



WESTERN AUSTRALIAN
TECHNOLOGY & INDUSTRY ADVISORY COUNCIL

**TOWARDS A WEST AUSTRALIAN
SCIENCE POLICY
FOR THE 1990'S?**

INTRODUCTION

For reasons of convention rather than constitution Science Policy in Australia has traditionally been the preserve of the Commonwealth Government. As we approach the decade of the 1990's the increasing relevance of science to Western Australia's industrial future suggests that effective leadership in this field at a State level is required.

A Science Policy for Western Australia would provide overt recognition of the fact that science and technology underpin modern sophisticated industrial development.

Science is the process of investigation of physical, biological and other related phenomena, whereas -

Technology is the process of production and delivery of goods and services.

Science is inextricably linked to technology. Science and Technology are integrated components of industry and not separate and distinct entities.

BASIC OBSERVATIONS

1. The Western Australian economy has strong foundations in the primary, secondary and service sectors, with mining and agricultural products forming the traditional base of the State's exports. The continued success of mining and agriculture in Western Australia is in no small part due to the application of scientific research and development to the unique problems which have been encountered.
2. As traditional markets for primary and secondary industries have matured, a new generation of science based industries has emerged.
3. Australia's research infrastructure has received little support from multinational companies. Furthermore, Western Australia has not been given a proportionate share of Australia's Research and Development laboratories. Both have militated against a strong scientific community developing in Western Australia.
4. Present day community attitudes to science have been influenced by at least two important factors:
 - (a) the notion that many of our social and environmental problems have been caused by science and the technology it has created;
 - (b) the perception that the possibility of a nuclear holocaust is directly attributable to the scientists who created the atomic bomb during World War II.

5. The sheer complexity of modern science poses problems of information transfer which have led to an understanding barrier separating science from the community it serves.
6. If Australians are to make informed, democratic decisions about technological developments, the community must have an understanding of the scientific basis of the technology, as well as the social and economic implications of its use.

STATE/FEDERAL PARTNERSHIPS

1. Government research funding agencies should provide more grants which combine private industry and government funds for work on industry related projects.
2. The National Teaching Company scheme should be extended to provide opportunities for a greater number of applied science and engineering students to work in innovative companies.
3. The Commonwealth funded "Centres of Excellence" programme within tertiary institutions should be expanded and encouragement given for tertiary institutions (and perhaps other research groups) in the same locality to combine resources to support the establishment of other centres.
4. The space, equipment and other resource needs of science-based courses at universities should be addressed as a matter of urgent priority.

5. Currently the Commonwealth funded research organisations such as CSIRO, Defence Science Laboratories, The Australian Atomic Energy Commission, Telecom Research Laboratories, Bureau of Meteorology and the Bureau of Mineral Resources, are heavily concentrated on Australia's Eastern seaboard. Action is required by the State and Commonwealth governments to ensure that W.A. receives a fair share of the nation's scientific budget and an appropriate share of the nation's government funded research organisations.

EDUCATION AND TRAINING

The unprecedented rate of change in knowledge and skills being experienced world wide has important implications for current education practices and training programmes in Australia.

Recent studies confirm that there is a declining participation rate in science and technology disciplines at secondary and tertiary levels of education in Australia. The proportion of Year 12 students studying traditional secondary science subjects has steadily declined over the past 15 years.

This situation is mirrored at the tertiary level. Whereas total tertiary enrolments have almost doubled over the past decade, enrolments in the physical, chemical and geological sciences have remained essentially static. The same trend is evident in engineering.

A number of identifiable factors have contributed to the declining participation in science and technology:

- (a) a lack of emphasis by schools, employers and government on the importance of scientists and technologists to the continuing development of Australia;
- (b) the masculine image of science and technology which has inhibited female participation;
- (c) a shortage of suitably-qualified mathematics and science teachers.
- (d) few of the nation's decision makers have a science background.

Such trends have important implications for our scientific and technological future and will have a direct bearing upon our ability to compete with other countries.

NOTE: Over the last five years almost 50% of the successful applicants for graduate or corporate membership of the Australian Institute of Engineers have non-Australian qualifications.

There is an urgent need to encourage more students to enter those fields of study which can enable Australia to compete in an increasingly technological world, and to enhance our tertiary institutions as first rate establishments capable of attracting students of high ability to study science-based courses.

The effectiveness of science education and the links between schools, tertiary institutions and employer groups may be enhanced by:

- i) initiating a system of science awards for outstanding teachers and students;
- ii) extending the Neville Stanley Studentship scheme to the secondary school level;
- iii) developing a system of cadetships in science and engineering to attract able students into these professions;
- iv) developing financial incentives to attract students to undertake graduate studies in engineering and science, where the research is of direct relevance to an industrial company and where scholarships are jointly funded by industry and government (perhaps similar to the British "Case" scheme);
- v) initiating a scheme of "Industrial Studentships" to enable students to undertake post-graduate training whilst continuing to work;
- vi) encouraging collaborative training programmes whereby university supervised post-graduate research can be carried out in companies;
- vii) conducting special Summer Schools for outstanding secondary school science students;
- viii) involving more scientists mathematicians and engineers in education planning and curriculum development;

- (ix) providing specific support for science clubs throughout primary and secondary schools.

SCIENCE AND THE COMMERCIAL/INDUSTRIAL SECTOR

1. In order to increase the quantity and quality of people entering science courses it is essential to overcome the shortage of vocational opportunities for scientists in Western Australia.
 - a) The Government encourage companies involved in advanced technology projects to provide relevant employment opportunities for scientists (very few scientists with research qualifications are employed in Australian industry).
 - b) The industry-university collaboration achieved through the Western Australian Mining and Petroleum Research Institute should be expanded to embrace other science and technology sectors.
2. A number of scientific services are essential to industry. Paramount amongst these are calibration, standardisation and testing services which underly quality control and quality assurance programmes. Government should work with industry and the universities to improve the quality and breadth of scientific services available to W.A. industry.
3. A government supported mechanism should be developed in W.A. to enable small companies to obtain technical advice and assistance in carrying out R & D.

4. A system of public accountability for government funded R & D, whether in research institutes or in government laboratories, should be established.

In order to achieve economic advantage from the high level of public sector research investment, the capacity to commercialise research and develop the intellectual property of government agencies should be encouraged.

5. Technology exchange schemes involving entrepreneurs, graduates and industry which enable students to spend some of their training periods in industry (as in many overseas universities) should be introduced.