strategies that impact on industry; (ii) Negotiate the implementation of the Kyoto protocol flexibility mechanisms so that they operate in an efficient and transparent manner; (iii) Only implement a mandatory domestic emissions trading scheme if the Kyoto Protocol is ratified by Australia and enters into force, and there is an established international emissions trading regime; and (iv) Avoid greenhouse gas abatement policies and measures that would distort investment decisions between particular projects and locations.	B	High	On-going	Government

Investing and re-investing in growth	11. The Government should: (i) Amend the Tariff Concession Scheme to ensure that Australian manufacturers are able to source imported goods not made in Australia at a zero tariff rate; (ii) Support a study of the product types in which the Australian industries could succeed in import replacement and/or increased exports considering the growth of other linked industries (iii) Take a proactive role in international trade fora in order to remove international trade barriers. It should also continue its efforts to negotiate bilateral trade agreements. The government should involve the industry in this process; and (iv) Identify and reduce some cost imposts that make coastal shipping in particular so expensive (this might include allowing international vessels to provide coastal shipping services).	B and D	High	Immediate to long-term	Government
Investing and re-investing in growth	12. The Commonwealth Government should: (i) acknowledge that the Chemicals and plastics industry is integral to the health of the Australian Economy and commit itself to the long term viability of the industry; and (ii) consider mechanisms to address feedstock cost / price impediments, including by providing for a different tax treatment for gas used as an feedstock in local processing industries.	A, B and C	High	Short-term	Government

Investing and re-investing in growth	13. The Commonwealth should take the lead in developing mechanisms to provide for common use infrastructure with the costs repaid through user fees over a specified time period. The Commonwealth's role could initially include bringing the stakeholders together, and assisting with resolving cross-jurisdictional issues.	B	High	Short to medium term	Government
Innovation	14. The Government should assist smaller companies gain access to sources of innovation by designing programs that offset some of the costs associated with attendance at technical fairs and conferences. In turn, industry should ensure that technical information obtained is spread throughout the industry.	E and F	Medium	Medium term	Government and industry
Innovation	15. Over the next two years closely monitor levels of chemicals and plastics industry R&D expenditure, to determine the impact of the Innovation Statement policies and if necessary, supplementary measures should be introduced.	E	High	Long term	Industry and government
Innovation	16. That an Innovation Liaison Office be created with representatives in each State and Territory.	E	High	Medium	Government
Innovation	17. That a specific mechanism be created to ensure better interaction and better linkages between the private industry and those relevant public research institutions.	E	High	Short to medium term	Industry and government
Innovation	18. That the Government support a marketing and awareness raising campaign to lift the profile of innovation and R&D programs to the industry.	E	High	Short term	Industry and government
Innovation	19. In establishing biotechnology centres of excellence, the Government should provide the scope to include an element of the emerging bioprocessing industry.	D and E	High	Short to medium term	Government

A Highly Skilled Workforce	20. Industry and State and Commonwealth training and education authorities continue to work together to accelerate the implementation of a nationally consistent vocational education and training arrangement.	F	High	Short term [ANTA Ministerial Council resolutions should be implemented by no later than 30 June 2001]	Industry and government
A Highly Skilled Workforce	21. The Government should: (i) Introduce AQF1 as a mandatory minimum employment condition standard (ii) Provide funding for the Australian Student Trainee Foundation to provide a coordinator to promote Certificate I of the Plastics, Rubber and Cablemaking Training Package in the VET program in schools; (iii) Provide further incentives to promote and reward organisations and individuals undertaking industry accredited training and skills acquisition; and (iv) Fund industry associations that wish to offer industry specific training, subject to demonstrated need and priority.	F	High	Short to medium term	Government
A Highly Skilled Workforce	22. Create an industry led National Training Council to facilitate implementation of the ANTA Ministerial Council resolutions of 30 June 2000.	F	High	Short to medium term	Government and Industry
A Highly Skilled Workforce	23. All interested parties should work together and place specific emphasis on improving the vocational education and training arrangements for the downstream processing and broader elements of the plastics industry, in particular through the National Training Council.	B and F	High	Short to medium term	Industry and government
A Highly Skilled Workforce	24. The National Training Council should address the currently difficulty in recruiting operators with higher level skills. It should also review the current definition of skills shortages.	E and F	High	Short to medium term	Government and Industry

Implementation	25. Create a Chemicals and Plastics Leadership Group (CPLG) and task it with implementing the agreed actions arising from the Action Agenda.	All	High	Immediate	Industry and government
Implementation	26. The CPLG should devise strategies for the industry and individual companies to drive the objective of altering the industry's image.	All	High	Medium to long term	Industry and government

5.2 Implementing the recommendations

The Steering Group's agreed vision and goals have as their objective the creation of a vibrant chemicals and plastics industry within the global economy. The Steering Group believes the implementation of the recommendations will be more effective if it continues to be an industry driven process. It therefore recommends the creation of an permanent structure to advise the Minister in the future.

25. Recommendation (all Goals)

The Steering Group recommends the creation of a Chemicals and Plastics Leadership Group (CPLG) tasked with implementing the agreed actions arising from the Action Agenda.

The CPLG should be an industry led small hands-on group that would translate the strategies and actions into concrete and measurable activities. In keeping with the broad nature of many of the recommendations in the report, the membership of the CPLG should be drawn from senior executives from industry and relevant Commonwealth, State and Territory government departments, research bodies and industry associations. It will be important to ensure that the group be representative of the wide community of interests that make up the industry.

The Minister should invite appropriate level stakeholders to participate in the CPLG.

The CPLG should report to the Minister.

The CPLG would report to the Minister at appropriate intervals on progress by stakeholders in implementing the Action Agenda[23]. The CPLG would also provide an excellent mechanism for on-going high-level dialogue between industry and government on policy issues.

23 It is expected that in the early stages the CPLG would report more frequently, perhaps six monthly. Reporting frequency could reduce to annually after the first 18 months. The need for the CPLG should be reviewed after two years.

5.2.1 Promoting a positive industry image

The industry must improve its image…

The Steering Group is concerned that the chemicals and plastics industry (in comparison with some other industries) has a relatively poor image. This negative image affects all of the industry's relationships with both users and producers, as well as with prospective employees, governments and the broader community.

While the industry plays a critical role in contributing to the health of Australia's economy as well as to the health and well being of the community, its healthy growth and even its continued existence cannot be taken for granted. The industry needs a general commitment to its future, but such a commitment is impeded by its negative image.

….since it has serious implications for the industry's future.

The industry's failure, in particular, to attract school leavers, has serious implications for its future. So too does the evidence emerging over recent years of a retreat from science based learning in education generally. This retreat, if it is not reversed, will adversely affect the stock of suitably skilled and qualified people to work in technology intensive industries such as plastics and chemicals.

26. Recommendation (all Goals)

These concerns will require more than just determination to take a more positive approach. The Steering Group considers that for the sake of the industry's future and in order to reverse this situation, the Chemicals and Plastics Leadership Group will need to focus on a range of factors contributing to the industry's negative image. The CPLG will need to devise strategies for the industry and individual companies to drive the objective of altering the industry's image in order to contribute to achieving the key goals of the Action Agenda.

The role of the CPLG

This will be an important task for the CPLG

The CPLG will need to address each of the recommendations of the Action Agenda as a matter of primary responsibility. But beyond that, the Steering Group considers the CPLG should begin with a focus on improved strategies to influence community and governments' opinions and that are sustainable and practical.

The CPLG needs to focus on:

- Diagnosing the problems as perceived by the industry (and as largely set out in the Action Agenda);
- Analysing the issues which bear on the industry – seeking underlying causes rather than perhaps more visible symptoms; and
- Developing strategies which industry associations and individual companies can implement.

Community and government perceptions

Community perceptions need to be changed.

The objectives in building up community relationships include:

- Being seen as good corporate citizens;
- Tapping into latent stores of goodwill (if indeed they exist);
- Building up trust between companies and their neighbours so that communities over time can feel a sense of ownership of 'their' industry/plant;
- Creating channels of communication which would enable the industry and companies to defuse or at least discuss constructively serious issues such as land usage conflict, and
- Identifying issues of concern to the community to enable them to be addressed in a timely fashion.

Conflict between companies and the local community can arise when the industry is perceived as causing health hazards, noise, dust or pollution, when product traverses local commercial/residential areas, and plants need to expand. Difficulties can be exacerbated if there is little or no reason for locals to identify with the industry. NIMBY-ism can be the dominant attitude[24].

Community ambivalence, or downright opposition, can also make it more difficult for Governments to give industry issues the long-term focus or support needed. Governments themselves may also have a poor understanding of what the industry does and how it does it. The interaction between industry and local government can be particularly difficult. This can have an adverse impact in relation to services, planning, and environmental issues.

The industry needs to show it provides environmental solutions, rather than being part of the "problem".

It is crucial to assess the underlying causes to the problems identified by the industry, otherwise any recommended strategies are unlikely to hit the mark. Several deep-seated perceptions must change. One of these is that that the industry is widely regarded as part of the "environment problem" rather than offering "environmental solutions".

No single strategy will suffice.

Effective strategy will be multi-dimensional, with some elements pursued by individual companies and others collectively, through industry associations. It is here that the CPLG has a real role to play. This role, however, should not be in terms of normal commercial/marketing activities in which all companies engage – and in which competitive rivalry between companies plays a part.

Possible strategies and tools to consider

The CPLG will need to consider a range of possible strategies and tools with a view to creating a more substantive and positive profile for the

24 NIMBY – Not In My Back Yard.

industry. These could include production of information on the industry, regular visits/open days to explain what the company/industry are and how they operate. These should be aimed at both opinion leaders and the community as a whole. Further suggestions for influencing young people's career choices on the education front have also been made in Section 4.4.3.

Community relations will need to be addressed through a variety of means.

Community relations can also be strengthened through regular media slots in local newspapers, sponsorship initiatives, establishment of formal mechanisms for community consultation. The latter could be used either for regular meetings on ongoing matters or invoked to address specific issues that arise from time to time.

A1. Steering Group members

Kate Abrahams (Chairman)	Chief Executive Officer, Australian Challenge
Peter Knowles	Managing Director, Wesfarmers CSBP
Bob Fairley	Managing Director, Qenos
Dr Nicole Williams [1]	Chief Executive Officer, PACIA
Michael Bracka	Managing Director, Cussons Australia
Don Hector	Managing Director, APS Chemicals
Noel Williams	Director Strategic Development, Asia Pacific, Dow Chemicals
Dr Greg Simpson	Division of Molecular Science, CSIRO
Bronwyn Capanna	Executive Director, Australian Chemical Specialties Manufacturers Association
Shane Moloughney	General Manager, Nylex Polymer Products
Ross Southam	Managing Director, Ameron (Aust) Pty Ltd
Veshi Basharen [2]	Victorian Department of State and Regional Development
Prof. David Black	School of Chemistry, University of New South Wales
Dr Peter Murphy	Western Australian Department of Resources Development
David Brett	Managing Director, Ecolab
Graeme Varcoe	New South Wales Department of State and Regional Development
Ken Pettifer	Head of Division, Manufacturing, Engineering and Construction Division, ISR
Craig Wellman	Managing Director, Wipco

1. *Until resignation from PACIA. Mr Ian Swann replaced Dr Williams for the last meeting.*
2. *From the second meeting. Mr. Brian Waters replaced Mr. Basharen for the last meeting.*

The Steering Group met on 4 occasions and conducted a workshop:

Meeting One	9 March 2000	Canberra
Meeting Two	8 June 2000	Melbourne
Meeting Three	31 July 2000	Melbourne
Meeting Four	28 November 2000	Melbourne
Workshop	11 October 2000	Surfers Paradise

A2. Working Party Members

Scenario Planning Working Party

Peter Knowles (Chairman)	Managing Director, Wesfarmers CSBP
Bob Fairley	Managing Director, Qenos
Dr Nicole Williams [1]	Chief Executive Officer, PACIA
Michael Bracka	Managing Director, Cussons Australia
Dr Ian Elsum	Principal Adviser, Manufacturing and Service Industries, CSIRO
Noel Williams	Director, Strategic Development, Asia Pacific, Dow Chemicals
Bronwyn Capanna	Executive Director, Australian Chemical Specialties Manufacturers Association
Ian Swann	General Manager, PACIA
Edward Kosior	Research and Technical Manager, Visy Plastics
Shane Moloughney	General Manager, Nylex Polymer Products
Ross Southam	Managing Director, Ameron (Aust) Pty Ltd
Veshi Basharen [2]	Victorian Department of State and Regional Development

1. Until resignation from PACIA *2. From meeting four*

Regulatory Reform Working Party

Don Hector (Chairman)	Managing Director, APS Chemicals
Bob Fairley	Managing Director, Qenos
Dr Daniel Burke	Technical Manager, Ecolab
Michael Bracka	Managing Director, Cussons Australia
Ross Southam	Managing Director, Ameron (Aust) Pty Ltd
Bronwyn Capanna	Executive Director, Australian Chemical Specialties Manufacturers Association
Ian Swann	General Manager, PACIA
Claude Gauchat	Executive Director, Avcare
Michael Hambrook	Executive Director, Australian Paint Manufacturers Federation Inc.

Innovation and Emerging Technologies Working Party

Prof. David Black (Chairman)	School of Chemistry, University of New South Wales
Mr Greg Simpson	Division of Molecular Science, CSIRO
Mr Graeme Varcoe	New South Wales Department of State and Regional Development
Mr Leo Hyde	R&D Manager, DuPont Australia
Mr Barry Huguenin	President, Society of Plastics Engineers (Australia & New Zealand)
Mr Bill Purton	Managing Director, Dolphin Products
Mr Alister Rees	Managing Director, Advanced Composites
Mr Mark Reynolds	Industrial Market Development, GE Plastics Australia

Education and Training Working Party

Shane Moloughney (Chairman)	General Manager, Nylex Polymer Group
Jeremy Gilling	Executive Officer, National ITAB, Manufacturing Learning Australia
Kate Abrahams	Chief Executive Officer, Australian Challenge
David Graham	Employee Development Manager, Huntsman Chemicals
Margaret Matthews	Director, Business Development, PACIA
Alan Wheeler	Senior Adviser, Training Services, Australian Industry Group
Brian Curtin	Executive Officer, Training Services, Australian Industry Group
Tim McMahon	Chair, Manufacturing Learning Victoria
John Molenaar	Executive Officer, Manufacturing Learning Victoria
Eddie Hardman	Senior Project Officer, Australian National Training Authority
Craig Wellman	Managing Director, Wipco Pty Ltd
Bob Parrington	Managing Director, International Plastic Equipment (IPE)
Demi Brown	Executive Officer, Plastics & Allied Industries Association of South Australia
Graeme Churchward	Senior Lecturer, Department of Chemical & Metallurgical Engineering, RMIT University
Ron Chatham	Managing Director, Plexipack Packaging Pty Ltd

A3. Meetings of the Working Parties

The Scenario Planning Working Party met on 5 occasions:

Meeting One	12 April 2000	Melbourne
Meeting Two	10 May 2000	Melbourne
Meeting Three	22 May 2000	Melbourne
Meeting Four	10 July 2000	Telephone Conference
Meeting Five	28 August 2000	Melbourne

The Regulatory Reform Working Party met on 4 occasions:

Meeting One	1 May 2000	Sydney
Meeting Two	22 May 2000	Sydney
Meeting Three	3 July 2000	Sydney
Meeting Four	25 July 2000	Melbourne

The Innovation and Emerging Technologies Working Party met on 2 occasions and held 1 ad hoc meeting.

Meeting One	8 May 2000	Sydney
Meeting Two	19 July 2000	Sydney
Ad hoc Meeting	31 July 2000	Melbourne

The Education and Training Working Party met on 5 occasions:

Meeting One	5 May 2000	Melbourne
Meeting Two	8 June 2000	Melbourne
Meeting Three	31 July 2000	Melbourne
Meeting Four	7 September 2000	Melbourne
Meeting Five	17 November 2000	Melbourne

A4. Regulatory reform case studies

This Attachment provides a series of case studies compiled by the Steering Group to illustrate clearly the types and prevalence of inconsistencies with COAG agreed principles of the activities of the regulatory entities governing the chemicals and plastics industry. These examples illustrate the following issues:

- Regulations impeding the adoption of improved technologies;
- The unnecessarily high cost of regulation;
- Inappropriate or unnecessary regulation;
- Inconsistent regulation; and
- Cost recovery problems.

NICNAS – the case for exemptions for 'Polymers of Low Concern'

Polymers are regarded as 'low hazard' in the US and European Union, due to their high molecular weight and hence low mobility and low biological activity. Accordingly, the polymers are generally exempt from notification. While NICNAS has introduced a notification category for 'Polymers of Low Concern' which involves reduced testing requirements and a lower fee, it still imposes extra costs and time delays. Many companies have difficulty providing the necessary information to NICNAS because that information has not been generated overseas, thus the NICNAS requirements present a significant barrier to the introduction of new technology. Advantages of the new technology include reduction in solvent emissions, efficiency gains in application, savings in transport costs and more durable coatings. All of these can be seen to have positive environmental impacts. The local manufacturing industry is consequently less competitive due to the inability to access best available technology.

One company estimates that over the last 3 years it has incurred direct costs in the order of $600,000 notifying polymers. This figure includes notification fees, costs of preparing submissions and generation of supporting data. This figure does not include costs due to delayed entry into the marketplace or lost opportunity due to products which are not economic to notify and are therefore ineligible for sale.

Globally, the company spends in the order of $100 million annually on R&D in its automotive coating division alone. Much of this research is environmentally driven (for example, by volatile organic compound regulations), however many of the products developed will not be introduced into the Australian marketplace due to regulatory related cost barriers.

Another company found that it took nine months to have a new polymer assessed that was already in use in Belgium, United Kingdom and the United States.

Therapeutic regulations pertaining to disinfectants

In 1995 it was decided that disinfectants would no longer be exempt under the *Therapeutic Goods Act 1989*. The Conformity Assessment Branch of the Therapeutic Goods Administration (TGA) took on the task of developing Industry Therapeutic Goods Order (TGO) Number 54.

The TGA decided that the range of products to be regulated should include sterilants, instrument grade, hospital grade, and household/commercial disinfectants.

Industry could understand the need to regulate sterilants, instrument and hospital grade disinfectants, but not household/commercial grade disinfectants. Despite industry protestations, regulatory requirements were developed without first determining the Australian market size for each of the categories of disinfectant, and determining the key efficacy and stability testing requirements and likely compliance costs. Thus no regulatory impact statement was prepared in accordance with COAG principles. At the time the TGA argued that the requirement to regulate disinfectants predated the need for an RIS in accordance with COAG principles.

The real objective of the regulations for each disinfectant category was never provided and the overall range of products to be regulated was never defined. This led to grey areas in the regulation whereby sanitisers used in the manufactured foods industry were required to comply with TGO 54, although they were clearly not therapeutic goods.

Although the Australian market is quite small, efficacy, stability and Good Manufacturing Practice (GMP) requirements, based on still-being developed overseas test methods were prescribed as standards for Australia. This has been extremely costly to small industry players.

Powder coating

A company wanted to substitute the chemical triglycidyl isocyanurate (TGIC) with a better performing and less toxic chemical in the manufacture of their powder coatings. An alternative, Araldite PT 910 has been widely used in Europe for a number of years with no adverse side effects. In Japan, Nissan has also been using their own alternative to TGIC.

The company has been discussing with NICNAS the introduction of the TGIC alternatives but have so far been unable to find any way of introducing the substitute chemicals other than through a full assessment process, which they estimate will cost up to $250,0000. The Australian market cannot support this, therefore TGIC alternatives are unlikely to be introduced. Thus the impact on health and environment is greater than

necessary and restricts the ability of Australian manufacturers of powder coatings to offer the latest technology to their customers. An additional anomaly occurs since products coated with Araldite PT 910 are freely imported into Australia.

Exerience with current "Approved Foreign Schemes" process.

NICNAS has begun trialing a process where they accept assessment reports generated overseas. If the approved assessment can form the basis of an assessment in Australia, NICNAS will charge a reduced fee and reduce the time frame for the assessment process. However, many assessments have been considered deficient or required further information from the overseas counterparts, causing delays. Many companies have been frustrated with the lack of flexibility shown by NICNAS in accepting foreign assessment reports.

Impact of new regulations

The revised 1999 'Designated List of Hazardous Substances' contained a number of changes and additions to the previous list. The new list included very common chemicals used in formulated products.

Given the nature of their business, formulating chemical specialty companies market many products. One company, for example, has over 700 different formulated products for the industrial and institutional market. The new Act required the company to review their entire product range. It took one regulatory affairs chemist 3 months full time to review the formulations and flag what changes had to be made. This cost the company approximately $15,000.

The company uses both pre-printed labels and computer generated labels for products. Computer generated labels are altered in house at low cost, however pre-printed labels cost on average $250 per printing plate change. This Company currently has 300 different pre-printed labels. Changes were made to 50 labels at a cost of $12,000.

There was no transition period given to manufacturers to adopt the new standard, except in Queensland, which amended their regulations to allow a transition period. As it currently stands, the company would be in breach of occupational health and safety regulations in other States if it ran out of the updated pre-printed label stock.

Material Safety Data Sheets (MSDSs) also had to be reviewed and resent to all existing customers. It took an administration officer one month to send out updated MSDS's to existing customers at a cost of $3,500.

If the current draft Code of Practice for the Preparation of MSDSs obtains NOHSC approval, the change to the new 16 header format would take this company approximately 12 months to implement. Labour costs alone will be $60,000 and all MSDSs will need to be reissued to existing customers. This would take a further 2 months at a cost of $7,000. It is

imperative that industry be consulted on regulations with such broad impacts, a reasonable and equitable implementation be agreed and that this be effected nation-wide.

Marine antifouling paints

Different authorities in each state and territory regulate the use of marine anti-fouling paints. In each jurisdiction the regulations differ slightly. These are international products and cannot be formulated for individual states.

In 2003 a worldwide ban will come into effect on the use of tributyltin oxide in antifouling paints. A question which may then arise is how to deal with boats already coated with these antifouling paints. The options include the complete removal of existing coating or its encapsulation and overcoating by a new antifouling paint. The disposal of the paint waste may also be an issue. In this case uniform legislation is clearly essential.

Hormonal Growth Promotant (HGP) products registered in Australia - commercial impediments resulting from HGP Compliance Program.

HGPs are implants designed to release slowly small quantities of hormones from the ear of cattle into the animal tissue in order to increase carcass weight and have been used in the Australian beef cattle industry since 1979. Regulatory reviews, and more recently a World Trade Organisation assessment, have found no evidence of harm to humans consuming the beef/offal of animals treated with HGP.

Nevertheless, since 1988, the European Union (EU) has required that imported beef/offal must be HGP free. To satisfy this requirement, Australia introduced the HGP Compliance Program, part of which is the condition that these products must include a palpable marker to aid in detection of treated cattle. Further requirements are that treated animals have a triangular ear punch placed in the ear and vendor declarations are used at the points of sale. These latter 2 requirements make the palpable marker redundant, especially since no other country using HGPs, and exporting cattle to the EU use these markers.

The impact on the Australian industry is that for products consistently proven to be safe there is a requirement on manufacturers to produce these products with palpable markers. These markers are not required anywhere else in the world, even in other countries that export beef/offal to the EU, and have HGPs registered. The result is that for what are in essence global products, there is a need for manufacturers to undertake special production runs of these products for use in Australia.

The regulator's requirement for markers adds costs to manufacturers and the HGP Compliance Program per se results is an increased financial burden on suppliers and users of these legitimate products, for which there is no direct compliance benefit. 1999 estimates place a cost of $2.436

million on suppliers and users of HGPs to satisfy government through their HGP Compliance Program.

Recently, a manufacturer of HGPs has developed a product that is an infeed preparation for cattle and as such, there is no mechanism for an implant to be part of the product. This has resulted in the product being stalled in the regulatory process due to the inflexibility of regulatory policy to adapt to innovative formulation chemistry.

In addition, EU inspectors have audited the HGP Compliance Program and found it wanting in satisfying the EU of the HGP-free status of imported Australian beef/offal. As such, Australia is now required to develop a system that will satisfy the EU requirements. In response, Australia is developing a "closed production system" for beef cattle producers that do not use HGPs and wish to access the EU market, but at the same time has decided to retain the old HGP Compliance Program that has been found wanting by the EU.

As the HGP Compliance Program has been found wanting, Avcare, together with the Cattle Council of Australia and the Australian Lot Feeders Association, believes that the "closed production system" should form the basis of satisfying the EU requirements as the incentive for producers to comply is in premium EU prices for HGP free beef/offal.

Impact on coatings industry of policy requiring chemical marking of solvents.

In response to the use of solvents as petrol substitutes, the Commonwealth government introduced legislation requiring a range of solvents to be chemically marked for the purpose of identifying the illegal use of those products.

However, lack of consultation with industry meant that those involved did not realise that large quantities of the solvents were used in the manufacture of paints. A remission system had to be rushed into place to enable coatings manufacturers to receive unmarked solvents as the marked solvents were unacceptable for technical and health reasons. The marker, for example, was not approved by the US Foods and Drugs Administration for exposure to foods. Solvents containing it could therefore not be used in the manufacture of can coatings. For a while, the legislation put at risk Australia's canned food export market. Australian coatings manufacturers are still faced with time consuming and expensive compliance obligations arising out of a problem that has nothing to do with their industry.

To date, there have been no prosecutions under the legislation, despite clear evidence of the continued misuse of solvents as fuel substitutes. It is vital that proposed legislation is more accurately focussed, and industry consulted.

Impact on coatings industry of waste oil levy.

The proposed waste oil levy, being considered by the Commonwealth Government is likely to impact on coatings manufacturers who use a number of oils, not as lubricants, but as components in paint and ink manufacture. Again, a cumbersome and time-consuming exemption system has had to be set up to ensure that coatings manufacturers do not have to bear the levy. Industry is particularly concerned to establish whether customers who have been charged the levy on oils used in paints, inks, food preparation and pharmaceutical products which are apparently to be exempt from the levy will be entitled to a refund.

NSW Protection of the Environment Operations Act

The new Act set up a new licensing scheme which impacts a company's two manufacturing sites. The sites were already licensed under the existing *Pollution Control Act* for NSW at an annual cost of $760 per site. The new licensing scheme for the same operations now has an annual cost of $12,825 and $5,700 respectively. These costs are termed "administration costs". Even if the sites operate on zero emissions to the environment (which one is pretty close to), the fee structure remains the same. Despite meeting with NSW EPA during the drafting of the regulations (and strongly outlining the concerns), no concessions were made.

Pool chlorine and the NRA

The NRA implemented fees for the ongoing sale of pool chlorine to assist in its monitoring role. While several hundred thousand dollars were collected in revenue, the level of activity in the NRA on pool chlorine was negligible. Clearly the funds were gathered and used as a cross subsidisation of other work for the agency. In this case an inefficient cost recovery scheme was unable to match the fund raising mechanism to the appropriate usage of the collected funds.

Windscreen films for Automotive Industry

In line with a transition to lead free chemicals, overseas companies have begun using safer chemicals for automotive windscreen tints. However, an Australian company is not able to import the chemicals, as they are not listed on Australian Inventory of Chemical Substances. While data sets exist to satisfy their current usage in both the European Union and the United States – where they are not of regulatory concern – they do not have the complete dossier for a NICNAS notification.

The cost for the company to perform all the testing required is too high given the size of market for the product. As a result the chemicals are now imported as a finished article on windscreens without the need to notify NICNAS. The Australian company is unable to satisfy customer demands and revenue from sales flows to a foreign based firm.

Phototronics Industry Inputs

The phototronics industry is involved in the production of computer chips, silicon wafers and solar cells and as such it is a very dynamic industry that requires new chemistry as part of its ongoing development. For Australian firms supplying this industry, NICNAS hinders their flexibility to keep up with developments in the chemistry for this technology due to:

- The short shelf life of chemicals as a result of the pace of development in the industry. As advances occur in chemical technology existing chemicals are dropped possibly even before an assessment has been completed.
- The market for photoresist chemicals is small but necessary for larger value added industries. The size makes it even difficult to justify applying for a low volume chemical permit as products may be consumed at 1 litre per month making it not cost effective.
- As a result of the above many of the small market niche products rely on old chemistry leading to internationally uncompetitive products.

Cost of Australian agencies using different product classifications.

TGA legislation requires that liquid hand-washes claiming an antibacterial effect are regulated as therapeutic goods. In Europe, the same products are regulated as cosmetics. TGA legislation requires an extensive data package be provided for registration and that they be notified prior to changes being made to the products. TGA also requires that the product be manufactured at a Good Manufacturing Practice medicinally licensed premise. These uniquely Australian requirements impose significant barriers, delays and costs to introducing new products or upgrading existing products which forces extra costs on to consumers. One company estimated that the net cost of the extra regulation (as opposed to if it was regulated along the same lines as in Europe) is over $160,000.

Aerosol Products (Positive Case Study)

In Australia, labelling of products must conform with the requirements of the dangerous goods code. The labelling requirements of the code differ to those in Europe.

For example, local uniform trade measurement legislation requires a weight statement on the front of aerosol cans sold in Australia whereas

Europe requires a mass (volume) statement, generally placed on the rear of the can. Our nearest trading partner, New Zealand, doesn't require weight or volume to be specified.

The financial impact of over-labelling these products would be approximately $200,000 per annum. This loss in margin would be such that the distribution and sale of these products could not be justified.

The Company applied for an exemption to the Dangerous Goods regulations to allow for cans marked in accordance with European regulations to be sold in Australia. This exemption has been granted allowing the company to execute a key part of its business plan and allowing innovative products to be made available to the Australian consumer.

While the company acknowledges that it was good that an exemption was made for this product, they believe it should also be noted that "Australianisms" still abound in the local regulatory regime for aerosol products.

A5. Survey of impediments to training

Individuals and industry associations were surveyed in August/September 2000 and asked to rank impediments to education and training with either A, B, or C, with A being the highest priority (and being given 4 points) then B (2 points) then C (1 point). 27 individual responses were received. Ten out of 14 key industry associations responded to the survey. The points total for each impediment is shown in **bold**.

Measures to improve individual attitude and company culture regarding training are listed in the table included a range of measures:

- Increased use of in house and flexible delivery of training;
- More publicity and awareness of opportunities in process industries; and
- Recognition and portability of all forms of training/learning: including in-house, seminars, courses.

The **main impediments to professional development** for individuals in pursuing a career in the chemicals & plastics industries beyond Certificate IV (Advanced Certificate) in priority order are:

Table 10 Results from survey on impediments to training and education

Lack of training culture –not recognising the value of skill acquisition.	**97**	Core Issue. Positive case studies of outcomes of good training
Staff cannot get away from work to attend/study	**96**	More Flexible delivery Training should be win-win
Shortage of students being attracted into courses related to the process industry	**90**	More publicity and awareness for primary and secondary education. Partnerships
Companies focusing on short term survival, not long term growth and develop	**83**	Educate companies of value of training. Subsidise/mandate training.
Cost of companies releasing staff.	**80**	Flexible delivery. Tax incentives
Employees do not see the value of training if it is not associated with direct salary increases.	**79**	Recognition is a powerful driver. Some company managers see value in training. 'Whole of Life' approach
Unless employers see immediate returns such as increased in productivity, they do not value training	**76**	Encourage longer term view Managers need to encourage job satisfaction, not just productivity

No official recognition or requirement for completion of short courses – portability.	**71**	Accreditation of short courses and recognition of more in-house training
Limited availability of programs for companies-career &management development	**71**	Programs need to be flexible, customised and recognised
Lack of appropriate technical & management opportunities	**70**	Continue funding for postgraduate study. Need Recognition
Companies fear that if employee achieves higher qualifications, they expect more pay	**66**	Attitude –Training pays dividends Competency for tomorrow.
Universities currently compete and only get small numbers.	**64**	Rationalise providers and upgrade facilities. On-line delivery.

A6. List of Acronyms

ANTA	Australian National Training Authority
ANZFA	Australia New Zealand Food Authority
APAC	The Australian Pharmaceutical Advisory Council
AQF1	Australian Qualification Framework level 1
BAU	Business as usual
COAG	Council of Australian Governments
COMET	Commercialising Emerging Technologies Program
CPLG	Chemicals and Plastics Leadership Group
CRC	Cooperative Research Centre
EU	European Union
HGP	Hormonal Growth Promotant
ISIG	Innovation Summit Implementation Group
ITABs	Industry Training Advisory Bodies
MSDSs	Material Safety Data Sheets
NICNAS	National Industrial Chemicals Notification and Assessment Scheme
NRA	National Registration Authority
PACIA	Plastics and Chemical Industries Association
PDF	Pooled Development Funds
REEF	Renewable Energy Equity Fund
SMEs	Small and medium-sized enterprises
SWOT	Strengths, Weaknesses, Opportunities and Threats
TGA	Therapeutic Goods Administration
TGIC	Triglycidyl isocyanurate
VET	Vocational education and training
WHP	Withholding periods

A7. Responsible Care Codes of Practice

1. Community Right To Know

Effective communication with the community about the risks of operations and products with potential impact on them.

Desired Outcomes

User friendly information is provided to all enquirers.

Consultative processes are established so that the real concerns and information requirements of the community are heard and addressed.

2. Research & Development

Protection of human health & the environment during research and development.

Desired Outcomes

All companies have effective, up-to-date R & D management systems and improvements plans

Systems exist for provision of healt, safety and environment information on new materials to those who may come into contact with them

Systems ensure safe and environmentally sound laboratory practice and transfer to pilot or initial manufacturing operations.

3. Manufacturing

Identification and management of all hazards in manufacturing to prevent loss of containment or of operational control.

Desired Outcomes

Manufacturing management systems exist which measure and strive for industry best practice performance by analysis and continuous elimination of weaknesses.

Facilities operate with sustained reliability, in compliance with regulation and without HSE impact on employees, neighbours or the general environment.

HSE awareness and motivation of all people on manufacturing sites prevents injury, illness and environmental damage.

4. Emergency Response

Protection of people, property and the environment by provision of effective emergency response plans developed in consultation with the community and emergency services.

Desired Outcomes

All companies have effective up-to-date, exercised, operational and emergency plans.

The community and employees are aware of plant operations and products, potential HSE issues and their roles in response to on-site and off-site emergencies.

5. Waste Management

Reducing Waste - Report on Waste Survey 1996 Management, reduction or elimination of wastes to improve human health and the environment. Contribution to sustainable development through clean production, energy conservation and more efficient resource use.

Desired Outcomes

All companies have an effective waste management system covering all life cycle stages of wastes.

Waste minimisation is practiced in all phases of the operation. Waste re-use is preferred to treatment or disposal.

Wastes are handled, treated and disposed of in ways which protect human health and environment.

Co-operation with authorities in the assessment and remediation of previous landfill sites occurs.

6. Warehousing & Storage

Minimisation of the impact of warehousing and storage of bulk, packaged or pipelined goods on human health and the environment.

Desired Outcomes

All companies have an effective warehousing management system and improvement plan.

Regular risk assessments of warehousing and storage are carried out.

Risks are reduced by the use of effective practices in all stages.

The local community is aware of plans, operations, HSE issues and the response to emergencies.

7. Transportation

Safety improvement, accident reduction and provision of effective emergency response in all modes of transport of chemical materials.

Desired Outcomes

All companies have an effective Transport Management System and improvement plan.

Active programs to improve safety and prevent accidents are in place.

Immediate access to documented, up-to-date, exercised operational transport emergency plans are available.

The community particularly along transport corridors is aware of plans, operations, HSE issues and response to emergencies.

8. Product Stewardship

Reduction of product risks by ensuring that HSE issues arising at any stage of the product life cycle are handled in socially and environmentally acceptable ways.

Desired Outcomes

All companies have an effective Product Stewardship management system and improvement plan.

HSE information, risks and risk management systems are available for all categories of products.

Internal product and process management systems exist covering design, manufacture, product use, education and feedback.

External systems that define and meet company obligations relating to HSE issues management exist. They cover suppliers, distributors, direct and downstream customers.

A8. Impediments to major infrastructure investments

Scale factors for Australia

By world standards Australia's market for chemicals and plastics is small and thus, in most cases it is difficult to size a competitive plant based purely on a local market. Examples of current sizes of world scale plant include:

- Ethylene plant 1.4 million tpa – Current Australian polyethylene market 0.5 million tonnes per annum;
- Methanol plant 1.3 million tonnes per annum – Australian market 0.04 million tonnes per annum
- There are exceptions that are usually related to our agricultural or mining industries that are world scale. For example, the Australian caustic soda market (largely for the alumina industry) is 1.2 million tonnes per annum, whereas a world scale plant is 0.5 million tonnes per annum.

For Australia to secure investments that would satisfy the requirements of world scale, integration (and thus multiple investments), and effective use of infrastructure, it is necessary to look to regional export markets.

The development of an export-oriented petrochemical/chemical complex will depend on the key economic advantages of the site. Should the economic advantages be sufficient to attract the first few investments then the advantages of integration and common use of infrastructure make additional investments more incremental in nature and hence easier to justify economically.

Globally competitive complexes for the manufacture of chemicals and plastics are developed in locations where each operation can benefit from the economic, environmental and social gains of being part of the larger whole. Together, these benefits make the difference between a successful venture and one that struggles for viability. Benefits include:

- Use of common facilities to provide: power, steam, compressed air, nitrogen, water (potable, demineralised, process);
- Feedstock, product and by-product availability to all industries within the complex; and
- Optimisation of support services: site management, community interface, maintenance services, specialist contract services, common logistic facilities (port, rail, transportation facilities).

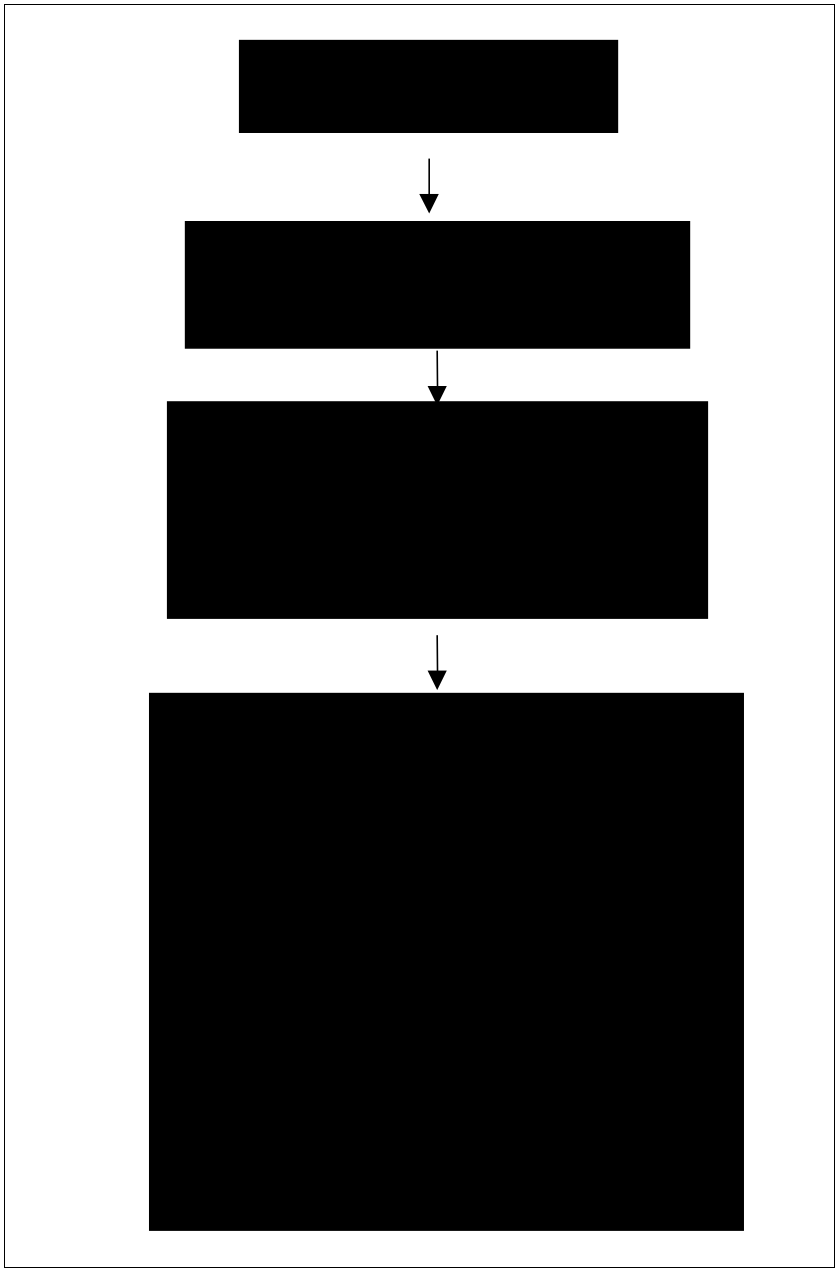
Examples of this type of complex can be found in most developed industrialised countries. Complexes now being developed in the Asia Pacific region include:

- US Gulf Coast;
- Korean sites - Ulsan, Yeochun, Daesan;
- Map Ta Phut – Thailand;
- Singapore – Jurong island, and
- Taiwan.

Several of these complexes have been built based on indigenous ethane/propane and methane supply after which developments based on imported feedstocks have been possible due to the advantages of integration with existing facilities. The use of common infrastructure and energy and feedstock integration improves the economics of subsequent investments relative to the initial stand-alone investments.

Further upstream integration also facilitates support for investments to supply a wide range of industries and applications that are based on products from the chemical industry. Figure 8 provides an overview of the range of processes and industries that can be co-located in a major integrated infrastructure complex.

Figure 8 Integrated infrastructure facilities



Potential locations within Australia

Currently there appear to be two Australian locations that could provide a competitive advantage in energy and raw material costs:

- The Pilbara area of Western Australia – existing W.A. offshore gas field landfall, and
- The Darwin area of the Northern Territory - Timor Sea gas landfall (yet to be developed).

Both could provide a possible base for methane based chemistry (methanol, urea, and ammonia). However, today, both are limited by the amount of ethane available through extraction from the gas brought on-shore. As a large percentage of commodity chemicals and plastics production is based on ethylene chemistry (raw material either ethane or naphtha), increases in the volumes of gas brought on shore is critical to the development of the chemicals industry.

Pilbara

The Pilbara already has large quantities of gas coming on-shore and thus could today provide the basis for investment in industries utilising methane based chemistry. Some projects have already been proposed, however, to date these have not progressed beyond the initial proposal stage, largely due to the high infrastructure and capital construction costs.

At present there is insufficient ethane feedstock available from the gas coming on-shore to justify a world scale ethylene plant. Clearly, this particular problem could be addressed by increasing the amount of landed gas. A liquids cracker (based on condensate/naphtha) has not been successfully considered due to the much larger capital investment, infrastructure requirements and the capital construction penalties that would render a stand alone investment less than competitive. Plants to produce acrylonitrile, acetic acid, and sodium cynanide could be included in a second phase but would also encounter capital penalties from higher construction costs due to the remote location.

Darwin

The proposed Timor Sea gas pipeline is believed to be able to deliver competitively priced gas and thus should be able to support industries based on methane chemistry at the suggested Darwin site. However, the ethane content of the Timor Sea gas is only 4.5-5% and, with the quantities that it is proposed to bring onshore, would supply, at best, half of the raw material required for a world scale gas cracker.

The concept of a liquids cracker appears more viable than in the Pilbara as the construction penalties should not be as high as it is located close to a major city and the environment is more hospitable for construction (flat compacted clay). Import of additional raw materials (naphtha / condensate) could be required for subsequent phases.

Development issues

The development issues for either option are similar, involving infrastructure, equipment and construction costs, scale, feedstock cost, integration, shipping and greenhouse gas policies.

Key infrastructure elements are involved for both. In the Pilbara, a bulk port for liquids and bulk solids (urea) would be needed; water is an issue

with a desalination plant required, site development costs would be extensive and roads and site access would need to be developed. Due to its proximity to Darwin, infrastructure would be less of an issue there than in the Pilbara. (For example, water is readily available.) A bulk liquids port would still be required and, if urea were included in the scope, a bulk solids facility.

Capital cost penalties for the Pilbara are quoted at between 25% and 40% and for Darwin are quoted between 10 - 15%. These are the most significant of any of the hurdles facing projects in these locations. Due to the penalties on construction capital, the full benefits of integration appear unlikely unless the potential benefits in terms of fuel gas pricing, competitive logistics to regional markets, scale, and bringing construction costs to global benchmarks are realised. Clearly:

- operations such as these would need to be world scale in nature;
- fuel gas costs of US$1.00/MMBTU or less would need to be achieved for either site to be attractive for investment
- while the proximity of both sites to Asia provides a competitive shipping cost for exports, this advantage could be dissipated if attention were not paid to the implications of continuing constraints on coastal shipping.

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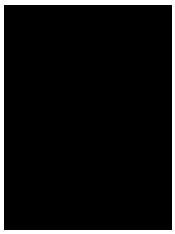

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