A Report on

Skill Shortages in Electrotechnology

Produced by the
Electrotechnology Working Group

for The Hon Dr David Kemp MP

Minister for Education, Training and Youth Affairs

Foreword

I have considerable pleasure in presenting this Report on Skill Shortages in Electrotechnology prepared by the Electrotechnology Working Group for the Hon Dr David Kemp MP, Minister for Education, Training and Youth Affairs.

As Chair of the Working Group, I am delighted that representatives of industry have been provided with such a valuable opportunity to research and report on the growing issue of skill shortages in electrotechnology.

Our industry faces an outstanding challenge as the rate of ongoing technological change and the development of new technologies impact on both the supply of skilled tradespersons in the sector and changing market demands for new skill sets to meet the needs of the Australian economy in the 21st Century.

As the nature of the industry changes to work with "smart" technology, there has been a remarkable employment growth across the electrotechnology occupations and in the areas of voice and data communications trades particularly. The Report recognises that the development of new trades and occupations has highlighted the need to change the traditional image of trades in electrotechnology.

The Electrotechnology Working Group comprised key industry representatives working in partnership with Government to identify industry-specific issues relating to investment in training, changing skill set needs and identified or perceived barriers to commencement, retention and completion rates in New Apprenticeships in electrotechnology.

The Working Group extended from the research and findings presented in this Report to provide recommendations for action in response to identified issues relevant to skill shortages in electrotechnology. Goals, related strategies and specific actions are recommended for implementation. These recommendations reflect the commitment of both industry and government to work in partnership to increase the supply of skilled tradespersons and to facilitate training for new skill sets in the industry.

I would like to thank Dr David Kemp for his support in initiating this important Report from industry on issues impacting on the national economy, employers, employees, New Apprentices, training organisations and Government bodies concerned with employment, training and youth affairs. The participation and input from a wide range of stakeholders has been invaluable.

I commend this Report as a major step towards an efficient, wide-ranging and effective response to issues that affect us all.

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Executive summary

Australia has experienced an expanding economy accompanied by strong employment growth over the last decade. Australian industry facilitates this by responding flexibly to changing demands and markets. The supply of skills to meet market and industry demand is vital to maintain Australia's competitive edge.

Industry leaders recognise that skill shortages in the traditional trades is an issue requiring response at a number of levels to meet changing and growing market demand. The challenge is to improve the present skills base and to ensure that employer and government investment in training results in a workforce with skills appropriate to the needs of the Australian economy in the 21st Century.

The Office of the Hon Dr David Kemp, MP, Minister for Education, Training and Youth Affairs announced an initiative focusing on the issue of skill shortages in three key industry sectors in a Media Release issued on 3rd November 1999. In partnership with industry, working groups were established to consider skill shortages and related training needs and to develop options to counter identified shortages in engineering (mechanical, fabrication and electronic), automotive (retail and repair) and electrotechnology

This report presents the findings of the Electrotechnology Working Group. The report investigates areas of skill shortages in electrotechnology and recommends strategies and actions in response to findings.

Issues

Research undertaken for the Working Group demonstrated that areas of concern relating to the skill shortage issue included:

- The need to increase the number of skilled tradespersons in the workforce through improved uptake and completion of contracts of training. This also involves the need for measures to improve retention rates during training and to reduce occupational wastage as qualified tradespersons leave the industry.
- The need to ensure training is developing skills relevant to changing market demands. The electrotechnology industry in particular must respond to rapid development of new technologies and changing applications of existing technology. This means that there is an ongoing need to upskill the existing workforce and to facilitate new training pathways in response to demands for new skill sets.

The Electrotechnology Working Group will present findings on the issue of skill shortages in this industry at a forum for employers and other relevant stakeholders in the sector to be held in early 2000.

Content of the Report

The Report of the Electrotechnology Working Group presents:

- an overview of the electrotechnology industry and the industry sectors employing skilled electrotechnology tradespersons
- an examination of the status of the industry and issues affecting the industry
- a brief summary of key statistics, research findings and evidence identifying specific areas of skill shortages and skill set needs for electrotechnology
- identified critical issues and/or barriers, both systemic and attitudinal, to satisfying identified skill needs
- recommendations and initiatives to solve these issues and proposed strategies to overcome barriers to meeting skill shortages
- attachments: documents, research papers and evidence supporting the findings of this Report.

Findings

The Report shows that:

1. There is a current skill shortage in identified electrotechnology trade areas. Despite growth in numbers in structured training, employers report that supply is still not meeting demand for skilled workers.
2. Growing employment rates, particularly in new areas of high technology trades, means that skill shortages are projected to increase, especially for voice and data communications trades.
3. The industry as a whole is experiencing rapid changes in technology with considerable growth in high technology areas such as voice and data communications. At the same time enterprises are undergoing structural changes resulting in a great increase in contracting work. Technological and structural changes experienced by the industry lead to market demands for new skill sets and an ongoing need to upskill the current workforce.
4. New Apprenticeship opportunities are not adequate for the number of suitable applicants. Employer investment in training remains low, demonstrating that not enough employers currently recognise the benefits of training nor are aware of the potential for flexible training arrangements under New Apprenticeships.

5. There are critical issues for the industry in areas of demand for traditional trades skills and for new skill sets and the supply of skilled workers:
   - Demand issues arise as high employment growth in specific sectors requires more skilled tradespersons and new technology skill sets.
   - Supply of skilled workers remains an issue as qualified tradespersons leave the industry for alternative careers or pathways, numbers entering training are insufficient to meet current and projected demand and rates of attrition during training remain high.
6. Flexibility in addressing skills needs and shortages is affected by licensing, safety and technical-based regulation and the impact of different legislations on the uptake of New Apprenticeships. Barriers arising from these issues need to be examined and strategies implemented to overcome unnecessary impediments to commencements, retention and completion of training.
7. There is a need for employers, industry and training personnel to consider flexible and alternative pathways for trainees and apprentices in order to:
   - make a career in electrotechnology both more attractive and more accessible, and
   - provide appropriate training pathways that will lead to improved retention rates and outcomes appropriate to market demand.

Recommendations

Recommendations are made under four Focus Areas for Action. These are:

1. Increased marketing and promotion
2. More flexible and alternative training pathways
3. Evaluation of regulatory, legislative or systemic barriers to New Apprenticeships
4. A streamlined response to demand for new skill sets

Strategies relating to each of these Focus Areas for Action are identified for implementation. A detailed framework is provided for use as a guide for future planning to implement these strategies as appropriate.

Background to the report

The electrotechnology industry recognises that the supply of skilled tradespersons in the industry does not meet current market demand and that skill shortages are projected to increase, especially in rapidly developing areas of high technology.

In response to industry concerns, this study was initiated by the Hon Dr David Kemp MP, Minister for Education, Training and Youth Affairs, at a meeting on 24 September 1999 with the Chief Executives of the Australian Chamber of Commerce and Industry (ACCI), the Business Council of Australia and the Australian Industry Group. In recognition of the need to address issues relating to skill shortages in traditional trades, the Government agreed to make resources available for a study into the issue with a focus on three key industry sectors. Working Groups were established for the electrotechnology, engineering and automotive industries and key industry and Government representatives are to respond to the outcomes and findings of these Working Groups in early 2000.

A Steering Committee was also appointed to examine cross-industry issues emerging from the findings of the three Working Groups and identify measures and make recommendations to address skill shortages in the traditional trades at a cross-industry level.

The Working Groups will present their findings to Minister Kemp at a National Skills Forum to be held on 28 April 2000 in Melbourne. Key stakeholders are to discuss identified critical issues and strategies recommended by the Working Groups with reference to the reports from the three industry areas and from the Steering Committee.

Mr Simon Gerard, National Marketing Manager of Gerard Industries was appointed by the Minister as Chair of the Electrotechnology Working Group. Members of the Electrotechnology Working Group are listed in *Attachment 1*.

The findings summarised in the Report are based on information from:

- Research, statistics and data on supply and demand for skills in the industry and related employment issues. Data and information provided by the Commonwealth Department of Employment, Workplace Relations and Small Business (DEWRSB) and the National Centre for Vocational Education and Research (NCVER) are specifically summarised.

- Desk research and various commissioned papers and reports
- A telephone survey into shortages currently experienced by employers in the electrical and communications contracting industry
- Focus groups and consultations conducted with relevant stakeholders by the National Electrical and Communications Association (NECA)

Discussion papers and data relative to the industry, current training statistics and identified skill requirements were considered by the Working Group members. Critical issues were identified and ranked and initiatives and strategies were recommended in response to the findings. The approach of this Report is to present information on skill shortages in electrotechnology in four broad sections:

Section1. The first section describes the research method and presents an overview of principal sources of evidence.

Section 2. The second section of the Report summarises data identifying what skill shortages are occurring in the industry and emerging patterns and trends in the areas of demand and supply of skills.

Section 3. The third section is a summary of the critical issues currently faced by electrotechnology with reference to unmet skill set needs and skill shortages in identified sectors.

Section 4. The fourth section of the Report presents recommendations and proposes strategies to be implemented in response to identified key issues in four identified Focus Areas for Action. A framework or Action Plan is provided for each strategy to be used as a guide for future implementation planning as appropriate.

Introduction

The issue of skill shortages in traditional trades is recognised by industry, government and key stakeholders to be an impediment to the building of Australia's skill base to meet emerging industry needs.

The Electrotechnology Working Group was established in partnership with industry to consider training needs and to develop options to counter identified skill shortages in electrotechnology trades areas. The Terms of Reference for the Working Group were to:

1. Undertake research and/or provide evidence of research which demonstrates the benefits to employers of investment in training.
2. Identify the skill set needs of the industry sector and identify cross industry issues where possible.
3. Identify impediments and/or barriers to satisfying skill set needs.
4. Recommend initiatives/solutions (short, medium and long term) which may assist in addressing the skill needs within and across the industry.

Overview of the Electrotechnology Industry

The electrotechnology industry impacts on almost every aspect of daily life. The technology ranges from traditional light and power, hardware platforms and networking automation to virtual enterprise, the internet and fibreoptics. The spread of new information processing and communication technologies means that the industry is developing rapidly.

The industry includes the installation, servicing, repair and maintenance of electrical and electronic equipment for industrial, commercial and domestic purposes. It comprises communications, distribution and transmission, electrical generation and computer data and communications cabling systems. The telecommunications and information technology aspects of the industry are becoming increasingly important as the knowledge economy alters the way businesses operate.

People employed in the electrotechnology industry can be found working in most sectors. Principal areas include:

- Construction
- Communication services
- Electrical generation, transmission and distribution
- Manufacturing
- Housing
- Resources
- Transport
- Health and community services
- Wholesale and retail

The major occupations in the electrical trades are electricians, electronic and office equipment tradespersons, communications trades and refrigeration and air-conditioning mechanics. The current rate of technological change in the industry is very high and is expected to increase. The use of 'smart' technology such as home automation and the integration of systems, including data is becoming common in many sectors of the industry.

As the industry develops and changes, more sophisticated technical skills and problem solving abilities are in demand. The primary entry into the industry is via a traditional apprenticeship. Apprentices are expected to be highly competent in the skills required and to be prepared to continue updating skills throughout their working life.

The Industry in Context

The industry covers the electrical, electronic and communications sectors. All areas in the industry are experiencing rapid changes in technology and the industry as a whole is responding to changes in the organisation of work with extensive contracting out of work. Traditional electrical work is undergoing a shift of skill set as work in voice and data communications grows. Research conducted in 1997 by the peak employer body for this industry sector, the National Electrical and Communications Association (NECA), found that the voice and data communications aspect of the contracting sector had a growth rate in business turnover of 25% per annum.

The electrotechnology industry turnover in Australia in 1997 was $43b, the contracting sector accounting for $5.1b (Austech Forum, 1999, p.5).

The Electrotechnology Working Group relates its research into skill shortages to the electrotechnology trades, covering occupations that fall within the electrical, electronic and communication sectors.

Total employment in the electrotechnology trades workforce is approaching 200,000 people. This amounts to some 2.3% of all employment in Australia. These trades represent the third largest area of employment in Australia's trades workforce (behind the building and construction and metal trades), accounting for some 16% of total trades employment in Australia. (NCVER paper, p.2, *Attachment 2*)

As shown in *Table 1*, two occupations account for 70 percent of the electrotechnology trades employment: some 99,200 are employed as electricians and 31,200 as communications tradespersons. Other large employing trades include electronic and office equipment tradespersons (27,000) and refrigeration and airconditioning mechanics (13,000). (NCVER paper, p. 2)

Table 1

Employment in Electrotechnology Trades Occupations

Trades Occupation		Employment in 1997/98	
		Number ('000)	Share (%)
3123	Electrical engineering associate professionals	8.2	4.4
4411	Electricians	99.2	53.2
4312	Refrigeration and airconditioning mechanics	13.0	7.0
4313	Electrical distribution tradespersons	7.4	3.9
4314	Electronic instrument tradespersons	0.6	0.3
4315	Electronic & office equipment tradespersons	27.0	14.5
4316	Communications tradespersons	31.2	16.7
	Total	186.6	100.00

Source: Murphy Chris & Douglas Justin 1998, The Outlook for Jobs*, National Centre for Vocational Education Research (NCVER)*

Emerging Issues

Shortages of tradespersons are occurring across all the electrotechnology industry sectors, demand exceeding the available supply of skilled labour particularly in the voice and data communication area. The issue of availability of a sufficient number of qualified tradespersons is compounded by the ongoing need for the development of new technological skills reflecting rapid technological change and the identified shifting skill sets.

Critical emerging issues are:

- How to attract more people into electrotechnology trades training
- How to gain greater commitment from employers to increase investment in training and to reduce attrition rates during training
- How to promote relevant and flexible training and facilitate responsive pathways to improve the skills base of existing electrotechnology tradespersons, to decrease occupational wastage and meet rapidly changing needs for new technological skills
- How to facilitate cross-industry and/or alternative pathways for those entering or re-entering the industry to:
- How to satisfy the changing demands for different skill sets in response to current and projected needs of the Australian economy and
- How to cater for the needs of an increasing number of older entrants to training in electrotechnology.

Employer Perspective

Mr Simon Gerard, the Chair of the Electrotechnology Working Group and National Marketing Manager of Gerard Industries, presented members of the Working Group with an employer perspective on these issues as they impact on enterprises in the industry.

The points he highlighted can be summarised as follows:

- The current rate of ongoing technological change in the industry is very high and is expected to increase
- New technology means that the industry is no longer a 'smokestack industry' and there is a need to promote a new image
- The nature of the industry is altering from using passive or static technology to working with 'smart' technology such as home automation and the integration of systems including data
- It is important to obtain economic value from the new technology and this requires new skills across the industry
- Short product cycles now mean that updating skills is of critical importance to the workplace and to the workforce
- Retraining the existing workforce in the industry is very important as is the need to identify and respond to demands for new skill sets.

SECTION 1

Research Method

The aim of this Report is to identify current and projected skill shortages in the electrotechnology industry, to consider critical issues and reasons for identified shortages and to provide recommendations and strategies as solutions to key issues.

Recognition by the Commonwealth Government that skill shortages in traditional trades represent a barrier to achieving an appropriate skill base to meet Australian industry needs for the 21st Century led to three research questions:

1. Are industry-specific skill shortages occurring and is there a market demand for new skill sets?
2. What are the critical issues and barriers to satisfying market needs?
3. What can be done to resolve identified critical issues and to break down barriers?

The Report examines these questions with reference to a number of sources of evidence. The Working Group for Electrotechnology was provided with:

- Research, statistics and data on current skills training and on unmet employer needs relevant to trades in general and to the electrotechnology industry in particular.
- Discussion and position papers submitted by external organisations providing different perspectives on emerging issues related to skill shortages and presenting recommendations and strategies in response.
- The results of a telephone survey of 95 employers of electrical and communications contractors to confirm current employer issues to do with skills needs and shortages.
- A summary of the outcomes of focus group meetings held to identify current attitudes of employers in electrotechnology and to discuss possible strategic responses

Research

A number of papers were commissioned from external organisations on the issue of skill shortages in the electrotechnology industry. Discussion papers were submitted by the: Australian Chamber of Commerce and Industry (ACCI); Australian Industry Group (AiG); the Australian National Training Authority (ANTA); Commonwealth Department of Employment, Workplace Relations and Small Business (DEWRSB); Commonwealth Department of Education, Training and Youth Affairs (DETYA) and by the National Centre for Vocational Education and Research (NCVER). (see *References*)

Research papers and data submitted by NCVER and by the Labour Market Policy Group, DEWRSB, presented quantitative data, statistics and comment on current trends in employment and training in the trades in general and in electrotechnology in particular. (*Attachments 2, 3*)

A telephone survey was commissioned by the Working Group and conducted through the National Electrical and Communications Association (NECA). The survey contacted 95 employers and contractors in the industry who were asked to identify areas of skill shortage and the industry sectors currently experiencing these shortages. (See *Attachment 4*) NECA also conducted two focus group meetings to identify industry attitudes to emerging issues and discuss possible responses with employer representatives. (See *Attachment 5*)

Data Analysis

The Terms of Reference of the Electrotechnology Working Group and the research questions identified for this Report guided the selection of both the data summarised in the next section and the key issues on which the recommendations and the proposed strategies are based.

The following principles guided the data analysis and findings of this Report:

- To identify what new skill set needs and which skill shortages are occurring in the electrotechnology industry requires looking at employment and growth figures for the electrotechnology trades areas, including projections and forecasts, and identifying which skills and skill sets are in demand and how far these skills are available, both currently and in the future.
- To understand critical issues and barriers and their impact on the supply of skills in the medium to long term, it is necessary to evaluate current training pathways and to identify unnecessary impediments to streamlined and responsive training provision. It is also necessary to consider the impact of changing characteristics, such as the age of the current workforce, in order to identify effective strategic responses to key issues relating to training and employment in the industry.
- To make appropriate recommendations and to propose and implement effective strategies requires wide consultation with relevant stakeholders including industry associations and employers, training and government personnel and employee representatives.

SECTION 2

Market Demand and Supply of Skills- Statistics and Trends

This section summarises relevant content of two research papers into current and projected demand for skills in the electrotechnology industry and issues related to the supply of these skills. It also presents qualitative findings on reported employer experience of skill shortages and attitudes to identified issues gathered through conducting a telephone survey and focus groups meetings.

Data and findings are presented in the context of the following question:

"Are industry-specific skill shortages occurring and is there a market demand for new skill sets?"

Research papers providing data and statistics on supply and demand in the electrotechnology trades were submitted by the Labour Market Policy Group of the Department of Employment, Workplace Relations and Small Business (DEWRSB) and by the National Centre for Vocational Education and Research (NCVER).

Paper 1. Skill Shortages in the Trades – an Employment Perspective

(Paper provided by the Labour Market Policy Group DEWRSB, *Attachment 3*)

The paper made the following points:

The Demand for Skills in the Trades

- Employment rates in Australia have grown steadily and the unemployment rate has declined to around the lowest level in a decade. Further employment growth can be expected in the period ahead
- Shortages of a broad range of trades skills are evident
- There is a high rate of occupational wastage. This occurs both in the workforce when qualified workers leave their trade and during training when high rates of attrition mean that one third of apprentices do not complete their training.

The electrotechnology context

Recent and extensive structural change and strong employment growth particularly in the electrotechnology industry sectors are seen to have resulted in alternative, often more rewarding, career paths becoming available for electrotechnology tradespersons.

High attrition rates during training along with rapid technological change indicate a need to evaluate traditional training pathways and examine flexible alternatives for the industry.

The Supply of Skills in the Trades

- It is recognised that historically apprentice intake is directly affected by fluctuations in economic conditions, with the number of commencements falling during periods of economic downturn and rising during periods of economic growth. The reduced supply of completing apprentices a few years later often coincides with economic recovery and stronger demand for skilled tradespersons thus contributing to skill shortages in the trades (DEETYA, 1997, p.3). The Australian labour market has strengthened considerably in recent years with a steady growth in employment. However, apprenticeship commencements in metal trades, electrical and electronics trades and vehicle trades have remained close to the low levels recorded in the early 1990s recession, and well below the levels achieved in the late 1980s. (DEETYA, 1997, p.9)

The electrotechnology context

Tradespersons working in electrotechnology are experiencing a change in the pattern of work due partly to broad structural changes in the economy as well as industry-specific developments including the shift to contracting out and reforms to the public sector organisations (rationalisation, sales and closures). Such changes have effectively reduced the supply of electrotechnology tradespersons available and also have influenced the rate of apprentice intake in the industry.

- In considering the issue of skill shortages and the unemployed, the point was made that "for some occupations, including the trades, factors such as outmoded skills can limit the competitiveness of formally qualified job seekers". (DEWRSB, 1999, p.4)

The electrotechnology context

Employment and training in the electrotechnology trades in particular must respond to rapidly changing technology and consequent market demands for different skill sets.

The paper made the following suggestions to address issues of skill shortages in the trades:

1. Obtain more extensive information on reasons for skill shortages, including the importance of geographical spread, to improve understanding of all relevant issues
2. Encourage take-up by employers of opportunities for more innovative and flexible access to training, use of skills and remuneration arrangements within enterprises which are available following such government initiatives as enterprise agreements
3. Focus expansion of New Apprenticeships on training for relevant trades in growth sectors
4. Implement strategies to improve the image of trades and New Apprenticeships and to ensure that applicants enter the trades with an awareness of the relevant industry, knowledge of training requirements and appropriate aptitude. Pre-vocational courses and VET in schools can assist in this regard.
5. Utilise the supply from overseas of skills in demand. The 1999-2000 Migration Programme has increased somewhat from previous years and has maintained a strong emphasis on skills.

The Electrotechnology Working Group endorses the need for further research and recommends a marketing strategy with a focus on the electrotechnology industry as a sector experiencing considerable growth in order to:

- improve the image of a career in electrotechnology,
- encourage employers to invest in training and
- promote flexible pathways and school-to-VET initiatives to increase the number of entrants and the rate of retention in New Apprenticeships in the industry.

Paper 2 Evidence of Skill Shortages in the Electrotechnology Trades

This paper was produced by the National Centre for Vocational Education and Research (NCVER) for the Electrotechnology Working Group in early 2000. (*Attachment 2*). The paper provides statistics and data specifically relevant to skill shortages in the electrotechnology industry.

The paper also compares employment levels and new apprenticeship patterns and trends in the electrotechnology trades with similar figures for trades overall. Data specific to the electrotechnology sector include particular areas of skill shortages, market demands for new skill sets, patterns of wastage and attrition in the industry, training commencement and completion rates and trends and projected employment and skilled vacancy levels compared to projected skills supply. Content is summarised on the following pages.

The Demand for Skills in the Electrotechnology Trades

- Electrotechnology trades are the third largest area of employment in Australia's trades workforce (behind the building and construction and metal trades).
- Electrotechnology trades employment grew by an average of 1.3% per year over the past decade (to August 1999). This growth has been stronger than for employment growth in the trades generally.
- Total employment for tradespersons in the electrotechnology industry is projected to grow at an even faster rate over the next few years (ie by 2.5% per year) (See *Table 2*).
- The projected growth is different across the different skilled trades within the electrotechnology industry. The communications tradespersons occupation category has the highest forecast annual growth rate of 5.4%.
- In the context of current training activity in the electrotechnology industry, these patterns are consistent with the necessary preconditions for increased skills shortages in the electrotechnology trades.

Table 2

Electrotechnology Trade Occupations Employment Forecasts

Trades occupation		Average annual growth 97/98 – 00/01 (% pa)	Total employment 1997/98 ('000)	Total employment 2000/01 ('000)	Share of total employment 1997/98 (%)	Share of total employment 2000/01 (%)
3123	Electrical engineering associate professionals	0.9	8.2	8.4	0.1	0.1
4311	Electricians	2.4	99.2	106.3	1.2	1.2
4312	Refrigeration & airconditioning mechanics	2.2	13.0	13.9	0.2	0.2
4313	Electrical distribution tradespersons	-0.6	7.4	7.2	0.1	0.1
4314	Electronic instrument tradespersons	0.8	0.6	0.6	0.0	0.0
4315	Electronic & office equipment tradespersons	0.9	27.0	27.7	0.3	0.3
4316	Communications tradespersons	5.4	31.2	36.5	0.4	0.4
	Subtotal	2.5	186.6	200.6	2.3	2.3

Source: Murphy, Chris & Douglas, Justin 1998, The Outlook for Jobs, *NCVER*

The Supply of Skills in the Electrotechnology Trades

Information for this section was provided with reference to four different sources of skills in the industry:

(i) Skills of the existing trades workforce

- Some 70% of the skilled trades workforce in the electrotechnology trades have post-school qualifications. The average for the whole Australian workforce is below 50%.
- The incidence of vocational qualifications in the electrotechnology trades workforce is very high (60%), compared with fewer than 20% of the national workforce having a vocational qualification.
- Issues affecting the supply of skills in the existing trades workforce include a high rate of skills wastage due to qualified workers leaving the workforce and a high rate of non-completion of New Apprenticeships.

(ii) New Apprentices entering training

- Overall the proportion of the total skilled trades workforce in New Apprenticeships in the electrotechnology trades is just over 9% (9.3%). This average is lower than for all skilled trades in Australia where almost 12% of the skilled trades workforce, on average, is made up of those in New Apprenticeships (see *Table 3*).
- Over 90% of all those in a contract of training in electrotechnology occupations as at December 1998 were following traditional apprenticeship pathways leading to a Certificate III qualification.
- The number in training in the newer high technology areas are as low as 1% and 1.6% in the skilled occupations of communications tradespersons and electronic and office equipment tradespersons respectively. (See *Table 3*). These are very low rates. These sectors, which employ some one third of the total skilled trades workforce in the electrotechnology occupations, require specific attention if the penetration of skilled trades training is to be raised in the electrotechnology sector as a whole in Australia.

Table 3

Electrotechnology New Apprenticeships, 31 December 1998

		No. of new apprentices (no)	Proportion of total new apprentices (%)	New apprentices as a proportion of total skilled trades workforce (%)
3123	Electrical engineering associate professionals	64	0.4	7.1
3124	Electronic engineering technicians	2	-	-
4311	Electricians	11181	63.0	11.3
4312	Refrigeration & airconditioning mechanics	1725	9.7	13.3
4313	Electrical distribution tradepersons	399	2.2	5.4
4314	Electronic instrument tradesperson	281	1.6	46.8
4315	Electronic & office equipment tradespersons	438	2.5	1.6
4316	Communications tradespersons	315	1.8	1.0
Other	electrical & electronic new apprentices	2801	15.8	15.4
	Total	17746	100.0	9.3

Source: NCVER unpublished apprentice and trainee data

- There has been a marginal decline in the proportion of New Apprentice commencements aged 15-19. At the same time, the numbers of commencing apprentices and trainees has grown across all age groups since 1995. (See *Table 4*).The number of 15-19 year olds commencing in a contract of training in the electrotechnology trades is now growing by over 5% peryear. Growth in commencements by those aged 20 –24 is even stronger, being over 10% in the year 1997 to 1998.

Table 4

The Age of New Apprentices in the Electrotechnology Trades (a)

Age of apprentices and trainees	Proportion of total apprentices and trainees		Average annual growth rates	
	1995 (%)	1998(%)	1995-1997(%)	1997-1998(%)
No of Commencements				
15 – 19 year olds	68.3	66.0	0.2	5.5
20 – 24 year olds	22.0	22.7	1.6	10.2
25 years or more	9.7	11.3	10.6	5.6
All ages	100.0	100.0	1.4	6.6
Total No in Training				
15 – 19 year olds	28.8	28.9	3.3	4.3
20 – 24 year olds	59.3	57.6	2.5	2.9
25 years or more	11.9	13.5	10.5	4.1
All ages	100.0	100.0	3.7	3.4

(a) *excludes electrical and telecommunications trades assistants*

Source NCVER unpublished apprentice and trainee data

(iii) Skills training undertaken through other pathways

- Contracts of training as traineeships were more frequent in non-traditional trade occupations such as electrical engineering associate professional, electrical engineering technicians, electronic and office equipment tradespersons and communications tradespersons. Traineeships in these areas commonly led to Certificate IV/advanced diploma and diploma levels in the first two categories, while the other traineeships were at Certificate II and III

- Throughout 1998 there were some 25,000 enrolments in vocational education and training programs for electrotechnology skills that were not contracted training or New Apprenticeships, compared to the less than 18,000 New Apprentices in training by the end of 1998. (It should be noted that this data is based on occupation codes assigned to courses to indicate the most likely occupation that the course is relevant to. Therefore this can be seen as only a rough estimate of the amount of non-apprentice and non-trainee VET activity relevant to the electrotechnology trade occupations – regardless of whether or not this training is actually utilised in these occupations)
- Clearly this non-apprentice training activity represents a wide range of training pathways, from advanced technical courses leading to high level qualifications through to persons already employed in the industry upgrading their skills through enrolment in one or more modules

(iv) Skilled migration

- Net migration is an insignificant source of skills for the electrotechnology trades in Australia with entry of between 400 and 600 skilled electrotechnology tradespersons from overseas per year (compared to a total skilled trades workforce in electrotechnology in Australia of nearly 200,000)
- Rapidly burgeoning global demand for the electrotechnology skills means that migration is likely to remain an insignificant source of such skills for Australia in the future

Training Commencements and the Demand for Skills

- The number of commencements in electrotechnology New Apprenticeships has grown by an average of 3.2% per year since 1995. In 1997-1998 there was a very strong growth of 6.6%.This compares favourably with the net growth in employment, which has averaged 1.3% in the last decade and is forecast to grow by 2.5% in the coming years.
- However the NCVER data suggest that problems relating to insufficient numbers entering skilled trades training relate to particular occupations within the electrotechnology trades, rather than being an across-the-board problem. As related elsewhere, electronic and office equipment and communications tradespersons are sectors that may warrant particular consideration in this regard.
- There is a very low level of New Apprenticeships in schools in relation to the electrotechnology trades. Clearly this is an area for consideration when implementing strategies to boost the uptake of New Apprenticeships in electrotechnology by younger people.

- The majority of non-apprenticeship enrolments in training for electrotechnology skills (57%) were in courses at the Certificate III level or higher.
- NCVER suggests that enrolment figures in non-apprenticeship pathways indicate that alternative training pathways need to be given as much priority as New Apprenticeship pathways in any overall skill formation policies for the electrotechnology trades.

Training Completions, Current Workforce Skills Levels and the Demand for Skills

- Although records of apprentice and trainee completions in the 1990s demonstrate a reasonably healthy rate of completion, the reported number of completions of around 3,500 per year is not sufficient to supply all of the projected growth in employment in electrotechnology of 2.5% per year – a growth of around 5,000 trades jobs per year.
- There was a strong growth of 11.9% per year in completions recorded in the mid 1990s. However the growth in the rate of completions reversed in 1997-1998, the growth rate for that year being –1.7%. This is seen as a most disturbing trend that will require more specific consideration.
- The adequate supply of skills to fuel growth in the industries is also dependent on the rate of occupational wastage in the industry, ie the extent to which qualified and skilled tradespersons leave their employment in their skilled trade. A considerable proportion of qualified electrotechnology tradespersons leave trade employment for non-trade employment.

Analysis of the 1996 Census data shows for those with electrotechnology trade qualifications:

- 42% were working in an electrotechnology trades occupation;
- 35% were working in a non-trade occupation;
- 4% were unemployed; and
- 17% were not in the labour force (includes those who retire).

- There is some potential to lower net wastage rates from electrotechnology trades as 54% who have left say they would consider returning with improved pay and career prospects. This figure is significantly higher than the 46% from other trades who say they could be induced to return to their trade.

Employer Experience of Issues of Skill Shortages and Skill Supply in the Electrical and Electronic Trades

- To date the combination of commencements and completions in New Apprenticeships and the significant set of non-apprenticeship training pathways have been sufficient to keep up with overall employment growth in the electrotechnology trades areas.
- However reported vacancies in the skilled electrotechnology trades are expanding rapidly, at a rate far outstripping the actual employment of skilled tradespersons in the industry.
- DEWRSB's recent assessment (of the period September to October 1999) of skill shortages in the trades shows that shortages of two of the electrotechnology trades are currently widespread in Australia. These trades are electricians and refrigeration and airconditioning mechanics. DEWRSB assessments by state and territory are outlined in *Table 5*.

Table 5

Electrical Trades Skill Shortages by State and Territory (a)

Tradespersons	NSW	VIC	QLD	SA	WA	TAS	NT	National
Electricians	S		S	R		S		
Refrigeration/ airconditioning mechanics	S	S	S	S	ss	S		N

S = Statewide R = Regional ss = Seasonal N = National

(a) *As assessed by DEWRSB*

Source: NCVER, 1999, p.22

- Preconditions for skill shortages are clearly emerging as critical in some areas as employment and vacancy rates grow. This is particularly the case in some rapidly expanding areas of high technology such as in the electronics and voice and data communications industries.

Qualitative Research

Qualitative data provided to the Electrotechnology Working Group demonstrates that employers are already experiencing considerable skill shortages in a range of electrotechnology trades. Evidence is as follows:

1. The National Electrical and Communications Association (NECA) carried out a telephone survey of its members in December 1999/ January 2000. A sample of 95 member companies were asked whether or not they were involved in particular sectors and, if so, whether they were experiencing skill shortages in those sectors. (*Attachment 4*)

   As shown in *Table 6*, electrical contractors are reporting skill shortages far outstripping situations of skills being in balance or in oversupply across all sectors of work. Electrical and electronics work in major projects can be seen as an exception. In all other sectors at least 70 % of companies are currently experiencing at least some shortages in electrical and electronics skills.

Table 6

Electrical Contracting Companies Experiencing Skills Shortages, December 1999 – January 2000

		Of those companies involved in the sector proportion reporting			
Sector	**Proportion of companies reporting involvement in the sector (%)**	**Is a shortage (%)**	**Supply = demand (%)**	**Is an over supply (%)**	**Total (%)**
Major commercial contractor work	61.0	70.7	19.0	10.3	100.0
Industrial work	76.8	79.5	17.8	2.7	100.0
Domestic household work	55.8	77.3	18.9	3.8	100.0
Voice and data communications work	42.1	72.5	22.5	5.0	100.0
Building, construction and other low voltage specialists	36.8	82.9	17.0	0	100.0
Resource projects	24.2	56.5	39.1	4.4	100.0

Source: NECA survey of Electrical and Communications Contractors

2. Two focus group meetings with representative employers were conducted by NECA to discuss identified issues and to explore strategic responses. (*Attachment 5*). Findings confirmed that employers were experiencing skill shortages and a number of attitudinal barriers to improving current skill levels were identified, including:
   - An employer perception that it was difficult to invest in training because of economic cycles and the nature of contracting work
   - A perception that entrants to training did not have prerequisite skills, knowledge and aptitude
   - A lack of understanding of current and flexible New Apprenticeship arrangements
   - A belief that career and training pathways currently available in the industry were inappropriate, resulting in occupational wastage and attrition during training.

Discussions of identified issues at these focus group meetings endorsed the need for industry-led initiatives to overcome these barriers.

Summary

Key factors indicating that there are current and projected industry-specific skill shortages in the electrotechnology trades and that there is a market demand for new skill sets are as follows:

- Employment in the electrotechnology trades is forecast to grow at a faster rate than in the past and at a faster rate than for many other trades.
- Overall less than 10% of the electrotechnology workforce is made up of New Apprentices in training despite the projected increased demand for skills in these trades.
- Despite recognition that the industry must respond to rapidly changing technology, there are very low levels of New Apprentice training in some key high technology areas. High growth areas such as electronics and voice and data communications trades currently have less than 2% of the workforce in New Apprenticeships.
- There was a disturbing stagnation in the growth of New Apprenticeship completions during 1998.
- Migration as a source of skills for these trades has severe limitations of because of high levels of global demand for electrotechnology skills.
- Research data and statistics and recent employer reports of increased skill shortages indicate that market demand for traditional trades and for new skill sets are not being met.

SECTION 3

This section summarises findings and key issues with reference to the second research question:

"What are the critical issues and barriers to satisfying market needs?"

Summary

Critical issues and barriers impacting on skill shortages in the electrotechnology trades are summarised as follows:

1. The demand for skills is high and employment growth is projected to increase to 2.5% per year over the next few years. The communications tradespersons occupation category has the highest forecast annual growth rate of 5.4%
2. The supply of skills to meet growing demand is potentially inadequate as:
   - The proportion of the total skilled trades workforce in training in the electrotechnology industry is just over 9%. This is lower than the 12% average current for the whole skilled trades workforce in Australia,
   - The attrition rate for those in new apprenticeships in the electrotechnology trades is high. Only 68% of commencements currently complete training,
   - The number in training in the newer high technology areas are as low as 1% in the skilled occupation of communications tradesperson and 1.6% for electronic and office equipment tradespersons, and
   - A considerable number of qualified electrotechnology tradespersons leave trade employment for non-trade employment

3. There is a growing market demand for new skill sets and it is projected that the demand will not be met. Evidence includes:

   - Very low training commencements for new high technology trades such as voice and data communications and electronics as a proportion of the existing workforce. These areas have a high projected employment growth rate.
   - Large numbers of people undertaking training for Certificate IV and higher as non-apprenticeship training pathways. Data demonstrates that in 1998 there were 25,000 people undertaking non-apprenticeship training compared to 18,000 in contracts of training and new apprenticeships

4. The current rates of employer investment in training is negatively affected by two principal factors:

   - The apprenticeship training period lasts longer than the business economic cycle. This means that outcomes of a four year investment in training are not always relevant in a changed economic context nor appropriate to changes in required technological skills.
   - Employers experience high costs during the first half of the training period. By the third or fourth year when returns on training investment should be evident, more than one-third of apprentices have dropped out.

5. There is evidence that people are acquiring skills for a career in the electrotechnology industry through non-apprenticeship pathways. Factors contributing to this might include:

   - The electrotechnology industry has maintained a traditional trades training level at AQF 3. It is seen that the development of shorter training pathways permitting trades training outcomes at the Certificate II or lower level is not possible in an industry concerned with regulatory and licensing outcomes.
   - The electrotechnology industry commitment to a traditional trades training level at AQF 3 is supported by a finding by the Australian National Training Authority (ANTA) that there is a growing imbalance between rapidly increasing numbers of lower skill level outcomes and compared to low growth in higher level skill outcomes in vocational education and training.
   - However, it could also be an issue that skills training for the electrotechnology trades may have become too prescriptive, resulting in widespread enrolment in non-apprenticeship training pathways.

SECTION 4

The findings summarised above demonstrate that the electrotechnology industry is experiencing:

- skill shortages that are projected to increase with a high rate of employment growth particularly in the new technology electronics and voice and data communications trades
- a growing market demand for new skill sets in response to rapid and ongoing technological developments and the changing nature of work
- an inadequate uptake of New Apprenticeships in electrotechnology as employer investment in structured training remains low and there is a high rate of attrition among apprentices,

This section provides recommendations in response to the third research question:

"What can be done to resolve identified critical issues and to break down barriers?"

Recommendations

The supply of skilled tradespersons in electrotechnology does not meet current market demand and projected figures on employment growth indicate that the issue is critical. To improve the supply of skills in the industry the following objectives relating to trades training have been identified:

Objective 1

Increase the numbers of commencements: There is a need to increase both opportunities available for New Apprenticeships and the number of entrants to contracts of training.

Objective 2

Increase the numbers of completions: The numbers of New Apprentices completing structured training is dependent on the numbers of commencements and the rate of attrition. There is a high rate of attrition during training in the electrotechnology trades. Statistics show that approximately one-third of those commencing contracts of training do not complete their training. It is a critical issue for the industry that the number of completions is currently 3,500 annually while the projected employment growth of 2.5% per year means a market demand for 5,000 new tradespersons each year.

The electrotechnology industry recognises the need for an industry-wide response to these critical issues relating to the demand and supply of skilled tradespersons. This section outlines goals related to the objectives and proposes strategies for implementation as endorsed by industry following wide consultation with key stakeholders.

Recommendations are made under four Focus Areas for Action. These are:

1. Increased marketing and promotion
2. More flexible and alternative training pathways
3. Evaluation of regulatory, legislative or systemic barriers to New Apprenticeships
4. A streamlined response to demand for new skill sets

Each Focus Area for Action identifies relevant goals and presents a rationale for the specific area for action. Strategies to achieve the goals are proposed for each Area for Action. An outline of an Action Plan for each strategy is provided as a suggested framework to guide implementation activities.

Focus Area For Action

Focus Area	Goal
Increased Marketing and Promotion	A. Increase the number of applicants for entry into New Apprenticeships in electrotechnology B. Improve the level of commitment of employers to investment in training in order to increase the number of opportunities for New Apprenticeships in electrotechnology
More Flexible and Alternative Training Pathways	A. Identify the impact of current training pathways on entry, attrition and completion rates in New Apprenticeships in electrotechnology B. Develop and pilot flexible, alternative pathways to better meet the needs of trainees, employers and the market
Evaluation of Regulatory, Legislative or Systemic Barriers to New Apprenticeships	A. Identify and address barriers to undertaking or completing training due to regulatory or legislative arrangements B. Identify and address systemic impediments impacting on retention rates during training
A Streamlined Response to Demand for New Skill Sets	A. Establish mechanisms and effective data management processes to support industry in identifying and facilitating New Apprenticeships in new technology areas according to market needs B. Promote the uptake of New Apprenticeships in communications and new technology areas

The recommended strategies or action agenda to achieve these goals will facilitate:

- **A short-term solution** to identified skill shortages by promoting a growth in the numbers of commencements and completions of trades training in electrotechnology
- **Medium to long-term solutions** by increasing the supply of skilled workers through:
  - Removing identified barriers to completion of training represented by unnecessary regulatory impediments
  - Creating responsive training pathways

The electrotechnology industry endorses the findings and actions recommended in this Report. The industry is committed to implement strategies to address the issue of skill shortages in the electrotechnology trades by promoting specific industry initiatives, supporting Government initiatives and participating in joint industry/ Government responses.

Focus Area for Action 1
Increased Marketing and Promotion

Goals

A. Increase the number of applicants for entry into New Apprenticeships in electrotechnology

B. Improve the level of commitment of employers to investment in training in order to increase the number of opportunities for New Apprenticeships in electrotechnology

Rationale

Available evidence shows that while seemingly sufficient numbers of people are entering New Apprenticeships in electrotechnology to meet the net demand, in terms of projected employment growth for skilled tradespersons in the industry, these are not sufficient numbers to either:

a) Offset the attrition that occurs throughout the New Apprenticeship period; or

b) Enable an increase in the proportion of the total workforce with appropriate trades qualifications for projected medium- and long-term market demand.

Current figures show that there are more applicants for training than there are New Apprentice opportunities being made available by employers. Reasons could include:

- lack of employer awareness of recent developments in industry training or support mechanisms and
- issues such as the discrepancy between industry planning cycles and the four-year apprenticeship.

It is important that employer investment in structured training and the number of New Apprenticeships available increases to ensure a long-term growth in the existing qualifications level of the skilled trades workforce.

A solution to these issues is to increase the intake to structured trades training by:

(i) marketing a career in electrotechnology to both young people and more mature entrants who may be seeking a career change to improve the uptake of New Apprenticeships in the electrotechnology trades

(ii) promoting the benefits of investment in training to employers and industry to increase the number of opportunities made available for those seeking New Apprenticeships in the industry

Recommended Strategies

There are two strategies recommended for implementation to achieve the goals for this Focus Area for Action:

1.1 Develop a promotional and marketing campaign aimed at increasing the number of people seeking to commence entry level training in the electrotechnology trades

1.2 Develop a promotional and marketing campaign aimed at employers of electrotechnology tradespersons to increase the number of New Apprentice opportunities.

Focus Area for Action 2
More Flexible and Alternative Training Pathways

Goals

A. Identify the impact of current training pathways on entry, attrition and completion rates in New Apprenticeships in electrotechnology

B. Develop and pilot flexible, alternative pathways to better meet the needs of trainees, employers and the market

Rationale

Training pathways in electrotechnology must be responsive to:

- changing demographics in Australia leading to an increase in numbers of more mature New Apprentices (currently 11% of all commencements in electrotechnology are aged over 25)
- rapidly developing technology in the industry leading to a growing need for continuous reskilling and upskilling of the current workforce
- a focus on training pathways facilitating schools to VET transition and articulation to tertiary training
- short business economic and planning cycles resulting in employer difficulty with four-year commitment to apprenticeship training

Current training pathways in electrotechnology could represent barriers to improved entry, retention and completion rates of trades training when:

- Available training pathways are identified as not sufficiently responsive to specific trainee, employer or market needs
- Entry points and training arrangements are not flexible enough to facilitate entry and re-entry for those seeking a career change for upskilling in specific skills areas or mature-age entrants

To identify and overcome barriers arising from existing training pathways, it is necessary to:

(i) Survey trainees and employers and research market statistics to identify needs and requirements that might not be met through current training pathways in electrotechnology

(ii) Develop and pilot alternative pathways aimed at increasing levels of commencements, retention and completions of New Apprenticeships in the industry

(iii) Conduct research targetting entrants into New Apprenticeships in the electrotechnology trades who are over 25 years old to examine why and how these mature age apprenticeships are facilitated.

Recommended Strategies

There are two strategies recommended for implementation to achieve the goals for this Focus Area for Action:

2.1 Identify, develop and pilot flexible and alternative training pathways as a means of increasing the commencement, retention and completion rates for those in training in electrotechnology

2.2 Identify, develop and pilot appropriate alternative pathways and promote effective training arrangements for mature-age New Apprentices entering or currently in training

Focus Area for Action 3
Evaluation of Regulatory, Legislative or Systemic Barriers to New Apprenticeships in Electrotechnology

Goals

A. Identify and address barriers to undertaking or completing training due to regulatory or legislative arrangements

B. Identify and address systemic impediments impacting on retention rates during training

Rationale

Stringent legislative and licensing requirements in the electrotechnology trades have resulted in perceived concepts such as time-based training and assessment issues that can represent barriers to employers or to potential entrants who need more flexible arrangements to complete their training.

Similarly, State-based regulatory systems and vocational training arrangements mean that, although national in concept, those involved in training for qualifications in the Electrotechnology Training Package must respond to up to eight different system requirements for implementation.

Qualitative and anecdotal evidence demonstrates that high attrition rates during training may be due to perceived barriers of inappropriate aptitude or skills of New Apprentices and/or negative attitudes of employers to investment in training. A systemic response to provide increased support and advice for both employers and apprentices during training could overcome this barrier.

This strategy aims to improve retention rates through monitoring existing support services and identifying possible new schemes to provide assistance and advice for employers and apprentices involved in contracts of training.

To identify and overcome barriers due to regulatory, legislative or systemic arrangements, it is necessary to:

(i) Evaluate the extent to which industry licensing regulations and/or state legislative requirements represent barriers to entry or completion of training in electrotechnology trades

(ii) Monitor the effectiveness of existing arrangements providing support and assistance to employers and trainees

(iii) Identify and initiate legislative, regulatory and systemic changes to facilitate entry and re-entry and improve retention in electrotechnology trades training

Recommended Strategy

There is one strategy recommended for implementation to achieve the goals for this Focus Area for Action:

3.1 Identify and implement a national industry initiative in response to identified legislative, regulatory and systemic barriers to entry and retention in electrotechnology trades training.

Focus Area for Action 4
A Streamlined Response to Demands for New Skill Sets

Goals

A. Establish mechanisms and effective data management processes to support industry in identifying and facilitating New Apprenticeships in new technology areas according to market needs

B. Promote the uptake of New Apprenticeships in communications and new technology areas

Rationale

Overall New Apprentices make up 12% of the total skilled trades workforce in Australia. As noted elsewhere, the proportion of New Apprentices in electrotechnology is lower than average, currently only 9.3% of the skilled workforce.

At the same time, the electrotechnology sector in particular is experiencing rapid development of new technology resulting in ongoing market demands for new skill sets.

It is a priority issue to promote and facilitate training for new technology skills and in response to market demand for new skill sets in the electrotechnology industry. An approach to this issue would involve:

(i) Monitoring current and projected business needs through effective data management to identify present and emerging new technology skill requirements.

(ii) Identifying and implementing an appropriate industry/Government response to increase the uptake of contracts of training in the new technology area.

An example of a new technology area currently requiring investigation and industry monitoring is the communications trades. This area currently employs 36,500 people with only 1% (315 in December 1998) being made up of New Apprentices in the communications trades. The fact that this outstandingly low proportion of New Apprentices to numbers in the skilled workforce is occurring in a high technology area with a current annual employment growth of 5.4%, the highest in all the electrotechnology trades, could be a critical issue requiring response.

An investigation of New Apprenticeships in the communications trades can represent a case study for the implementation of the recommended strategies to achieve the goals for this Focus Area of Action.

Recommended Strategies

There are two strategies recommended for implementation to achieve the goals for this Focus Area for Action:

4.1 Co-ordinate relevant industry research to ensure regular updates on changing needs for structured training in electrotechnology and market demand in new technology areas

4.2 Investigate actual and emerging needs for communications tradespersons and implement an appropriate response

ACTION PLANS

Suggested Framework for Implementation of Strategies recommended by the Electrotechnology Working Group

Strategy 1.1

Develop a promotional and marketing campaign aimed at increasing the number of people seeking to commence entry level training in the electrotechnology trades.

Strategy 1.1

Target	Action	Responsibility	Indicator
Attitudinal barriers to entry into New Apprenticeships in electrotechnology identified	1. Conduct research into possible attitudinal barriers to entry into New Apprenticeships in electrotechnology, including: ■ Negative community attitude to an apprenticeship career ■ Poor attitude to/awareness of a career in electrotechnology ■ Lack of knowledge of electrotechnology training pathways, articulation and New Apprenticeship mechanisms ■ Effectiveness of industry/ Government/training organisation role in facilitating and promoting entry into the industry	Joint industry/ Government initiative managed by Working Group and specialists in the field	Survey and research results indicate areas and priorities for promotional and marketing campaign
Promotional strategies to overcome identified attitudinal barriers implemented	1. Conduct promotional campaigns, information sessions and workshops with a range of community and school representatives, young people, parents and peers, older people seeking a career change and employers to ensure that stakeholders have the knowledge and awareness to advocate the benefits of training for a career in electrotechnology 2. Implement a communication strategy to ensure industry/ government/training organisation stakeholders understand the importance of improving the skill levels in the industry and their role in promoting and facilitating entry into training for a career in electrotechnology	Industry with Working Group setting performance measures Industry/Government specialists to develop. Working Group to disseminate NUEITAB, State/ Territory ITAB Network	Followup survey indicates increased knowledge and awareness Evidence of co-ordinated action by stakeholders to facilitate entry into training in the industry and flexible training pathways

Strategy 1.1 (continued)

Target	Action	Responsibility	Indicator
Communication and marketing strategies target a range of appropriate potential entrants	1. Promote a career in the electrotechnology industry to young people as an attractive choice which offers: ■ A career at the cutting edge of new technology in Australia rather than "just an apprenticeship" ■ Relatively high wages and excellent career opportunities in these trades, prospects for self-employment and desirable lifestyle options ■ A career pathway which compares favourably with many careers available from commonly perceived better options such as the conventional university pathway	Government as part of generic program. Industry to targetted groups, careers nights, schools etc NUEITAB, State/ Territory ITAB Network	Increase in enquiries and applications for New Apprenticeship opportunities
	2. Develop a new set of careers information, complementing the Government-developed website, for careers teachers, parents, peers and the media. The information will specifically cover the main electrical and electronics trades with different material for careers information in each trade area, especially: ■ electricians (99,200 currently employed) ■ communications tradespersons (31,200 employed) ■ electronic and office equipment tradespersons (27,700 employed) ■ refrigeration and air conditioning mechanics (13,000 employed)	Industry using NUEITAB networks and resources Industry site linked to DETYA, NACs and NUEITAB sites Industry DEWRSB	Number of information kits distributed in a range of venues
	3. Establish a hotline and/or interactive website to provide information about New Apprenticeships in these trades and to refer young people to other services such as New Apprenticeship Centres (NACs)		Number of visits and calls made, increase in enquiries at NACs
	4. Provide careers information packages, seminars etc for registered training providers, NACs and other relevant institutions to use to promote a career in electrotechnology to clients.		Number of information packs distributed to a range of venues

Strategy 1.1 (continued)

Target	Action	Responsibility	Indicator
Training pathways and support mechanisms ensure that skills supply meets market demand	1. Use findings of research into barriers to entry into New Apprenticeships to identify possible areas for change in existing training pathways and support mechanisms 2. Co-ordinate with industry/training representatives to ensure that changes introduced to training pathways and support mechanisms are informed by research findings	Industry committee of employers, unions, NUEITAB, regulators and State Training Authorities	Adjustments made to training pathways and support mechanisms recognise attitudinal and systemic barriers

Strategy 1.2

Develop a promotional campaign aimed at employers of electrotechnology tradespersons to increase the number of New Apprentice opportunities.

Strategy 1.2

Target	Action	Responsibility	Indicator
Information kit developed for employers	1. Collate relevant information on: ■ Issues of projected demand and supply of skills in electrotechnology ■ Structured training, flexible pathways and infrastructure arrangements for New Apprenticeships ■ Sources of information, websites and support services facilitating the uptake of contracts of training 2. Research and publicise case studies and good practice models demonstrating benefits of training and flexibility of training and career pathways in the industry 3. Publish kit and distribute widely to employers	NECA Group Training Companies/New Apprenticeship Centres/State Training Authorities distribute information DEWRSB NUEITAB	Increased enquiries and use of infrastructure and information services by employers Increase in numbers of New Apprenticeship opportunities
Employers contacted directly about the role of enterprises in promoting New Apprenticeships	1. Make direct contact with employers when information kit is distributed by telephone, through mailouts and face-to-face to: ■ emphasize the importance of the issues ■ reinforce key role of employers in initiating training activities ■ establish the importance of employers maintaining control over training activities in the industry	Dedicated staff from appropriate key industry organisations	Evidence of employer-initiated growth in New Apprenticeship opportunities

Strategy 1.2 (continued)

Target	Action	Responsibility	Indicator
Available support services for employers mapped and new needs identified	1. Research and develop a map of existing support services specifically for employers wishing to invest in training 2. Publish and supply the map to interested employers 3. Survey/interview employers currently and potentially providing structured training opportunities to identify further needs to support their management of New Apprenticeships 4. Initiate strategies to meet these needs	Industry NACs NUEITAB	Employers report more effective use of infrastructures and greater enterprise control over New Apprenticeships
Role of Group Training Companies explored	1. Examine Group Training Company (GTC) interface with employer stakeholders to identify: ■ effectiveness of brokerage role and ■ potential perception that government initiatives dominate industry ownership 2. Identify strategies in response to findings, as appropriate 3. Recommend Industry/Government response to implement identified strategies	Joint industry/ Government initiative Industry and Group Training Companies	Report on GTCs evaluates current effectiveness of brokerage role and identifies strategies to ensure improved sense of industry control as appropriate Response strategies implemented

Strategy 2.1

Identify, develop and pilot flexible and alternative training pathways as a means of increasing the commencement, retention and completion rates for those in training in electrotechnology

Strategy 2.1

Target	Action	Responsibility	Indicator
Needs, current issues and activities leading to the development of new or alternative pathways identified	1. Survey trainees, employers and market demand to identify: ■ Characteristics and emerging needs of applicants for training – young people and mature-age, career switches, modular training ■ Issues emerging from current training pathways and priorities for action – impact of time-based training, responsiveness to new technologies, reasons for non-apprenticeship pathways, attrition rates, number of entry points ■ Current activities supporting development of new training pathways – mapping against Competency Standards of other Training Packages, development of Certificate IV qualifications (ref. NUEITAB model) 2. Conduct a research/benchmarking project to examine effectiveness of non-apprenticeship pathways as: ■ A key approach to upgrading current skills of existing workforce ■ An alternative to entry-level training for electrotechnology trades	NCVER NUEITAB/Skill Centres - needs analyses ANTA Industry	Details of new and emerging trainee needs available Issues relating to training pathways identified and prioritised Alternatives to existing pathways evaluated Current relevant activities mapped

Strategy 2.1 (continued)

Target	Action	Responsibility	Indicator
Alternative flexible and responsive training pathways developed	1. Develop alternative pathways incorporating as appropriate: ■ cross-industry pathways (more entry points) ■ specific competency outcomes rather than complete or licensed qualification ■ more flexible entry points to training arising from, for example: ■ expanded RPL arrangements for recognition of relevant technical skills from cross-industry experience ■ expanded RPL for entry level skills to improve retention rates, eg key competencies demonstrating aptitude, interpersonal skills	Consultative committee of employers, GTCs, industry and training stakeholders, NUEITAB Government, technical and industry regulators	Alternative training pathways addressing identified issues developed
A joint industry/ Government pilot of alternative, flexible training pathways conducted	1. Pilot an alternative pathway developed to address identified issues: ■ select target trainees and promote benefits of new training pathway ■ identify success indicators/goals (eg higher percentage of target entrants, lower attrition, relevance of qualification outcomes) ■ monitor outcomes (attrition rate, market demand/recognition, career pathways) ■ evaluate new pathway in terms of identified issues (employer/trainer/ trainee perspectives) 2. Recommend adjustments and promote new pathway as good practice	Consultative committee of employers, GTCs, industry and training stakeholders, Government, technical/ industry regulators NCVER – performance measures	New pathway introduced and evaluated against identified goals New pathway promoted as good practice

Strategy 2.2

Identify, develop and pilot appropriate pathways and promote streamlined training arrangements for mature-age New Apprentices entering or currently in training

Strategy 2.2

Target	Action	Responsibility	Indicator
Needs/issues relevant to mature-age New Apprenticeships identified	1. Research current training arrangements for mature-age apprentices. Focus questions can include: ■ Are New Apprentices over 25 responding to a demand for new skill sets? ■ Is there a difference between trades qualifications achieved and the attrition rates of older entrants and those of young people? ■ Are there adjustments to entry-level pay rates and any related industrial relations issues in response to mature age apprenticeships? ■ Are recognition of prior learning (RPL) arrangements more commonly used for New Apprentices of this age? ■ Is there evidence of alternative or more streamlined training pathways in these New Apprenticeships, such as the provision of more specific customised training? and ■ Are mature-age trainees in particular following alternative non-structured training or career pathways?	Consultative committee of representatives from NACs, NECA, CEPU, ACCI/ACTU, NCVER, Skill Centres, VET, researchers, NUEITAB DETYA ANTA NUEITAB	Current good practice facilitating entry of mature-age trainees identified

Strategy 2.2 (continued)

Target	Action	Responsibility	Indicator
Best practice in facilitating mature-age entry into New Apprenticeships identified and promoted	1. Identify successful or model approaches to issues relevant to mature-age apprentices (customised training, extended RPL, adjustments to industrial and pay arrangements, relevant qualifications/prior career experience) 2. Publicise best practice models, new pathways and/or adjusted arrangements to employers in order to facilitate mature-age entry into training	Consultative committee of representatives from NACs, NECA, CEPU, NCVER, Skill Centres, VET researchers, NUEITAB Communication/ marketing specialist Industry association DETYA/ANTA	Best practice models supported, publicised and promoted by industry

Strategy 3.1

Identify and implement a national industry initiative in response to identified, legislative regulatory and systemic barriers to entry and retention in electrotechnology trades training.

Strategy 3.1

Target	Action	Responsibility	Indicator
Regulatory/ legislative barriers to entry and completion of New Apprenticeships identified	1. Research data on initial enquiries or reasons for attrition to identify impediments arising from: ■ industry regulations and/or ■ complex State-based legislative requirements (vocational training orders, implementation guides etc) 2. Monitor current systems and processes to identify systemic barriers to: ■ Accessing correct training and career information ■ Selecting applicants who have awareness and aptitude for the industry	Joint Industry/ Government initiative Consultative committee NUEITAB	Regulatory, legislative and systemic barriers to entry, retention and completion of contracts of training defined and prioritised
Existing support arrangements for employers and New Apprenticeships evaluated	1. Review effectiveness of New Apprenticeship Centres (NACs) in providing support for New Apprentices during training and monitor the impact of new NAC contractual arrangements on contracts of training in the electrotechnology industry to identify further needs for mentoring/ support services 2. Research and identify current good practice case studies of effective mentoring or support arrangements for employers and New Apprentices in the industry	Consultative committee NACs DETYA NUEITAB	Current support systems monitored and evaluated for effectiveness Good/best practice case studies identified

Strategy 3.1 (continued)

Target	Action	Responsibility	Indicator
Appropriate adjustments to regulation/ legislation and support systems identified and initiated	1. Consult with industry and regulatory bodies to examine adjustments or alternative pathways as solutions to problems arising from current regulatory requirements 2. Initiate a national Government/ industry response to issues arising from complex State-based legislation 3. Identify and pilot an industry-specific support/ mentor initiative based on a best practice case study to provide advice or the support services of a third party for New Apprentices or their employers if difficulties are encountered during the apprenticeship period	Joint Industry/ Government initiative Consultative committee State governments Standards Australia ERAC	Initiatives introduced as solutions to identified problems arising from existing regulatory and legislative arrangements and

Strategy 4.1

Co-ordinate relevant industry research to ensure regular updates on changing needs for structured training in electrotechnology and market demand in new technology areas

Strategy 4.1

Target	Action	Responsibility	Indicator
Key information necessary to ensure informed industry response to changing needs established	1. Consult with relevant research bodies (NCVER, DEWRSB, DETYA) to identify appropriate sources of relevant information and issues relating to collection of data (eg currency of relevant training statistics, monitoring of developments in technology, identifying and projecting changes in market demand) 2. Establish characteristics of key information required and frequency of reports	Consultative committee of key industry representatives	Details of required reporting mechanisms and key information items confirmed
Quality providers of data and research relevant to changing technology, market demand and training in electrotechnology identified and commissioned	1. Evaluate research bodies providing VET data relevant to the electrotechnology industry with reference to sources and currency of information, clients, regularity/ accessibility of reports, expertise and experience relevant to the industry 2. Research bodies monitoring developments in technology, including established industry or enterprise reporting mechanisms 3. Identify quality providers of relevant information on VET activities, changing technology and market demand in the electrotechnology industry and commission regular reports on identified key information items	Consultative committee of key industry representatives NUEITAB	Sources of relevant data confirmed and research bodies contracted

Strategy 4.1 (continued)

Target	Action	Responsibility	Indicator
Systems established to support effective industry-wide response to updated information on changing training and market needs	1. Identify existing barriers to effective response to changing markets and training needs in electrotechnology, for example: ■ poor information channels resulting in training provision or employer investment in contracts of training leading to the development of skills not relevant to market demand, ■ traditional training pathways not responsive to current economic cycles or identified trainee needs 2. Establish communication strategies and formal networks to facilitate an efficient, industry-wide response to identified changes in market demand and training requirements	DETYA NACs NUEITAB ■ Consultative committee of key industry representatives	Systems and mechanisms to process and respond to relevant information established at industry-wide level

Strategy 4.2

Investigate actual and emerging needs for communications and electronic and office equipment tradespersons and identify an appropriate response

Strategy 4.2

Target	Action	Responsibility	Indicator
Current and projected business need for these trades and for the specific training pathways identified	1. Investigate current and projected business needs for these trades 2. Examine attrition rates and characteristics of entrants into training(eg age, career change) for these trades to identify how far current training and career pathways meet the needs of entrants and existing trainees 3. Examine alternative pathways to achieving competency in these trade skills ie identify how far present industry need for these skills is actually being met by electrical tradespersons 4. Define the level of need for New Apprenticeships for these specific trades	Consultative committee ACCI (economic analysis)	Current and projected business need defined Relevance of current training pathway and of alternative pathways defined
Campaign to increase employer and RTO awareness and promotion of training for these trades undertaken as appropriate	1. According to the findings of above research, conduct a marketing/ promotional campaign to increase numbers of New Apprenticeships available in the specified trades and the number of entrants into training ■ Identify target employers to promote commitment to contracts of training in these specific trades ■ Promote training to potential trainees who meet identified characteristics ■ Promote alternative or new training pathways to achieve required skills as appropriate	Consultative committee NUEITAB Industry ANTA	Increase in numbers of opportunities available and of commencements in New Apprenticeships for communications, electronic and office equipment tradespersons

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Attachment 1

Membership of the Electrotechnology Working Group

Membership of the Steering Group (cross-industry)

Membership of the Electrotechnology Working Group

Chair

Simon Gerard (National Marketing Manager, Gerard Industries)

Deputy Chair

Phil Potterton (until 17 January 2000) and then Joan Armitage (Acting Assistant Secretary, Industry Training Branch, DETYA)

Steve Balzary, Australian Chamber Commerce and Industry (ACCI)

Peter Davis, Krone Australia

Peter Glynn, National Electrical and Communications Association (NECA)

Peter Hannigan, Australian National Training Authority (ANTA)

Linda Lipp, Department of Employment, Workplace Relations and Small Business (DEWRSB)

David Madson, Stowe Australia

Chris Robinson, National Centre for Vocational Education Research (NCVER)

Sally Stevens, Project Officer, ACCI

Craig Somerville, The Somerville Group

Peter Tighe, Communications, Electrical and Plumbing Union (CEPU)

Secretariat

Annely Aeuckens (until 25 January 2000) and then Berenice Wilson, Assistant Director, Industry Skills Section, DETYA

Evan Lewis, Director, Industry Skills Section, DETYA

Membership of the Steering Group (cross-industry)

Chair

Colin Walters, First Assistant Secretary, Training and Youth Division, DETYA

Phil Potterton, DETYA (until 17 January 2000), Joan Armitage, DETYA (from 17 January 2000)

Steve Balzary, ACCI

Barbara Bennett, DETYA

Brian Curmi, President – VACC

Simon Gerard, Gerard Industries

Linda Lipp, DEWRSB

Gillian MacDonald, AiG

Rod Manns, DETYA

Chris Robinson, NCVER

Adrian Stephens, ANTA

Colin Thatcher, BCA

Richard Winter, Email Ltd

Secretariat (DETYA)

Evan Lewis, Greg Clarke, Perelle Scales, Berenice Wilson

Attachment 2

Paper Provided by NCVER for the Electrotechnology Working Group

Evidence of Skill Shortages in the Electrotechnology Trades

1. Introduction

Employers in a number of critical economic sectors have been reporting increased difficulties recently in securing the necessary skills in their industries.

In developing appropriate industry or sector-based responses to skill shortages, it is necessary to first ascertain

- To what extent do skill shortages exist in terms of the types of skills in short supply and the areas where they are in short supply?
- What are the underlying causes of the shortages that exist?

With respect to underlying causes, skill shortages in the trades can arise from

- An inadequate number of people entering trade training
- A high attrition rate during the training period, that means not enough people are completing trade training and attaining the qualifications necessary for highly skilled/technical work in the trades
- A high separation from the skilled trades workforce once people are qualified; due to a variety of reasons, such as low demand for skills, declining industry employment prospects or better careers and conditions being offered in other industries/sectors
- An insufficient level of activity by the existing trade workforce in upgrading skills once initial qualifications have been attained
- A failure in the provision of training to ensure that the quality and relevance of training provision is keeping up with rapidly changing skills needs in the workforce.
- A combination of the above

In this paper available evidence about patterns and trends in trades employment and training in the electrotechnology industry is reviewed in order to gauge the nature and extent of any skills shortages in these electrotechnology trades. This paper has been prepared by the National Centre for Vocational Education Research (NCVER), using

information supplied by the NCVER, the Australian Bureau of Statistics (ABS) and the Department of Employment, Workplace Relations and Small Business (DEWRSB). The electrotechnology trades cover a range of electrical and electronic trades including:

- electricians
- electrical engineering associate professionals
- refridgeration and air conditioning mechanics
- electrical distribution tradespersons
- electronic instrument tradespersons
- electronic and office equipment tradespersons
- communications tradesperson

There is also a growing number of electrical and telecommunications trades assistants.

2. The Demand For Skills in the Electrotechnology Trades

2.1 Employment Levels

Total employment in the electrotechnology trades workforce is almost 200,000 people. This amounts to the some 2.3 % of all employment in Australia. Electrotechnology trades are the third largest area of employment in Australia's trades workforce (behind the building and construction and metal trades), accounting for some 16 % of total trades employment in Australia.

As shown in Table 1, the largest single electrotechnology trades occupation is electricians, accounting for more than half of the total electrotechnology trades workforce. The other significant electrotechnology trades occupations are electronics communications tradespersons and electronic office and equipment tradespersons, accounting for 16.7 % and 14.5 % of skilled electronic trades employment respectively.

In addition to the skilled trades occupations depicted in Table 1, there are a further 3,500 electrical and telecommunications trades assistants.

Table 1

Employment in Electrotechnology Trades Occupations

Trades Occupation		Employment in 1997/98	
		Number ('000)	Share (%)
3123	Electrical engineering associate professionals	8.2	4.4
4411	Electricians	99.2	53.2
4312	Refrigeration and airconditioning mechanics	13.0	7.0
4313	Electrical distribution tradespersons	7.4	3.9
4314	Electronic instrument tradespersons	0.6	0.3
4315	Electronic & office equipment tradespersons	27.0	14.5
4316	Communications tradespersons	31.2	16.7
	Total	186.6	100.00

Source: Murphy Chris & Douglas Justin 1998, The Outlook for Jobs*, National Centre for Vocational Education Research (NCVER)*

2.2 Employment Growth

There has been relatively strong employment growth over the past decade. The Department of Employment, Workplace Relations and Small Business (DEWRSB) reported that electrotechnology trades employment grew by an average of 1.3 % per year over the past decade.

As shown on Figure 1, this growth has been stronger than for employment growth in the trades generally.

2.3 Employment Prospects

An underlying precondition for the existence of skill shortages is usually (but not always) a rising demand for skilled labour in a growing labour market. Of course it is possible for skill shortages to exist in a declining labour market, but this situation is much less frequent.

Employment forecasts (made by using the Murphy Model), predicts modest employment growth in the electrotechnology trades of around 2.5 % per year in the coming years. This is shown in Table 2.

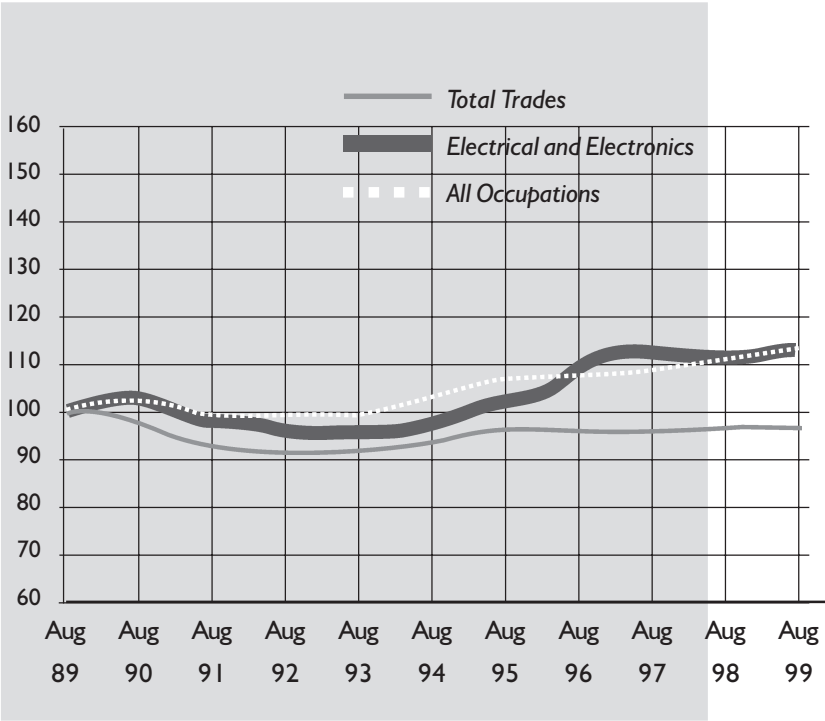

Figure 1: Electrotechnology, total trades and total employment, 1989-1999 (indexed)

Source: Australian Bureau of Statistics (ABS), Labour Force Survey

Table 2

Electrotechnology Trade Occupations Employment Forecasts

Trades occupation		Average annual growth 97/98 – 00/01 (% pa)	Total employment 1997/98 ('000)	Total employment 2000/01 ('000)	Share of total employment 1997/98 (%)	Share of total employment 2000/01 (%)
3123	Electrical engineering associate professionals	0.9	8.2	8.4	0.1	0.1
4311	Electricians	2.4	99.2	106.3	1.2	1.2
4312	Refrigeration & airconditioning mechanics	2.2	13.0	13.9	0.2	0.2
4313	Electrical distribution tradespersons	-0.6	7.4	7.2	0.1	0.1
4314	Electronic instrument tradespersons	0.8	0.6	0.6	0.0	0.0
4315	Electronic & office equipment tradespersons	0.9	27.0	27.7	0.3	0.3
4316	Communications tradespersons	5.4	31.2	36.5	0.4	0.4
	Subtotal	2.5	186.6	200.6	2.3	2.3
9918	Electrical & telecommunications trades assistants	2.0	3.5	3.7	0	0

Source: Murphy, Chris & Douglas, Justin 1998, The Outlook for Jobs, *NCVER*

However, the projected growth is different across the different skilled trades within the electrotechnology trades. For instance, the communications tradespersons occupation category has the highest forecast average annual growth rate of 5.4 %. Only one category, electrical distribution tradespersons, has a forecast decline – from 7,400 in 1997/98 to 7,200 in 2000/01.

In relation to the electrical and telecommunications trades assistants occupation category, specifically the total number in employment is forecast to grow from 3,500 in 1997/98 to 3,700 in 2000/01, representing an average annual growth rate of 2.0 %.

These projections indicate faster employment growth in the next two years in the electrotechnology trades, than was experienced on average over the past decade.

However, longer term forecasts by DEWRSB (using the Monash Model) suggest that electrotechnology employment to the year 2004-05 is, on average, projected to grow at a slower rate than employment generally. This projection in part reflects the completion of construction of the Sydney Olympic site and the absence, at this stage, of any infrastructure project of comparable size and complexity.

2.4 Overview of the Demand for Electrotechnology Skills

The patterns of employment growth in the electrotechnology trades suggest an increase in already expanding employment in these trades, noting the very strong growth on vacancies that have been experienced recently.

DEWRSB reports that the demand for the electrotechnology trades is closely linked to trends in building and construction (residential, commercial and other constructions, including resource development), manufacturing, electrical generation and distribution, the wholesale and retail industries and transport. The strong activity in the construction and transport sectors is generating demand for electrical tradespersons. Wholesale and retail activity has been healthy and this has had a positive flow–on effect on demand. Some factors have also led to an easing of the demand for electrotechnology tradespersons in recent years, such as the negative impact of the Asian economic difficulties on some resource projects, especially in Western Australia and the Northern Territory.

The overall situation concerning the demand for trades skills in the electrotechnology sector is summarised in Box 1.

Box 1: The demands for skills in the electrotechnology trades

- Electrotechnology trades are and important and growing industry sector, with nearly 200,000 people in the skilled trades workforce.
- Employment growth in the electrotechnology skilled trades workforce over the past decade has been much higher than growth in the workforces of all skilled trades in Australia.
- Total employment in the electrotechnology skilled trades is projected to grow at an even faster rate over the next few years (ie by 2.5 % per year).
- These patterns are consistent with the necessary preconditions for increased skills shortages in the electrotechnology trades.

3. The Supply of Skills to the Electrotechnology Trades

The supply of skills to the electrotechnology trades comes from four major sources.

- The skills of existing trades workforce, including the upgrading of skills of the existing workforce
- New apprentices entering the electrotechnology trades
- Skills training undertaken through other (non-apprentice) training pathways
- Skilled migration into the electrotechnology trades.

Of course the other critical issue with respect to the supply of skills to the electrotechnology trades concerns the rate of skills wastage arising from skilled and qualified labour leaving these skilled trades occupations.

Each of these factors is examined below in this section of the report.

3.1 The Skills of the Existing Electrotechnology Trades Workforce

Some 70 % of the skilled trades workforce in the electrotechnology trades have post-school qualifications, as shown in Table 3.

This is a much higher proportion than the average for the whole Australian workforce, this proportion being below 50 %.

The information in Table 3 shows the highest qualification attained. Some of those with degrees, diplomas and associated diplomas may also have vocational qualifications.

For the electrotechnology trades as a whole

- Almost 9 % of employed persons have a diploma or advanced diploma (or equivalent) as their highest qualification, which is a slightly higher rate than the 8 % for the workforce as a whole.
- Almost 60 % possess a vocational qualification, compared to a workforce average of less than 20 % of employed persons having a vocational qualification as their highest level attained.
- Only 2.6 % possess a degree level or higher qualification compared to over 15 % having such qualifications in the workforce as a whole.

In relative terms, this means that the proportion of the workforce in electrotechnology trades who possess relevant qualifications (ie diploma and other vocational qualifications) is very high compared to the levels of qualifications attained in the workforce as a whole.

Significantly, the numbers who have no formal post-school qualifications, but are working in the electrotechnology trades, are less than 25 % of the total workforce. This is a comparatively low level, given that around half of the Australian workforce reported having no post-school qualification in 1996.

A summary of the situation concerning the existing skills of the existing workforce is given in Box 2 below.

Box 2: The skills of the existing electrotechnology trades workforce.

- Some 70 % of the existing electrotechnology trades workforce hold a post-school qualification, compared with only 50 % of the workforce as a whole having qualifications.
- The incidence of vocational qualifications in the electrotechnology trades workforce is very high (60 %), compared with fewer than 20 % of the national workforce having a vocational qualification.
- But one quarter of the electrotechnology trades workforce have no formal qualifications. This situation may not meet contemporary industry needs for high level technical skills.

Table 3

The Education Attainment of Persons Employed in the Electrotechnology Trades, and the Total Workforce, 1996

Occupational categories	Proportion of workforce with (%)								
	Degree or higher	Diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	Sub Total with qualification	No qualification	Not started/ unknown	Total
3123 Electrical engineering associate professionals	3.1	2.4	22.5	52.0	4.0	84.0	12.3	3.7	100
3124 Electronic engineering technicians	4.8	3.2	20.6	41.8	6.7	77.1	17.3	5.6	100
4311 Electricians	0.8	0.6	3.2	74.1	1.0	79.7	16.4	3.9	100
4312 Refrigeration & airconditioning mechanics	1.0	0.8	1.7	67.3	1.0	71.8	23.8	4.4	100
4313 Electrical distribution tradespersons	0.3	0.2	0.9	58.2	4.7	64.3	25.7	10.0	100
4314 Electronic instrument tradespersons	2.9	2.2	11.9	66.4	3.2	86.6	11.9	1.5	100
4315 Electrical & office equipment tradespersons	9.0	3.2	9.4	30.5	4.7	56.8	35.5	7.7	100
4316 Communications tradespersons	1.9	1.2	4.6	34.5	3.1	45.3	47.5	7.2	100
4310 Other electrotechnology trades	0.3	1.0	2.1	43.0	1.8	48.2	45.1	6.7	100
Sub total skilled electrotechnology trades	2.6	1.5	7.3	56.4	2.8	70.6	24.1	5.3	100
9918 Electrical & telecommunication trades assistants	1.1	0.7	0.9	18.3	2.4	23.4	70.4	6.2	100
Total electrotechnology	2.6	1.4	7.2	55.9	2.9	70.0	24.7	5.3	100
Total Australia workforce	15.5	4.5	3.5	14.2	3.8	41.5	51.3	7.2	100

Sources NCVER (1998) The Outlook for Training in Australia's Industries, *Table A2 and ABS 1996* Census of Population and Housing

3.2 New Apprenticeship Patterns and Trends

Australia's national and state/territory governments have reformed the apprenticeship and trainee system by making it more flexible and responsive to employer needs with the aim of ensuring that the highest quality training is provided. The new training arrangements covering apprenticeships and traineeships are collectively known as new apprenticeships. They were introduced from 1 January 1998.

Although new apprenticeships cover both apprentice and traineeship training, the vast majority of entry level skills training in the electrotechnology trades through contracts of training with employers occurs through the apprenticeship pathway, leading to a Certificate III qualification (typically involving a four year apprenticeship contract).

The apprenticeship pathway accounts for almost all those in contracts of training as electricians, refrigeration and airconditioning mechanics, electrical distribution tradespersons and electronic instrument tradespersons. Moreover almost all of those in the other electrotechnology tradespersons category are also apprentices.

The National Centre for Vocational Education Research (NCVER) reports that of the 17,746 contracts of training shown in Table 4, apprenticed trades (at the Certificate III level) account for over 90 % of all those in a contract of training in electrotechnology occupations.

The contracts of training where non-traditional apprenticeships (ie traineeships) are more prevalent are in the occupations of electrical engineering associate professionals, electrical engineering technicians, electronic and office equipment tradespersons, communication tradespersons and electrical and telecommunications trades assistants.

Electrical engineering associate professionals and electronic engineering technicians contracts of training are all at the Certificate IV/advanced diploma or diploma levels. Electronic and office equipment tradespersons and communications tradespersons have a mix of Certificate II and Certificate III and higher pathways, whereas electrical and telecommunications trades assistants are almost all in Certificate II traineeships.

As can be seen from Table 4, the number of new apprenticeships as a proportion of the skilled trades workforce varies considerably between the different occupations in the electrotechnology trades. In the major traditional occupations – electricians and refrigeration and airconditioning mechanics – apprentices make up between 11 and 14 % of the total skilled trades workforce.

In the newer high technology areas where traineeship pathways are more important, skills training through contracts of training is a much more recent phenomenon, the numbers in training as a proportion of the skilled workforce are as low as 1 and 1.6 % in the skilled occupations of communications tradespersons and electronic and office equipment tradespersons, respectively. These are very low rates. These sectors, which employ some one third of the total skilled trades workforce in the electrotechnology occupations, require specific attention if the penetration of skilled trades training is to be raised in the electrotechnology sector as a whole in Australia.

Table 4

Electrotechnology New Apprenticeships, 31 December 1998

		No. of new apprentices (no)	Proportion of total new apprentices (%)	New apprentices as a proportion of total skilled trades workforce (%)
3123	Electrical engineering associate professionals	64	0.4	7.1
3124	Electronic engineering technicians	2	-	-
4311	Electricians	11181	63.0	11.3
4312	Refrigeration & airconditioning mechanics	1725	9.7	13.3
4313	Electrical distribution tradepersons	399	2.2	5.4
4314	Electronic instrument tradesperson	281	1.6	46.8
4315	Electronic & office equipment tradespersons	438	2.5	1.6
4316	Communications tradespersons	315	1.8	1.0
Other electrical & electronic new apprentices		2801	15.8	15.4
	Total	17746	100.0	9.3

Source: NCVER unpublished apprentice and trainee data

Overall the proportion of the total skilled trades workforce in the electrotechnology trades is just under 10 % (ie 9.3 % as shown in Table 4). This average is lower than for all skilled trades in Australia, where almost 12 % of the skilled trades workforce, on average, is supplied by those in new apprenticeships.

The key issues to consider in relation to the contribution of apprentices are trainees to the supply of skills, are whether or not

- The numbers entering contracts of training are sufficient to meet industry needs
- The numbers staying in apprenticeships and traineeships to complete their training are adequate.

Apprenticeship training in the electrotechnology trades (and all other major trades) experienced a decline in Australia in the early 1990's from the record high levels of the late 1980's.

Since the mid 1990's, we have seen a significant turnaround, with strong growth in the past couple of years.

The number of commencements in electrotechnology apprentices and trainees grew by an average of 3.2 % per year since 1995. The NCVER reported very strong growth of 6.6 % in the most recent year for which data is available (ie 1997 to 1998). As shown in Table 5, this pattern varies between the different skilled trades in this sector.

The key point, however, is that the growth rate in commencements since the mid 1990s compares favourably with the net growth in employment, which has averaged 1.3 % in the last decade and is forecast to grow by 2.5 % in the coming years.

This NCVER data suggests that problems relating to insufficient numbers entering skilled trades training relate to particular occupations within the electrotechnology trades (rather than being an across the board problem). Electronic and office equipment tradespersons is a sector that may warrant particular consideration in this regard.

There has also been a significant improvement in the overall numbers in an apprenticeship or traineeships in the electrotechnology sector since the mid 1990's. Growth in the numbers in training has consistently averaged around 3.6 % each year since 1995 as shown in Table 6. Again this growth has varied in different sectors within the electrotechnology trades.

This growth of 3.6 % per year in the numbers in training compares favourably to the overall projected net growth in employment of 2.5 % per year. However, growth in the numbers in training at these levels will only make small inroads into raising the ratio of new apprentices to the total skilled trades workforce in Australia's electrotechnology sector.

If we consider apprentice and trainee completions (Table 7), we can see that over 3,500 people completed their new apprenticeship in 1998. Taking crude completion rates this amounts to a completion rate of 68 % of all commencements in 1995 (noting that the contracts of training in these trades average around 4 years duration). This is a reasonably healthy rate of completion.

Moreover, strong growth of 11.9 % per year in completions has been attained since the mid 1990's. However, in recent times between 1997 and 1998 the recorded number of completions plummeted to a fall of 1.7 %. This is a most disturbing trend that will require some more specific consideration. Although it is important to point out that the NCVER has found that there are problems with completions data. The reported new apprentice completions are below the true level of completions being recorded in national data, because not all completions are being reported.

Table 5

Commencements in Contracts of Training in the Electrotechnology Trades, 1995 to 1998

	Number				Average annual growth rate	Average annual growth rate	Growth rate
	1995	1996	1997	1998	1995 - 1998 (%)	1995 - 1997 (%)	1997 - 1998 (%)
3123 Electrical engineering associate professionals	12	4	33	27	213.4	329.2	-18.2
3124 Electronic engineering technicians	2	1	0	0	-	-75.0	-
4311 Electricians	3448	3152	3372	3604	1.8	-0.8	6.9
4312 Refrigeration & airconditioning mechanics	504	453	567	602	7.1	7.5	6.2
4313 Electrical distribution tradespersons	143	108	114	114	-6.3	-9.5	0.00
4314 Electronic instrument tradespersons	73	58	53	120	32.4	-14.6	126.4
4315 Electronic & office equipment tradespersons	285	239	154	134	-21.6	-25.9	-13.0
4316 Communications tradespersons	49	86	127	159	49.5	61.6	25.2
Other electrical & electronics tradespersons (a)	647	1066	843	892	12.6	12.6	0.0
Sub total	5163	5167	5313	5662	3.2	1.5	6.6
9918 Electrical & telecommunications trades assistants	82	328	412	577	121.9	162.8	40.0

(a) not known at 4-digit level

Source: NCVER unpublished apprentice and trainee data

Table 6

The Number of Apprentices and Trainees in Contracts of Training in the Electrotechnology Trades Number In-training, 1995 to 1998

	Number				Average annual growth rate	Average annual growth rate	Growth rate
	1995	1996	1997	1998	1995 - 1998 (%)	1995 - 1997 (%)	1997 - 1998 (%)
3123 Electrical engineering associate professionals	23	17	44	64	59.4	66.4	45.5
3124 Electronic engineering technicians	2	3	2	2	5.6	8.3	0.0
4311 Electricians	10887	11025	11065	11181	0.9	0.8	1.0
4312 Refrigeration & airconditioning mechanics	1386	1473	1590	1725	7.6	7.1	8.5
4313 Electrical distribution tradespersons	557	510	443	399	-10.5	-10.8	-9.9
4314 Electronic instrument tradespersons	173	229	241	281	18.1	18.8	16.6
4315 Electronic & office equipment tradespersons	954	786	617	438	-22.7	-19.6	-29.0
4316 Communications tradespersons	100	161	245	315	46.7	55.8	28.6
Other electrical & electronics tradespersons (a)	1381	1981	2386	2801	34.3	24.3	17.4
Sub total	15464	16188	16633	17206	3.6	3.7	3.4
9918 Electrical & telecommunications trades assistants	75	297	359	540	122.4	158.2	50.4

(a) not known at 4-digit level

Source: NCVER unpublished apprentice and trainee data

Table 7

Completions from Contracts of Training in the Electrotechnology Trades, 1995 to 1998

	Number				Average annual growth rate 1995 - 1998	Average annual growth rate 1995 - 1997	Growth rate 1997 - 1998
	1995	1996	1997	1998	(%)	(%)	(%)
3123 Electrical engineering associate professionals	4	5	6	3	-1.7	22.5	-50.0
3124 Electronic engineering technician	0	0	0	0	-	-	-
4311 Electricians	1817	2291	2559	2523	12.1	18.9	-1.4
4312 Refrigeration & airconditioning mechanics	178	260	319	284	19.3	34.4	-11.0
4313 Electrical distribution tradespersons	152	132	140	116	-8.1	-3.5	-17.1
4314 Electronic instrument tradespersons	41	27	43	76	34.0	12.6	76.7
4315 Electronic & office equipment tradespersons	179	237	214	193	4.3	11.3	-9.8
4316 Communications tradespersons	11	16	19	33	46.0	32.1	73.7
Other electrical & electronics tradespersons (a)	160	232	274	284	22.3	31.6	3.6
Sub total	2542	3200	3574	3512	11.9	18.8	-1.7
9918 Electrical & telecommunications trades assistants	14	48	220	209	198.7	300.6	-5.0

(a) not known at 4-digit level

Source: NCVER unpublished apprentice and trainee data

Nevertheless, the reported number of completions of around 3,500 per year is not sufficient to supply all of the projected growth in employment of 2.5 % per year - a growth of around 5,000 trades jobs each year.

A significant issue with respect to the supply of skills to the trades through new apprenticeships concerns the age of apprentices and trainees.

The NCVER reports that, while there has been a marginal decline in the proportion of commencing apprentices (and trainees) aged 15 – 19 years, the numbers of commencing apprentices (and trainees) has grown across all age groups since 1995. This is shown in Table 8. The number of 15 – 19 years olds commencing in a contract of training in the electrotechnology trades is now growing by over 5 % per year. Growth in commencements by those aged 20 – 24 years is even stronger, being over 10 % in the year 1997 to 1998.

Table 8

The Age of New Apprentices in the Electrotechnology Trades (a)

Age of apprentices and trainees	Proportion of total apprentices and trainees		Average annual growth rates	
	1995 (%)	1998(%)	1995-1997(%)	1997-1998(%)
No of Commencements				
15 – 19 year olds	68.3	66.0	0.2	5.5
20 – 24 year olds	22.0	22.7	1.6	10.2
25 years or more	9.7	11.3	10.6	5.6
All ages	100.0	100.0	1.4	6.6
Total No in Training				
15 – 19 year olds	28.8	28.9	3.3	4.3
20 – 24 year olds	59.3	57.6	2.5	2.9
25 years or more	11.9	13.5	10.5	4.1
All ages	100.0	100.0	3.7	3.4

(a) *excludes electrical and telecommunications trades assistants*

Source NCVER unpublished apprentice and trainee data

In fact there has been little change in the proportions of different age groups amongst all those in training since the mid 1990's. As shown in Table 8

- The proportion of teenagers in electrotechnology contracts of training has remained virtually unchanged (at just under 29 %) throughout the 1995 to 1998 period.
- The proportion of 20 – 24 year olds in training fell marginally to 57.6 %, and the proportion aged 25 years or more rose slightly from 11.9 % to 13.5 % during this period.

The numbers of teenagers entering and undertaking new apprenticeships in the electrotechnology trades is growing, despite the rapid aging of the Australian population.

This is a critical point. The NCVER reports that demographic projections show that the numbers of persons in Australia aged 15 - 24 years will not grow in absolute terms over the next 20 years. In fact the relative proportion of young people in the population will fall considerably. This means the source of new skills for the electrotechnology trades, as for all other occupations, will have to increasingly came from apprentices and trainees, who are older when commencing a contract of training.

The other issue of relevance here is the very low level of new apprenticeships in schools in relation to the electrotechnology trades. The NCVER reports (NCVER 2000, *Electrotechnology Trades 1995 to 1999*) that for the electrotechnology trade occupations the number of apprentices and trainees who commenced their apprenticeship or traineeship whilst still attending school comprised an insignificant proportion for each year 1995 to 1998.

Clearly this is an area for consideration in any strategy to boost the intakes of younger people to new apprenticeships in the electrotechnology trades.

A summary of the situation concerning the contribution of apprentices and trainees to the electrotechnology trades is given in Box 3.

Box 3: The supply of electrotechnology apprentices and trainees

- The number of apprentices and trainees (now called new apprenticeships) in a contract of training with an employer in the electrotechnology trades is now almost 18,000, having grown by an average of 3.6 % since the mid 1990's.
- Commencements in electrotechnology new apprenticeship are now growing at even a stronger rate of 6.6 % per year which is a level sufficient to meet projected employment growth of 2.5 % per year in the skilled electrotechnology trades. This means insufficient entry to trades apprenticeships is now not the predominant cause of any skill shortages
- Apprentice and trainee completions in the electrotechnology trades grew strongly between 1995 and 1997 (by over 10 % per year), but completions growth stagnated in 1998, meaning measure to encourage completion of new apprenticeships must be a critical element of any strategy to boost skills in the electrotechnology trades. In absolute terms new apprentice completions of around 3,500 per year are not sufficient to supply all of the projected employment growth of 2.5 % per year in these trades, ie some 5,000 new trades jobs each year.
- Moreover new apprentice completions are not sufficient to make inroads into growing the numbers in these trades with appropriate qualifications even though there is a case for growth of the proportions of those with appropriate qualifications is to rise, noting that the ratio of new apprentices to the total skilled trades workforce in this sector is a relatively low 9.3 % (compared with other trades).
- However, some of the additional training provision required will come from sources other than new apprenticeships.
- The case for growth is particularly strong in some of the non traditional areas, such as in high level (Certificate IV or higher) technician occupations in electronics and telecommunications.

3.3 Training Undertaken through Non-apprentice Pathways

This section looks at the general vocational and education and training (VET) student population in 1998 for electrotechnology occupations but excluding those in streams in which apprentices and trainees would be expected to be most likely enrolled (that is, streams 3211, 3212, 3221).

It should be noted that for the apprentice and trainee data presented elsewhere in this report, the ASCO code is based in apprentices' and trainees' declared vocation, that is, the actual job that they are employed in. The data presented in this section are based on occupation codes assigned to courses to indicate the most likely occupation that the course is relevant to. However, students undertaking a VET course may not necessarily gain employment in the electrical or electronics occupation assigned to the course.

The data in this section therefore provide a rough estimate of the amount of non-apprentice and non-trainee VET activity relevant to the electrotechnology trade occupations – regardless of whether or not this training is actually utilised in these occupations.

Indications are that around 25,000 students were enrolled in a non-apprentice or non-trainee VET course in 1998 relating to the electrical trade occupations. Over half of these, 56.6 %, were at AQF level III or equivalent or higher levels. There were also some 3,395 students enrolled in a non-apprentice or non-traineeship VET course in 1998 relating to electrical and telecommunications trades assistants occupations.

A critical point is that over one third of these students were enrolled in high level programs at the diploma, advanced diploma or certificate IV level as shown in Table 9.

This means that non apprenticeship training pathways have now become a very substantial source of skills for the electrotechnology trades.

The NCVER figures show that by the end of 1998 (ie on 31 December 1998) there were just under 18,000 in new apprenticeships in the electrotechnology trades, compared with some 25,000 enrolments during 1998 in VET courses not involving a new apprenticeship but that are orientated towards skills for the electrotechnology occupations.

A wide variety of different types of training is occurring in these programs. For instance of these non apprentice students

- 35.7 % were in advanced/high level courses leading to diploma's, advanced diplomas or certificate IV level qualifications
- 11.2 % were in certificate III programs, which are traditionally done through apprenticeships
- 14.3 % were in certificate I and II level programs
- 38.8 % were undertaking skills training not leading to award or full qualifications.

Clearly this non-apprentice training activity represents a wide range of training pathways, from advanced technical courses leading to high level qualifications through to persons already employed in the industry upgrading their skills through enrolment in one or more modules.

The importance of non-apprenticeship pathways as a source of skills for electrotechnology occupations is summarised in Box 4 below.

Box 4: Non-apprentice pathways for skills in electrotechnology trades

- Alternative vocational pathways are now just as important source of skills for electrotechnology occupations in Australia as the traditional apprenticeship pathway.
- Throughout 1998 there were some 25,000 enrolments in vocational education and training programs that were not new apprenticeships compared to the less than 18,000 new apprentices in training by the end of 1998.
- The majority of these non-apprenticeships enrolments (57 %) were in courses at the certificate III level or higher. Only 14 % were at certificate levels I and II.
- Non-apprenticeship pathways need to be given as much priority as new apprenticeship pathways in any overall skill formation policies for the electrotechnology trades, particularly given that new sources of relevant skills will need to come increasingly from older persons in the future.

Table 9

Training in the Electrotechnology Trades: Non-apprentice and Non-trainee VET Students, 1998

	Diplomas	AQF Certificate IV and equivalent	AQF Certificate III and equivalent	AQF Certificates I and II	Other Certificates, endorse-ments and other	Statements of Attainment	Non Award Courses	Total Students
3123Electrical engineering associate professionals	3,188	2,193	333	19	0	68	13	5,814
3124-13Electronic engineering technician	209	804	0	284	0	29	0	1,326
43Electrical & electronics tradespersons	125	2,398	2,462	1,550	1,335	3,742	2,858	14,470
Sub Total3,522	5,395	2,795	1,853	1,335	3,839	2,871	21,610	
Electrical & telecommunications trade assistants	0	0	2	1,736	416	37	1,205	3,396
Total electrotechnology	3,522	5,395	2,797	3,589	1,751	3,876	4,076	25,006
% of total electrotechnology	14.1	21.6	11.2	14.3	7	15.5	16.3	100

3.4 Migration as a Source of Electrotechnology Skills

Migration of skilled labour is a source of skills that supplements the domestic skill base in the electrotechnology trades.

DEWRSB reports that in recent years net migration of electrotechnology tradespersons has fluctuated around 400 to 600, with arrivals of around 1,300 to 1,400 partly offset by departures of about 750 to 850. This is shown in Table 10.

Thus, migration is a relatively insignificant source of skills for the electrotechnology trades in Australia.

This is a situation that is not likely to change. Even if governments were to open up immigration intakes, it is highly unlikely that such a policy would increase net intakes in a significant way because of the global demand for skills in the electrotechnology fields.

The potential for increased migration as a source of new skills in the electrotechnology trades in Australia. is summarised in Box 5.

Table 10

Migration of Electrotechnology Tradespersons

Year	Permanent and Long Term Arrivals	Permanent and Long Term Departures	Net Permanent and Long Term			
			Settler	Long Term Residents	Long Term Visitor	Permanent and Long Term Total
1996-97	1289	743	509	52	-15	546
1997-98	1295	868	432	38	-43	427
1998-99	1403	810	622	-102	73	593

Source: Department of Employment, Workplace Relations and Small Business, November 1999

Box 5: Migration as a source of new electrotechnology skills

- Net migration is a relatively insignificant source of skills for the electrotechnology trades in Australia with between 400 and 600 per year (compared to a skilled trades workforce in this area of 200,000)
- Rapidly burgeoning global demand for electrotechnology skills, particularly for advanced and high level technical skills, means that migration is likely to remain an insignificant source of such skills for Australia in the future.

3.5 Skills Wastage from the Electrotechnology Occupations

The issue of the extent to which qualified and skilled tradespersons leave their employment in their skilled trade is a critical one. This is because the formation of new skills in the trade must be sufficient.

- Not only to meet skills needed to fuel growth in the industries
- But also it must be sufficient to replace those skills leaving through occupational wastage.

DEWRSB report that the proportion of electrotechnology tradespersons who leave these occupations appears to be below the average for all occupations. Nevertheless a considerable proportion of qualified electrotechnology tradespersons leave trade employment for non trade employment. Analysis of 1996 Census data shows for those with electrotechnology trade qualifications:

- 42 % were working in an electrical or electronic trades occupation;
- 35 % were working in a non-trade occupation;
- 4 % were unemployed; and
- 17 % were not in the labour force (includes those who retire).

The proportion (42 %) qualified electrotechnology tradespersons who were working in their trade. This is higher than the average (38 %) for the all trades in the Australian workforce (see Figure 2).

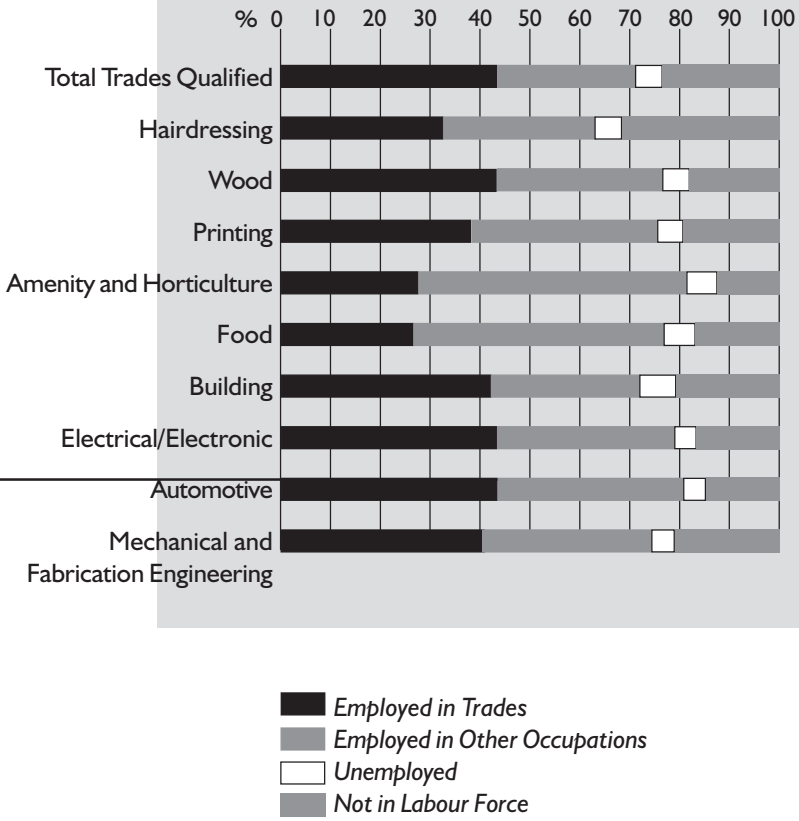

Figure 2: Trades qualified persons aged 15 and over - Proportion in trades employment, employed in other occupations, unemployed and not in the labour force, 1996

Note: 'Other Occupations' includes occupations not adequately described and not stated.
Source: derived from ABS 1996, *Census of Population and Housing*

Wastage from skilled trades can very often be mainly due to an aging of the skilled trades workforce and high wastage rates because of the retirement of skilled trades workers. However, the wastage that is occurring from the electrotechnology trades is not due to a higher than average incidence of skilled tradespersons in the older age groups.

As shown in Table 11 and Figure 3 DEWRSB's analysis shows that the age profile of most of the electrotechnology trades is broadly similar to the average for the total trades group. Although three electrotechnology trades have somewhat distinct age profiles:

Refrigeration and airconditioning mechanics and electronic and office equipment trades have a lower proportion aged 45 to 64 years (20 % and 18 % respectively compared to 24 % for all trades)

Electronic instrument, electrical distribution and communication trades have a relatively low proportion aged 15 to 24 years, but are overly represented in the 25 to 44 year age range.

Table 11

Age Profile of the Electrotechnology Trades (% in Age Group)

Occupation	Age Range		
	15-24	25-44	45-64
Electronic Instrument Trades	10.1	57.4	26.5
Electrical Distribution Trades	7.1	68.3	24.6
Communications Trades	12.6	62.1	24.5
Electricians	22.8	54.5	22.0
Refrigeration & Airconditioning Mechanics	24.9	54.5	19.9
Electronic & Office Equipment Trades	21.8	59.4	18.3
All Trades	23.0	52.1	24.2
All Occupations	18.0	51.6	28.8

Source: ABS 1996, Census of Population and Housing

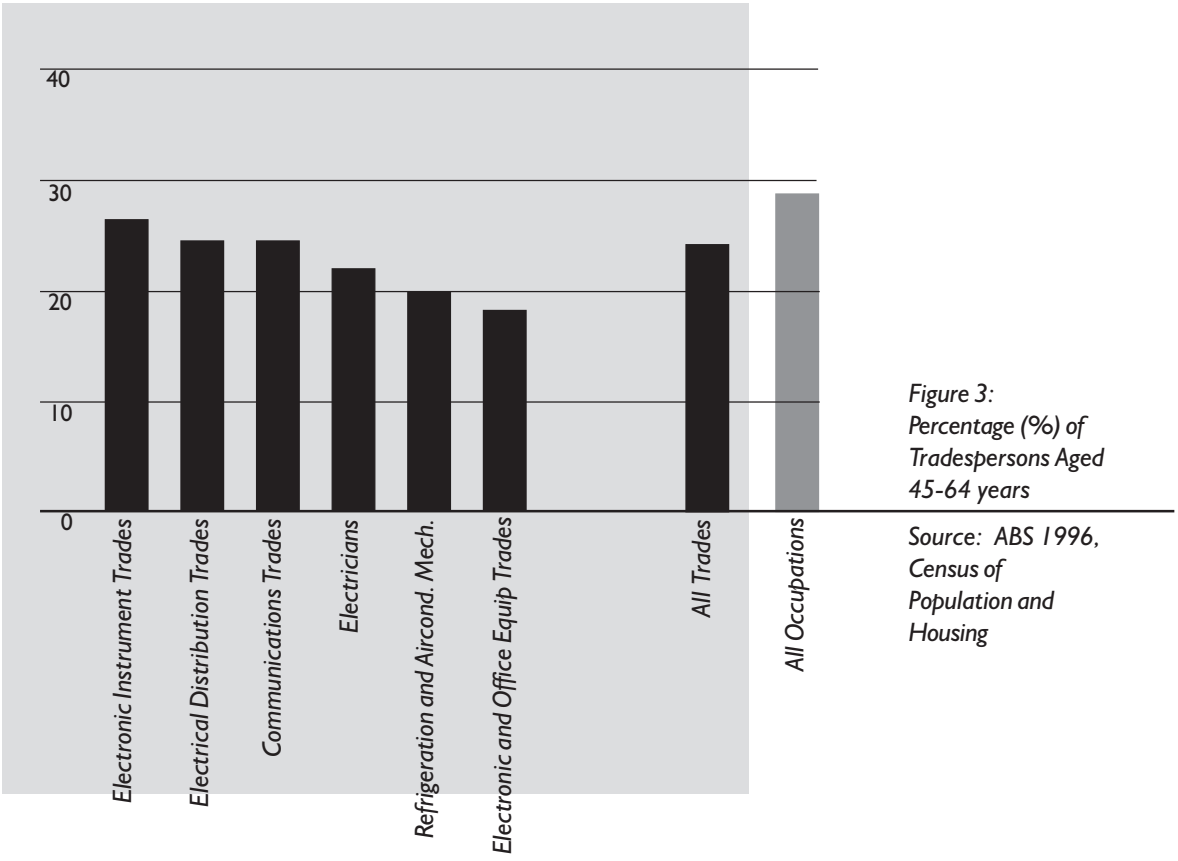

Figure 3: Percentage (%) of Tradespersons Aged 45-64 years

Source: ABS 1996, Census of Population and Housing

The DEWRSB analysis shows that career progression by electrotechnology tradespersons is a significant component of wastage. Almost two-thirds of the 35 % of electrotechnology tradespersons working in a non-trade occupation were employed in a more highly skilled occupation. The remaining one-third were, however, employed in a less skilled occupation.

Of the two-thirds moving to a more highly skilled occupation, they moved to a wide range of occupations; with building and engineering associate professionals, specialist managers, and managing supervisors being key areas of employment.

Again there was a wide range, of occupations involved with those moving to less skilled occupations. The most important of these less skilled occupations were transport drivers, intermediate clerical workers; and intermediate sales workers

DEWRSB report there are not particularly unusual patterns in the electrotechnology trades with respect to how long people stay working in these trades. Around two-thirds (64 %) of electrotechnology tradespersons who left their trade did so within the first 10 years of employment in their trade, as shown in Figure 4. Some 39 % of those who left worked less then five years in their trade. This is a similar pattern to that for the trades group as a whole.

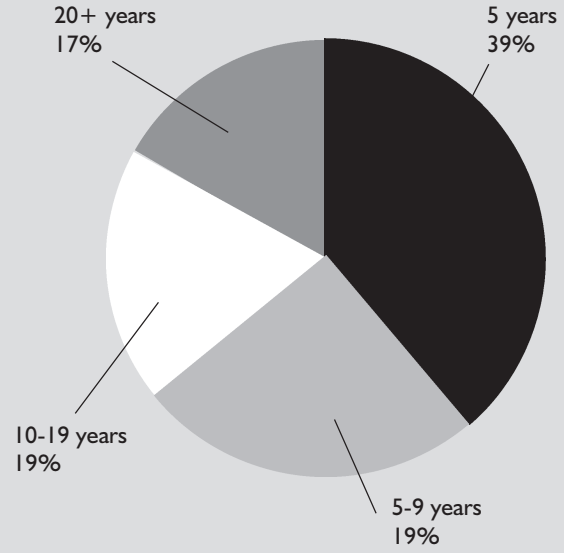

Figure 4: Trades qualified persons who have left the electrotechnology trades, by time in trade

Source: ABS 1996, Census of Population and Housing

The reasons why electrotechnology tradespersons leave their trade are important in any consideration about what can be done to increase the retention of skills in the electrotechnology trades. DEWSRB reports that, according to the ABS publication on Career Paths of Persons with Trade Qualifications the main reasons why electrotechnology tradespersons left the trade was because they were "laid-off, or lack of work" or because they "sought better pay, lack of career prospects or promoted". These reasons were given by 26 % and 24 % respectively of electrotechnology tradespersons (see Table 12).

The proportions of electrotechnology tradespersons giving reasons "laid-off, or lack of work" or "sought better pay, lack of career opportunities or promoted" were higher than for the total trades group. For the total trades group 21 % cited "laid-off, or lack of work" as the main reasons for leaving the trade and 19 % "sought better pay, lack of career prospects or promotes".

A number of factors could account for those who had "wanted a change, or (were) dissatisfied with work". These factors include a desire for a shorter working week.

DEWRSB also reports that there is some evidence to suggest that a significant number of those who left their trade could be enticed back. The ABS survey also showed that, of those who left the electrotechnology trades, 54 % would consider returning to the electrotechnology trades. This is a higher proportion than for the trades group in total. For the trades group, only 46 % would consider returning to their trades.

A return to the electrotechnology trades was not, however, unconditional. The extent of ready availability of trade and alternative non-trade employment is a major consideration. The other major consideration is "better pay, promotion or improved career prospects": this was cited by 17 % of potential returnees.

Table 12

Main Reason Trade Qualified Persons Left the Electrotechnology Trade

	Proportion (%)
Laid-off, or lack of work	25.9
Sought better pay, lack of career prospects or promoted	23.6
Wanted a change, or dissatisfied with job	19.9
Family, personal, or ill health	11.1
More job security or sought better physical working conditions	5.4
Other	14.1
Total	100

Source: ABS, Career Paths of Persons with Trade Qualifications

Despite the issues raised by people who have left the trades, it is clear that average weekly earnings for those in the electrotechnology trades have grown significantly throughout the 1990s, as shown in Figure 5. Moreover, earnings in these occupations are better than other trades generally. Earnings are also better in these trades than in the workforce generally.

DEWRSB also believes that wastage from the electrotechnology trades in the next few years is likely to be a smaller problem that for other trades in the Australian economy. Wastage from the electrotechnology trades in general, is projected to be relatively low and to be lower than trades generally, as shown in Table 13.

The implications of the wastage of skills from the electrotechnology trades workforce on the overall supply of skills to these trades is summarised in Box 6 below.

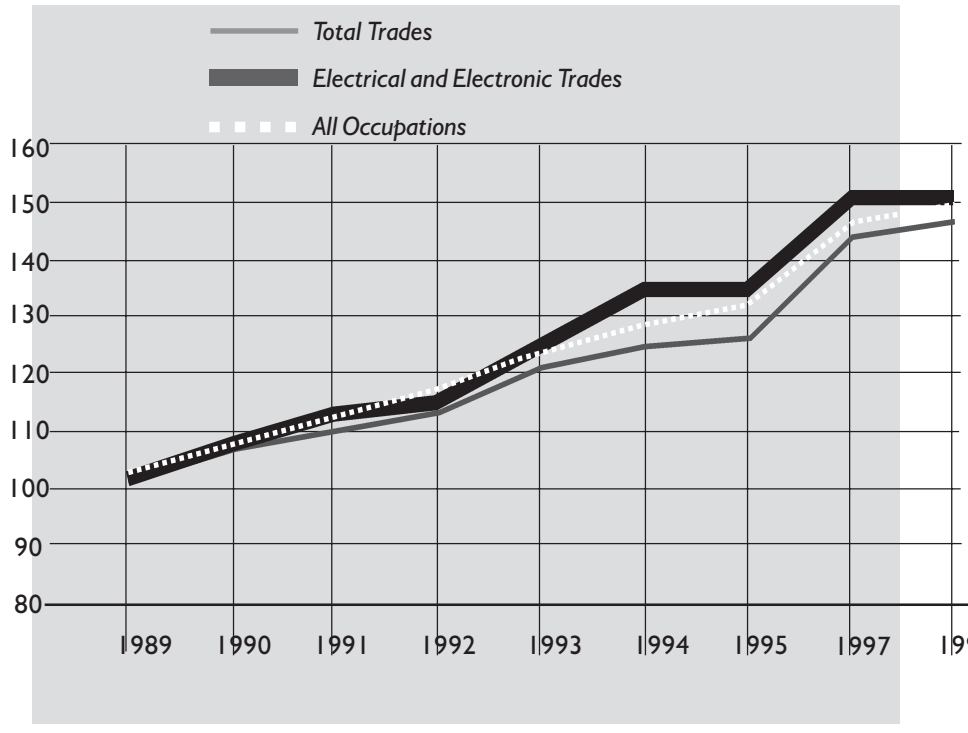

Figure 5: Indexed mean weekly earnings for the electrotechnology trades, all trades and all occupations, 1989–1998

Source: ABS, Weekly Earnings of Employees (Distribution) Australia, Cat No 6310.0 (unpublished data)

Table 13

Trade Wastage Projections

Trade occupation (ASCO Second Edition)	Wastage to 2004-05
Mechanical Engineering Tradespersons	⇓⇓
Fabrication Engineering Tradespersons	⇑
Automotive Tradespersons	⇓
Electrotechnology Tradespersons	⇓
Structural Construction Tradespersons	⇔
Final Finishes Construction Tradespersons	⇔
Plumbers	⇓⇓
Food Tradespersons	⇑
Skilled Agricultural Workers	⇓⇓
Horticultural Tradespersons	⇔
Printing Tradespersons	⇔
Wood Tradespersons	⇓
Hairdressers	⇑⇑
Textile, Clothing/Related Tradespersons	⇔
Miscellaneous Tradespersons	⇓
Total Tradespersons	⇔

⇑⇑ *well above average* ⇑ *above average*

⇔ *average*

⇓⇓ *well below average* ⇓ *below average*

Source: Wastage projections prepared by the ACER Centre for the Economics of Education and Training, Monash University under contract to DEWRSB

Box 6: The implications of skills wastage from for the skilled electrotechnology trades workforce

- The electrotechnology trades have been more successful than other trades in retaining qualified persons within the skilled trades workforce. Some 42 % of qualified electrotechnology tradespersons are working in their trades, compared with only 38 % for other trades.
- Of those now not working in an electrotechnology trade, the majority are working in other areas of the labour market, rather than having left the labour market or becoming unemployed.
- The majority of those leaving to work in other jobs (ie almost two-thirds) have gone onto more highly skilled/managerial positions, despite the fact that earnings in the electrotechnology trades are better than for other trades and national average earnings.
- Forecasts are for low wastage rates in the future.
- There is some potential to lower net wastage rates from these trades as 54 % who have left say they would consider returning with improved pay and career prospects, a figure which is significantly higher than the 46 % from other trades who say they could be induced to return to their trade.

4. Employers Recent Experience of Skill Shortages in the Electrotechnology Trades

The evidence presented to date suggests that the combination of commencements in new apprenticeship training and the now very significant set of non-apprenticeship training pathways to the electrotechnology trades have been sufficient to keep up with overall employment growth in the electrotechnology trades. This situation has been aided by electrotechnology trades having

- Better earnings and career prospects than other trades
- Lower rates of wastage from the trades than other trades
- Higher levels of qualified persons in the trades workforce.

Nevertheless it is also clear that the preconditions for skill shortages are arising in some areas. This is particularly the case in some rapidly expanding areas such as in the electronics and telecommunications occupations. The factors suggesting these preconditions for the existence of skill shortages are

- Forecasts of electrotechnology trades employment growth at a faster rate than in the past and at a faster rate than for many other trades
- Overall a relatively low 9 % of the electrotechnology workforce being made up of new apprentices in training despite the projected increased demand for skills in these trades
- Very low levels of new apprentice training (ie at less than 2 % of the trades workforce) in same key emerging electronics and telecommunications trades
- A disturbing stagnation in the growth of new apprentice completions during 1998
- The severe limitations of migration as a source of skills for these trades because of high levels of global demand for electrotechnology skills.

These factors have led to employers recently reporting increased skill shortages. This is discussed below.

4.1 Vacancy Growth

Job vacancies for electrotechnology trades have increased in the past two years, but not as strongly as for the total trades group, which was heavily influenced by strong growth in the building and construction trades.

DEWRSB carries out a periodic *Skilled Vacancy Survey*. From the survey a rise of 22.8 % in vacancies for the electrotechnology trades was recorded over the two years to October 1999.

This growth in vacancies is smaller than the 32.8 % rise over the past two years recorded for all skilled trades as shown in Figure 6.

Nevertheless the key point is that reported vacancies in the skilled electrotechnology trades are now expanding rapidly, at a rate that is far outstripping the growth in skilled trades employment in the electrotechnology trades.

Information from the *Labour Market Survey of Apprentices* survey undertaken by DEWRSB in mid 1998 indicates that there are sufficient suitable applicants for electrical apprenticeships, but that there was considerable tightening between 1997 and 1998. The number of suitable applicants for apprenticeships in the electrical trades fell from 6.0 per apprentice recruited to 3.9.

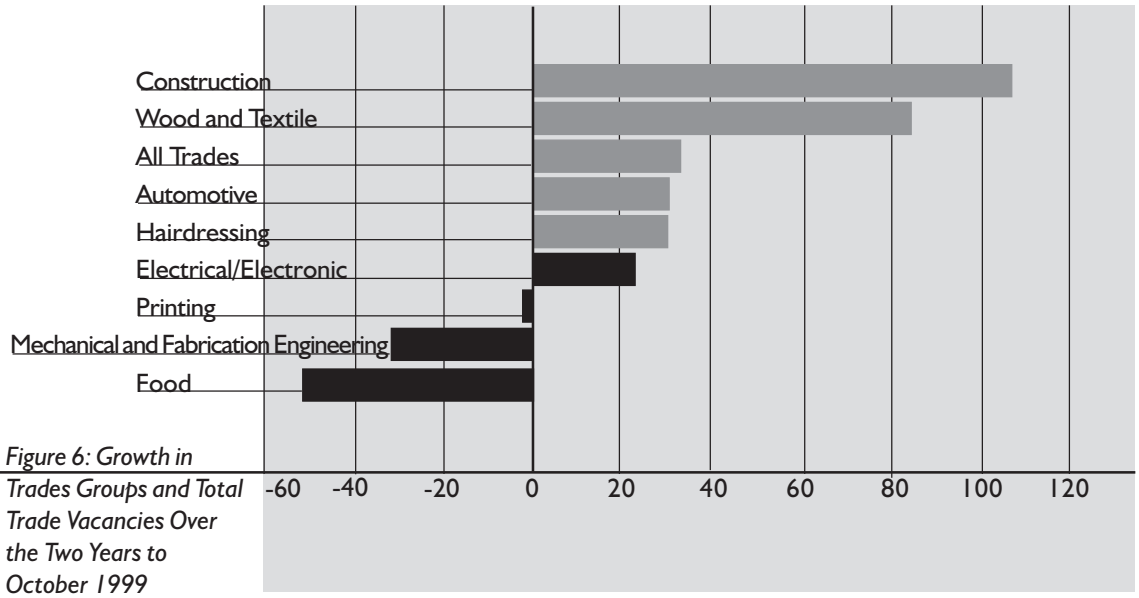

Figure 6: Growth in Trades Groups and Total Trade Vacancies Over the Two Years to October 1999

Source: DEWRSB, Skilled Vacancy Survey

Some tightening was also evident from Group Training Company apprentice recruiting with the ratio of suitable applicants falling from a quite low 2.7 per apprentice recruited to 2.2. Moreover, the youth labour market has tightened further since the survey was undertaken and finding suitable applicants for the year 2000 intake could be more difficult, especially in Sydney where many alternative career opportunities are available.

4.2 Employer Experiences and Perspectives

DEWRSB's recent assessment (of the period September to October 1999) of skill shortages in the trades shows that shortages of two of the electrical trades are currently widespread in Australia. These trades are for electricians and refrigeration and airconditioning mechanics. DEWRSB assessments by state and territory are outlined in Table 14.

Skill shortages for electricians and refrigeration and airconditioning mechanics are easing in New South Wales, particularly in Sydney with the completion of most of the electrical trades work for the Sydney Olympics. On the other hand shortages are broadening in Victoria. There are an increasing number of hotels and retail food outlets in Victoria under development or being upgraded. This, together with on-going development in large retail shopping centres, has resulted in increasing demand for refrigeration and airconditioning mechanics in Victoria.

Table 14

Electrical Trades Skill Shortages by State and Territory (a)

Tradespersons	NSW	VIC	QLD	SA	WA	TAS	NT	National
Electricians	S		S	R		S		
Refrigeration/ airconditioning mechanics	S	S	S	S	ss	S		N

S = Statewide R = Regional ss = Seasonal N = National

(a) *As assessed by DEWRSB*

Source: NCVER, 1999, p.22

While residential construction activity has been strengthening, and non-residential construction activity has also shown strong growth, the resource sector is experiencing a downturn. Consequently, in Western Australia only seasonal shortages are evident for refrigeration and airconditioning mechanics. Subdued mining and construction activity is also limiting demand for electrical trades in the Northern Territory. No electrical trades are assessed as in shortage in the Northern Territory, and shortages in Tasmania are numerically small.

Recent intelligence work by DEWRSB shows an easing of recruiting difficulty for electrical trades in New South Wales and varied situations in other States. In New South Wales around 90 % of employers in Sydney and 70 % of employers in regional areas were able to fill vacancies for electricians within four weeks in mid 1999, compared with only 60 % for the state as a whole a year earlier. This in large part reflects progress with the Sydney Olympic site. A similar situation was evident for refrigeration and airconditioning mechanics, with 75 % of employers being able to fill their vacancies within four weeks, compared to just 40 % last year.

In Victoria, some 90 % of employers were able to fill vacancies for electricians within four weeks, but 40 % were not able to fill vacancies for refrigeration and airconditioning mechanics.

In Western Australia 90 % of vacancies for electricians, almost 95 % of vacancies for electronic instrument and all vacancies for refrigeration and airconditioning mechanics were able to be filled. In Tasmania employers report that electrician vacancies are becoming harder to fill, particularly for smaller employers.

The National Electrical Contractors Association (NECA) has carried out a telephone survey of its members in December 1999/January 2000. A sample of 95 member companies were asked whether or not they were involved in particular sectors and, if so, whether they were experiencing skill shortages in those sectors.

As shown in Table 15, electrical contractors are reporting skills shortages far outstripping situations of skills being in balance or oversupply across all sectors of work except for electrotechnology work in major projects. In all other sectors at least 70 % of companies are currently experiencing at least some shortages in electrotechnology skills.

DEWRSB reports that the prospects for any continuing skill shortages in the electrotechnology trades depend on developments in key industries.

Construction and manufacturing industries are both subject to cyclical swings in employment. Manufacturing employment declined over the year to August 1999 but construction employment grew strongly. Construction activity will be influenced by the completion of the Sydney Olympic site and any drawing forward of dwelling activity associated with the introduction of the goods and services tax.

Table 15

Electrical Contracting Companies Experiencing Skills Shortages, December 1999 – January 2000

		Of those companies involved in the sector proportion reporting			
Sector	**Proportion of companies reporting involvement in the sector (%)**	**Is a shortage (%)**	**Supply = demand (%)**	**Is an over supply (%)**	**Total (%)**
Major commercial contractor work	61.0	70.7	19.0	10.3	100.0
Industrial work	76.8	79.5	17.8	2.7	100.0
Domestic household work	55.8	77.3	18.9	3.8	100.0
Voice and data communications work	42.1	72.5	22.5	5.0	100.0
Building, construction and other low voltage specialists	36.8	82.9	17.0	0	100.0
Resource projects	24.2	56.5	39.1	4.4	100.0

Source: NECA survey of Electrical and Communications Contractors

Wholesale and retail activity is heavily reliant on consumption behaviour. The level of consumer consumption has been strong in recent years and is likely to persist given continuing good economic performance.

The 1999-2000 Budget forecasts predicted continuing subdued activity in the mining sector, following a number of years of quite strong growth up to 1997-98. The present relatively low level of demand from this sector should limit prospects for electrical trades shortages in Western Australia and the Northern Territory in the short-term.

Nevertheless, a continuation of strong economic growth means that electrotechnology trades shortages are expected to persist in the short-term. Shortages would expect to become more widespread if relatively strong economic growth is sustained over the medium-term. Any resurgence in resource projects would further strengthen demand for electrotechnology trades.

A summary of employers experiences with skill shortages in the electrotechnology trades is given in Box 7.

Box 7: Employers experiences of electrotechnology trades skill shortages

- The Department of Employment, Workplace Relations, and Small Business (DEWRSB) Skilled Vacancy Survey shows a 23 % growth in electrotechnology skilled vacancies over the past two years, a smaller rise than for other trades
- The National Electrical Contracting Association (NECA) reports some 70 % - 80 % of members are experiencing at some skill shortages across most sectors
- DEWRSB reports at least some of the electrical skill shortages have eased recently with the completion of Olympics construction projects and in response to some resource sector slowdowns arising from the Asian economic crisis. In some electrical areas a higher proportion of employers are able to fill their skilled vacancies within four weeks than was the case a year earlier
- The labour market for apprentices has tightened with the number of suitable applicants for each apprentice recruited in the electrical trades falling from 6 to 4 between 1997 and 1998
- Nevertheless, skills shortages in some electrotechnology trades are widespread.

Attachment 3
Skill Shortages in the Trades –

An Employment Perspective

Labour Market Policy Group
Department of Employment, Workplace Relations and Small Business
September 1999

Skill Shortages in the Trades – An Employment Perspective

Background Issues

Labour Market Developments

The Australian labour market has strengthened considerably in recent years: employment has grown steadily and the unemployment rate has declined to around the lowest level in this decade. All three main vacancy series (ANZ, ABS and SVS) are at near decade high levels, indicating that further employment gains can be expected in the period ahead.

Skill shortages have become evident in a broadening range of occupations, especially Information Technology and Telecommunications (IT&T) skills, Health occupations and the Trades. Skill shortages, if extensive and sustained, can limit investment and growth opportunities, give rise to upward pressure on earnings and, thereby, dampen the pace of economic and jobs growth and make it more difficult to reduce unemployment.

Impact of Trades Skill Shortages

Although the downturn in resource projects resulting from the Asian economic difficulties has resulted in some easing of shortages in the Metal Trades, shortages of a broad range of Trades skills are evident and have been regarded by industry organisations as presenting potential impediments to:

- revitalising manufacturing industry and helping to encourage Australia's export and import competing industries;
- timely and cost effective completion of construction and resource projects; and
- growth in tourism/hospitality (tourism associated with the Sydney Olympics is expected to generate additional demand for occupations such as Chefs).

Cyclical Employment in Key Industries

The cyclical nature of much of Trades employment contributes to fluctuations in apprenticeship intakes and to people leaving trades work. This in turn flows through to skill shortages when the labour market strengthens. According to the latest ABS *Survey of Career Paths of Persons with Trade Qualifications,* the main reason a trade qualified person left the trade was because of being "laid off, lack of work".

- Construction and Manufacturing, the largest employing industries for Trades employment, are among those industries most subject to cyclical swings in employment.

Cyclical employment patterns impact upon trade training, with employers tending to provide fewer training opportunities in times of downturn. This often results in a diminished supply of newly trade qualified persons when the economy picks up.

- This trend is somewhat surprising given the sustained period of economic growth and may reflect structural changes in the economy, including the shift to contracting out and reforms to public sector organisatons (rationalisation, sales and closures) which have effectively reduced the supply of tradespersons available to industry.

The Government's economic policies are designed to maximise sustainable economic growth and job creation, creating an environment conducive to increased and sustained commitment by employers to training apprentices. Australia has performed well economically, especially in view of the downturn in Asian economies, and ongoing reforms are being implemented to underpin a continuation of sustained economic and employment growth.

Labour Market Flexibility

The Government recognises that enhanced labour market flexibility and greater responsiveness to industry needs are crucial to encourage innovative and internationally competitive enterprises. Enhanced flexibility can help to address skills shortages in two important areas. First, enterprise agreements provide a mechanism for more flexible remuneration arrangements for skills in shortage, and for training arrangements to upskill existing workers. Secondly, reformed workplace relations arrangements for New Apprentices pave the way for more flexible options for apprentice training, including part-time apprenticeships (in part for school students).

New Apprenticeships are a simpler and more flexible system of work-based training that build on and incorporate the previous apprenticeship and traineeship systems. The *Workplace Relations Act 1996* (the WR Act) introduced a number of provisions to facilitate this shift to greater flexibility:

- in relation to certified agreements and Australian workplace agreements, the WR Act enables wages to be varied to reflect different combinations of training and work; and
- DETYA has been working with peak industrial organisations, with the assistance of DEWRSB, to facilitate appropriate workplace relations access to the new forms of work based training available.

The recently passed Youth Employment legislation provides a permanent exemption for juniors from anti-age discrimination provisions, thus securing this aspect of apprenticeships for young people.

Occupational Wastage

Occupational wastage (qualified workers who no longer are employed in the trade for which they are qualified) and wastage during training (apprentices not completing their apprenticeship) are major causes of skill shortages. They help to explain the emergence of shortages in the context where employment for Trades overall is growing only slowly (3.3 per cent over the five years to May 1999).

Cyclical fluctuations in employment are only one reason that people leave their trade, sometimes involuntarily. In recent years Australia has undergone considerable structural change and strong employment growth that has resulted in alternative, often more rewarding, career paths for those employed in the Trades. Other reasons for occupational wastage vary according to trade (more information on occupational wastage is provided in Attachment A):

- Construction Tradespersons tend to leave their trade as they reach middle age, in order to seek less physically demanding work;
- uncongenial working hours contribute to wastage from Food Trades/ Chefs; and
- Hairdressers often leave their trade to raise a family, while reaction to chemicals can cause people to leave such Trades as Hairdressing and Vehicle Painting.

Image of Trades Employment

A study of the labour market for apprentices undertaken in early to mid 1998 found that Group Training Companies (GTCs) and employers commonly commented that overall apprenticeship supply and quality were limited by its poor image and lack of promotion as a career choice, especially compared with the professions and the emphasis placed on higher education:

- employers considered that the school system should be used to promote trades as a viable alternative to university through: careers advisers; introduction of more technical subjects in Year 11 and 12; and more work experience placements; and
- for employers and GTCs, there is an overall sufficient supply of suitable applicants for apprenticeships (although the pool was contracting).

Skill Shortages and the Unemployed

Skill shortages are an indicator of structural imbalances and a guide to where attention can best be directed to focus reform and provide skills that will overcome these impediments, support employment growth and reduce structural unemployment.

While many skill shortages do not provide direct job opportunities for unemployed persons, addressing such shortages in sectors such as IT&T and hospitality can open up associated less skilled jobs that will provide job opportunities for the unemployed:

- skill shortages typically relate to higher skilled occupations and specialised experience for which most unemployed persons are not suitable;
- measures to encourage qualified workers to move readily into areas of skill shortages can open up vacancies for the unemployed; and
- for some occupations, including the Trades, factors such as outmoded skills can limit the competitiveness of formally qualified job seekers.

Technology and Workplace Changes

Contributing to trades shortages are changes in the skills required by employers, particularly the greater use of computing, the obsolescence of older skills and increasing use of contract labour. The obsolescence of some trade skills partly accounts for unemployment and skill shortages coexisting in individual trades (some of the trades experiencing skill shortages, such as Vehicle Trades, have moderate unemployment rates):

- changes in skills requirements have been especially evident in the printing industry where increased use of computing is becoming widespread;
- changing technology is impacting on the work of Motor Mechanics; and
- the fragmented nature of the building industry and increasing use of sub-contracting has limited training opportunities.

What Can be Done to Address Skill Shortages?

Better Information on Reasons for Skill Shortages

There are some gaps in our understanding of Trades skill shortages, especially the geographical spread and the reasons for shortages. DEWRSB undertakes annual monitoring of skill shortages, based on telephone discussions with employers who have recently advertised and other industry and training bodies. Other industry associations also provide selected information. A more in-depth analysis of certain problem areas, such as Chefs or Construction, may be warranted, as well as more regular information on the supply of available qualified tradespersons and suitable apprentices or trainees.

Innovative and Flexible Use of Skills and Remuneration Arrangements within Enterprises

The way in which skills in short supply are deployed and rewarded within enterprises is an area that warrants attention to ensure the effects of skill shortages are ameliorated. The Government has taken active steps to provide more flexible alternatives, but the take-up by employers may not be a extensive as is desirable, in terms of fully exploiting the more flexible remuneration and associated training options that are available. For example, there is now greater scope to vary relativities, establish revised career paths and to vary employment conditions and working arrangements – all of which may be relevant to improving attrition and retention rates within the Trades.

Shift into Growth Sectors

Even though demand levels for most Trades have remained steady, job opportunities in the Trades do arise from occupational wastage and workers retiring. Considerable attention has already been focused on identifying growth sectors for the expansion of New Apprenticeships. This approach can encompass encouraging relevant traditional apprenticeships in growth sectors. More forward looking employment prospects information should also assist in strategically targeting training directions.

Better Career Matching

As well as the need to address the 'image' of the Trades, the *Labour Market for Apprentices* study emphasised the importance of getting those with the right aptitude - not necessarily the highest qualified - into the Trades. Pre-vocational courses and VET in school assist in this regard.

Greater Awareness of Migration Options

For the Trades, as with the total Australian workforce, migrants have been an important component of supply and have helped to alleviate skill shortages. A strong inflow of arrivals in recent years has continued to add to the supply of trade skills with a solid net inflow in trade skills in demand including Metal Tradespersons, Motor Mechanics, Electricians, Carpenters/Joiners and Hairdressers.

Australia's migration arrangements will continue to supplement Australia's skill base and help to address skill shortages. The 1999-2000 Migration Programme has increased somewhat from previous years and has maintained a strong emphasis on skills. Recent initiatives should further enhance the supply from overseas of skills in demand. The employer-sponsored categories (the Employer Nomination Scheme, Labour Agreements and the Regional Sponsored Migration Scheme) directly provide skills that are not available from the domestic labour market. These categories are demand-driven, with levels above planning targets accommodated by reducing other categories in the stream:

- a new points test was introduced from 1 July 1999 for the largest skilled migration categories, which includes additional points for occupations identified by DEWRSB as in demand;
- the 1999-2000 Migration Programme also includes a 5,000 place contingency reserve for employer-sponsored and State/Territory migration categories; and
- skill shortages can also be addressed by temporary and Trans-Tasman migration arrangements. Under arrangements introduced from 1 August 1996, employers have streamlined access to skilled workers from overseas, for up to four years.

Attachment A
Trades Wastage

People leaving their trade and seeking alternative employment or exiting the labour force can be an important contributor to skill shortages.

- Wastage increases resources firms must allocate to recruitment; raises training costs for employers; increases the cost to government for the provision of trade training; can handicap the efficient operation of enterprises, particularly small businesses; and can have social as well as economic implications for small towns and isolated communities.

Is There a High Incidence of Wastage from Trades Employment?

A considerable proportion of qualified tradespersons leave trade employment. Analysis of 1996 Census data reveal for all persons aged 15 and over with trade qualifications:

38% were working in a trade;

35% were working in a non-trade occupation;

5% were unemployed; and

21%were not in the labour force (that is, not employed or actively seeking work, which includes those who retire).

- Trades wastage rates are in general appreciably higher than those of the professions.

There are considerable differences in wastage rates among trades:

- Automotive, Wood, and Electrical and Electronic Tradespersons had the highest rates in trade employment (43 per cent, 43 per cent and 42 per cent respectively);
- Hairdressing and Amenity and Horticulture tradespersons had the lowest wastage rates (31 per cent and 26 per cent respectively);
- Amenity and Horticulture tradespersons were most likely to be working in non-trades employment; [1] and
- Hairdressing had a high proportion not in the labour force (32 per cent - see Figure B1). As this is predominantly a female trade, it may be that many left the labour force to raise children.

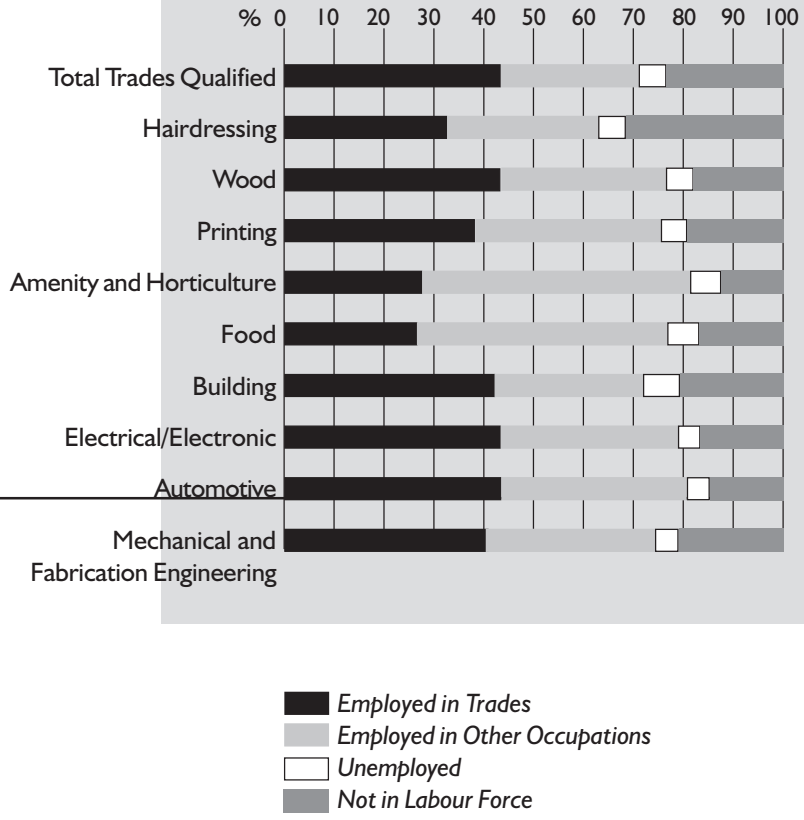

Figure A1: Trades qualified persons aged 15 and over - Proportion in trades employment, employed in other occupations, unemployed and not in the labour force, 1996

Note: 'Other Occupations' includes occupations not adequately described and not stated.
Source: derived from ABS 1996, *Census of Population and Housing*

[1] *The Food Trades present a similar pattern to Horticulture but it is considered that the low proportion of those with Food Trades qualifications working in the trades merely reflects a change in occupational classification. Many of those with Food trades qualifications would be employed as Chefs, which was a Trade occupation under Australian Standard Classification of Occupations (ASCO) First Edition but is classified as an Associate Professional occupation under ASCO Second Edition.*

Is Wastage Merely Career Progression?

Career progression by tradespersons is certainly a significant component of wastage. Half of the 35 per cent of tradespersons working in a non-trade occupation were employed in a more highly skilled occupation. The other half were, however, employed in a less skilled occupation.

The major more highly skilled occupations (in descending order by size) were:

- Building and Construction Managers;
- Shop Managers;
- Chefs;
- Managers and Administrators (not fully defined);
- Electronic Engineering Associate Professionals;
- Building, Architecture and Surveying Associate Professionals; and
- Production Managers.

The main less skilled occupations (in descending order of size) were: Truck Drivers; Sales Assistants; Sales Representatives; and Cleaners.

How Long do People Stay in their Trade?

Around two-thirds (65 per cent) of tradespersons who left their trade did so within the first 10 years of employment in their trade;

- 39 per cent of those who left worked less than five years in their trade (see Figure A2).

Why do Tradespersons Leave their Trade?

According to the ABS publication on Career Paths of Persons with Trade Qualifications the main reason a tradesperson left the trade was because of being "laid off, or lack of work". This reason was given by 21 per cent of all tradespersons and 23 per cent of males. The main reason, given by 59 per cent of females (most in Hairdressing), was "family, personal or ill health" (see Table A1).

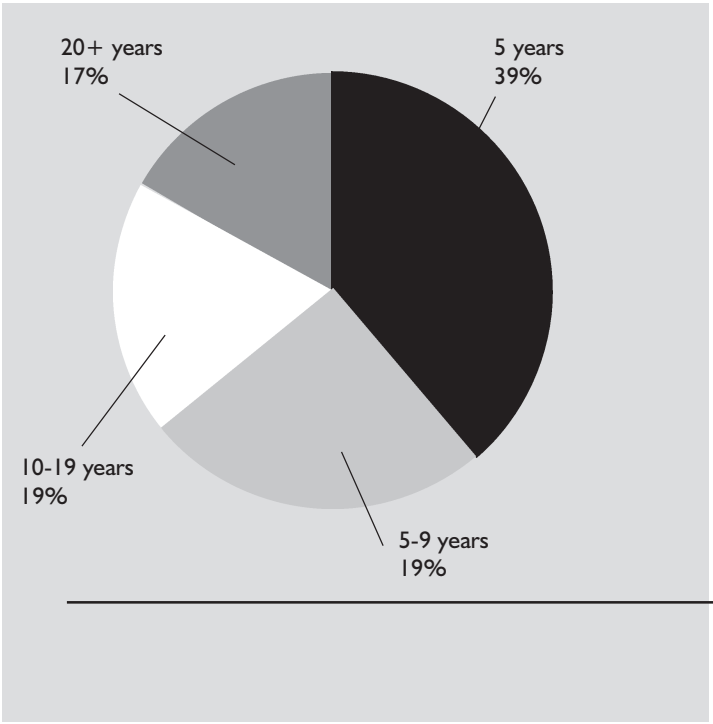

Figure A2: Trades qualified persons who have left the electrotechnology trades, by time in trade

Source: ABS 1996, Census of Population and Housing

Table A1

Main Reason Trade Qualified Persons Left the Electrotechnology Trade

	Proportion (%)
Laid-off, or lack of work	25.9
Sought better pay, lack of career prospects or promoted	23.6
Wanted a change, or dissatisfied with job	19.9
Family, personal, or ill health	11.1
More job security or sought better physical working conditions	5.4
Other	14.1
Total	100

Source: ABS, Career Paths of Persons with Trade Qualifications

A number of factors could account for the one-fifth who "wanted a change, or (were) dissatisfied with work". These are likely to differ between trades and include: a desire for less physically demanding work (including not working outside in hot or cold weather) for Construction tradespersons when they reach middle age; Food tradespersons – especially Chefs - seeking more congenial working hours; reaction to chemicals used by Hairdressers and Vehicle Painters; Electrical and Electronic tradespersons seeking a shorter working week; and Metal and Wood tradespersons wanting cleaner work.

Could Those who Left their Trade be Enticed Back?

The ABS survey also showed that, of those who left the trades, 46 per cent would consider returning to the trades. A return to the trades was not, however, unconditional. The extent of ready availability of trade and alternative non-trade employment is a major consideration. The other major consideration is "better pay, promotion or improved career prospects": this was cited by 17 per cent of potential returnees.

Will Wastage from Trades Employment Remain a Problem?

Wastage from the trades in general is projected to remain higher than wastage from the professions.

- Hairdressing is anticipated to continue to have well above-average wastage (see Table A2).

Table A2

Trade Wastage Projections

Trade occupation (ASCO Second Edition)	Wastage to 2004-05
Mechanical Engineering Tradespersons	⇓⇓
Fabrication Engineering Tradespersons	⇑
Automotive Tradespersons	⇓
Electrotechnology Tradespersons	⇓
Structural Construction Tradespersons	⇔
Final Finishes Construction Tradespersons	⇔
Plumbers	⇓⇓
Food Tradespersons	⇑
Skilled Agricultural Workers	⇓⇓
Horticultural Tradespersons	⇔
Printing Tradespersons	⇔
Wood Tradespersons	⇓
Hairdressers	⇑⇑
Textile, Clothing/Related Tradespersons	⇔
Miscellaneous Tradespersons	⇓
Total Tradespersons	⇔

⇑⇑ *well above average* ⇑ *above average*

⇔ *average*

⇓⇓ *well below average* ⇓ *below average*

Source: Wastage projections prepared by the ACER Centre for the Economics of Education and Training, Monash University under contract to DEWRSB

Attachment B
Study of the Labour Market for Apprentices

A study of the labour market for apprentices was undertaken to assess the adequacy of the supply of suitable applicants for apprentice positions, and to examine reasons why applicants are considered not suitable. The surveys of over 500 employers and more than 50 Group Training Companies (GTCs) were undertaken in mid 1998. The findings of both the employer and GTC surveys show that *overall there is sufficient supply of suitable applicants for apprenticeships being offered by employers.*

Supply of Applicants for Apprenticeships

In respect of both recent employer experience, either through direct recruitment action (employer survey) of indirectly through Group Training Companies (GTCs), the overall finding of this study is that virtually all employers received an adequate supply of suitable applicants for apprenticeships. Moreover, employers indicated that they were satisfied with the quality of apprentices they had recruited.

Firms in the 1998 employer survey received almost 17 applicants, on average, for each apprentice recruited.

- *There were close to four suitable applicants for every apprentice recruited in all apprentice types, except food trades.*
- This compares with seven suitable applicants in the 1997 survey, indicating a notable tightening of the apprentice labour market, in the context of a downward trend in the overall unemployment rate.
- For the metal trades there were five suitable applicants for each apprentice recruited, well down on around ten in 1997, and almost four for electrical and electronics apprenticeships, also lower than in 1997 (six).
- For building and construction trades there were about four suitable applicants for each apprentice recruited, down slightly form 1997, while for vehicle trades there were 3.2 suitable applicants per apprentice recruited.

The GTCs surveyed received some 2.5 suitable applicants per apprentice recruited.

While the number of applicants per apprentice recruited was less than for the employer survey, the supply was generally adequate.

Although the figures for suitable applicants indicate adequate supply, the ratios are averages. For individual GTCs, in some regions, there may be some difficulty in obtaining sufficient suitable applicants for apprenticeships.

The GTC survey results indicate some possible tightness in the supply of applicants for apprenticeships, with an average ratio of suitable applicants to apprentices recruited of 2.6 (and the lowest of just 1.6 for food trades). The highest suitable applicants ratios are for vehicle trades (3.7) and electrical/electronics (2.7), with most other apprentice types around 2.5.

Employer Size

The employer survey found that, generally, the larger the size of the employer the more likely it was to attract suitable applicants for apprenticeships. Larger employers have a higher profile, especially in regional economies; are in a better position to advertise extensively; and may be more attractive to prospective apprentices because of better career paths and greater ability to sustain employment for apprentices throughout the training period.

- *Firms employing less than 100 people received just over three suitable applicants for every apprentice recruited compared with more than four for firms of 100 or more.*
- If there is some difficulty in finding suitable applicants for apprentices, this is more likely for small firms with less than 20 employers.
- Small firms also have an above-average proportion of unfilled vacancies (almost 20 per cent), indicating some difficulty in recruiting suitable apprentices.

Unsuitable Applicants

In the employer survey, a very high proportion of applicants (almost three-quarters) was considered not suitable for apprentice positions. This may explain comments by some employers or employer groups that there are difficulties in recruiting apprentices, particularly the perception that the quality of many applicants is poor.

- Literacy/numeracy skills ranked higher than formal educational qualifications, even though inadequate educational qualifications are of particular concern for electrical/electronics, metal trades and vehicle trades.
- Overall, employer concerns do not appear to be the level of education, rather that education is not adequately preparing many young people for careers in the trades.
- Transport/travel was a significant issue in some regions, particularly in food trades.

Reasons for Applicants being Unsuitable

In the employer survey attitude/presentation was rated as the most important factor contributing to the unsuitability of apprenticeship applicants. Aptitude for the type of work was the second ranked reason for unsuitability, followed by literacy/numeracy skills.

Quality of Applicants

Overall, employers were satisfies with the quality of apprentices recruited, with 65 per cent commenting that the quality of applicants was either high or exceptionally high. Most GTCs reported that employers had a high level of satisfaction with applicants referred. GTCs had strict selection criteria for apprentices, contributing to relatively low rejection rates by most host employers.

For those applicants rejected after referral by GTCs, common reasons given for not being suitable include:

- Transport difficulties for rosters worked (hospitality sector);
- Educational standards below par (particularly for new technology);
- Lack of industry knowledge and work practice;
- Lack of trade awareness or commitment; and
- Poor hand skills.

Desirable Characteristics of Applicants

The characteristics that employers in the survey commented would make applicants more attractive, and successful in a trades career, include:

- Genuine interest in the trade area for which they were applying;
- Better understanding of the nature of work in the trade area of their choice;
- Completion of a pre-apprentice course to improve productivity in the critical early period of the apprenticeship and prepare apprentices for a career in the trades;
- Personal qualities such as maturity, positive attitude, good presentation, and good communication skills; and
- More understanding for school students of what work is about, through work experience programs, extra curricula trades studies and encouragement of pre-apprenticeship courses.

Preparation for Careers in the Trades

GTCs and employers commonly commented that overall apprenticeship supply and quality was limited by its poor image and lack of promotion as a career choice, especially compared with the professions and the emphasis placed on higher education.

Employers considered that the school system should be used to promote trades as a viable alternative to university through: careers advisers; introduction of more technical subjects in Year 11 and 12; and more work experience placements.

The survey findings highlight the importance of vocational preparation, including literacy and numeracy skills, to improve the prospects of young people successfully applying for apprenticeships, including through vocational education and training in school and separate pre-vocational courses.

Attachment 4

Summary of Telephone Survey Results

National Electrical and Communications Association (NECA)

Skills Shortage
Results 21st January 2000

There were 190 members on the original list that was handed to the Survey Company. Of these, 105 members were interviewed, whilst the majority of the other 85 were either closed or shut down due to Christmas.

The members who were interviewed were asked 3 questions, (see below) regarding skill shortages within their industry;

The questions were;

1. Are you experiencing a shortage or oversupply of skilled workers in the following sectors?
   - 1a. Major commercial construction
   - 1b. Industrial
   - 1c. Domestic
   - 1d. Voice and data communications
   - 1e. Building automation or other low voltage specialists
   - 1f. Resource
2. Your state of operation - if you operate in more than 1 state - please complete separate returns for each state
3. The size of your business (usual number of employees)

The Results of the Survey are as Follows

Out of the respondents surveyed (105 people), the percentage who *gave* a response for each sector of question 1 were as follow;

Response to Question 1 - By Sector

1a	1b	1c	1d	1e	1f
%55.2	%69.5	%50.4	%38.1	%33.3	%21.9

These figures broken down into Shortage, Supply=Demand and Oversupply gave the following results;

Shortage, Supply=Demand and Oversupply

	1a	**1b**	**1c**	**1d**	**1e**	**1f**
Was a Shortage	%70.69	%79.45	%77.35	%72.5	%82.85	$56.52
Supply=Demand	%18.96	%17.80	%18.86	%22.5	%17.14	%39.13
Is an Oversupply	%10.34	%2.74	%3.77	%5	%0	%4.34

On a state by state basis, the breakdown of those who indicated there was a shortage is as follows;

Shortage - By State

%	**1a**	**1b**	**1c**	**1d**	**1e**	**1f**
WA	12.19	8.62	12.19	3.44	10.34	15.38
NSW	29.26	29.31	24.39	37.93	31.03	15.38
VIC	17.07	24.13	19.51	20.68	24.13	30.76
SA	14.63	20.68	14.63	13.79	13.79	15.38
QLD	21.95	15.51	24.39	17.24	13.79	23.07
TAS	2.4	1.72	4.87		3.44	
NT						
ACT	2.4			6.89	3.44	

The breakdown of those who indicated Supply=Demand on a state by state basis is as follows;

Supply=Demand - By State

%	1a	1b	1c	1d	1e	1f
WA	27.27	7.69	20	11.11		
NSW	45.45	23.07	20	55.55	33.33	44.44
VIC	18.18	53.84	50	11.11	33.33	11.11
SA						22.22
QLD				11.11	33.33	11.11
TAS	9.09	15.38	10	11.11		11.11
NT						
ACT						

The breakdown of those who indicated there was an Oversupply on a state by state basis is as follows;

Over Supply - By State

%	1a	1b	1c	1d	1e	1f
WA						
NSW	33.33	50	50			100
VIC	33.33		50	50		
SA	16.66					
QLD		50		50		
TAS						
NT						
ACT	16.66					

Attachment 5

Summary of Focus Group Meetings Conducted by NECA

Focus Group Meetings

Background

Two focus group meetings were held: in Sydney on Tuesday 8 February and in Melbourne on Thursday 10 February.

Each meeting was held in the State NECA Office and lasted for about one hour.

The focus group meetings aimed to identify any systemic or attitudinal barriers to uptake of New Apprenticeships or traineeships in the Electrotechnology industry. Questions aimed to identify any barriers that may exist due, for example, to lack of up-to-date information on training and career pathways in relevant industry sectors or due to negative perceptions that Trades in general were an inferior choice in the area of further education and training or that the Electrotechnology Trades in particular were "dirty" or undesirable for other reasons.

Research Method

The research was undertaken with a range of relevant employers in the industry and the meetings were seen as an extension of the telephone survey on employer perspectives on skill shortage issues conducted by NECA in December.

Participants were asked about their opinions and experience of career and training pathways in the electrotechnology industry and to identify emerging issues such as the need to update skills and to access necessary training. They were asked about their own and other people's:

- preconceptions and attitudes to careers and skills development in the industry sector;
- experiences when seeking relevant and up-to-date information about skills training and
- experiences and perceptions of attitudes and expectations about careers and training in the electrotechnology field among peers or client groups such as young people at school or those currently in training, among parents and within the community and among applicants and recent entrants to the workforce.

Questions Asked were as Follows:

1. What is your experience of a career path and/or training in the electrotechnology industry?
2. How would you perceive a career in electrotechnology today? (exciting/dynamic/challenging/second-rate/problematic/long/short term). Why?
3. What do you think are important issues impacting on work in the industry sector?
4. How much do you know about training and apprenticeships in electrotechnology? (a lot, a little, enough???)
5. Have you tried to access information about training in the industry? Was the experience negative or positive?
6. Do you find it difficult to understand the options and training pathways available today? If 'yes', why?
7. What is your opinion or experience of apprentices and/or apprenticeships in the industry? (Applicants suitable, training relevant, career outcomes satisfactory???)
8. What are the main issues or problems related to a career or training in the electrotechnology sector from your perspective?
9. What actions would you recommend in response to these issues?

Findings

- Agreement that it was difficult to invest in training because of it was not possible to make a four-year commitment to a New Apprentice due to short economic cycles and the erratic demands of contracting work.
- A perception that entrants to training did not have prerequisite skills, knowledge and aptitude, especially knowledge of careers in electrotechnology industry and basic communication and numeracy skills to succeed in training.
- New flexible New Apprenticeship arrangements and the impact of variables such as enterprise agreements were not generally understood.
- High rates of occupational wastage and attrition during training were seen to be the result of inappropriate current career and training pathways in the industry.