Review of
Refrigeration and Air Conditioning Trade Qualifications and Competency Standard Units

Project Progress Report 5

15th December 2015

Contents

1. Aim

This project aims to develop revised Qualifications and Competency Standard Units for the Refrigeration and Air Conditioning trade to meet the current and future skill needs of Australia's Heating, Ventilation, Air Conditioning and Refrigeration (HVACR) industry.

2. Methodology:

The project will be undertaken in accordance with the following methodology and milestones:

Milestone 1 due March 2014, outlining the following:

a) Breakdown of tasks, deliverables, timeframes, stakeholder engagement strategy, Project evaluation measures and itemised expenditure required for the whole project.
b) National Steering Committee established and meetings scheduled to confirm project objectives, timelines and deliverables.

Progress Report 1, Milestone 2 due April 2014, outlining the following:

a) An overview of activity undertaken during the reporting period, including:
    I. Steering Committee meetings 1 and 2
    II. National consultation plan
    III. Project Forum on E-Oz website
b) Key activities to be completed during the next reporting period.

Progress Report 2, Milestone 3 due August 2014, outlining the following:

a) An overview of activity undertaken during the reporting period, including:
    I. Multi-level national consultations
    II. Draft recommendations
    III. Steering Committee meeting 3
b) Key activities to be completed during the next reporting period.

Progress Report 3, Milestone 4 due December 2014, outlining the following:

a) An overview of activity undertaken during the reporting period, including:
    I. Draft new qualifications and competency standard unit titles
    II. Consultations and agreements with key stakeholders on proposed new qualifications and competency standard units
    III. Plan to fully develop new qualifications and competency standard units
    IV. Steering Committee meeting 4
b) Key activities to be completed during the next reporting period.

Progress Report 4, Milestone 5 due May 2015, outlining the following:

a) An overview of activity undertaken during the reporting period, including:
    I. Review of draft units and assessment requirements
    II. Steering Committee meeting 5
b) Key activities to be completed during the next reporting period.

Progress Report 5, Milestone 6 due August 2015, outlining the following:

a) An overview of activity undertaken during the reporting period, including:
    I. Final review draft units and assessment requirements
    II. Steering Committee meeting 6
    III. Draft Case for endorsement
    IV. Project Report 5
b) Key activities to be completed during the next reporting period.

Final Report, Milestone 7, due January April 2016, which will evaluate the outcomes of this project and provide a full reporting of the Project's achievements, including:

a) *A comprehensive analysis of the Project's outcomes against those identified in the Project Plan and the Project Deliverables.*
b) Data against the evaluation measures set out in the Project Plan.
c) New qualifications and competency standard units
d) Finalise Training Package components and incorporate into the Training Package via Continuous Improvement process seeking endorsement. Advice on anticipated timeframes.

3. Project Progress Report

The project's Methodology states that this Progress Report 5 for Milestone 6 was due in August 2015 however it was not completed until 15th December due to:

- Project Report 4 being completed on 30th June, instead of May as scheduled caused by the need to:
  - complete a Student Survey in March/April 2015 to determine the range of common and specialised applications that apprentices are expected the work on at the end of their apprenticeship.
  - address the issues raised by AMCA in its February 2015 submission. These were investigated by the Working Group April/ May 2015 and addressed in E-Oz's response in August 2015.
- RAC TAC meeting being conducted on 14-15th September
- Other E-Oz priorities caused by the changing federal government funding arrangements and requirements.

Per the Project Methodology, this report was required to outline the following:

a) An overview of activity undertaken during the reporting period, including:
   I. Final review of draft units and assessment requirements
   II. Steering Committee meeting 6
   III. Draft Case for endorsement
   IV. Project Report 5
b) Key activities to be completed during the next reporting period.

Due to delays in the project and the uncertainty of E-Oz's role in developing Training Packages from January 2016, the content of this report was changed to contain:

a) An overview of the key activities completed to date, including:
   1. Activities undertaken during this reporting period
   2. Key outcomes of the:
      2.1. Industry, RTO, State Training Authority and Regulator consultations
      2.2. Draft Essential Performance Capabilities
      2.3. AMCA submission
      2.4. Student Surveys
      2.5. Revised Essential Knowledge and Skills Clauses
      2.6. Proposed New Unit to Essential Performance Capabilities and Essential Knowledge and Skills Mapping
   3. Proposed Certificate III and Certificate IV qualifications
   4. Proposed Certificate III and Certificate IV units
   5. Contact details of the project Steering Committee.
b) Key activities still to be completed.
c) Project Action Plan Progress Report

It is proposed that a copy of this report be provided to the project Steering Committee members, as well as Australian Industry and Skills Committee and the relevant Industry Reference Committee.

a) An overview of the key activities completed to date

1. Activities undertaken during this reporting period: 1st July – 30th November 2015

1.1. Steering Committee Meeting 7

This meeting was held on 6th August 2015 at NECA Group Training Centre, Chullora TAFE in Sydney. The minutes of the meeting are provided in Appendix A.

The main activities conducted from Steering Committee Meeting 6, held on 13 May until this meeting were covered by Agenda Item 4 as listed below:

a) E-Oz update regarding future role in developing Training Packages
b) Project Report 4
c) Additional Information on the Draft Qualifications and Essential Performance Capabilities Consultations
d) Additional Information from Student Survey results
e) E-Oz draft response to AMCA's submission
f) Report on industry association meetings

Refer to the attached meeting minutes for the details.

There was only one required action from the meeting, as listed below, which was completed on 10th August.

Action 1:
Noel to revise and finalise the response to AMCA's Position Paper and send it the AMCA via Graham MacKrill ASAP.

1.2 Steering Committee Meeting 8

This meeting was held on 20th November 2015 at NECA Group Training Centre, Chullora TAFE in Sydney. The minutes of the meeting are provided in Appendix B.

The main activities conducted from Steering Committee meeting 7 held on 6th August until this meeting are listed below:

- ITEM 4: E-Oz update and how Training Packages will be revised from 2016
  a) New Training Package Development Plan
  b) Australian Industry and Skills Committee
  c) Bob Taylor, update on the future role of E-Oz

- ITEM 5: Report on Actions since last meeting
  a) RAC TAC meeting held at the Canberra Institute of Technology on 14-15th September
  b) Revision of the earlier draft Certificate III qualification
  c) Duplication in the refrigeration electrical and the restricted electrical units.
  d) New RAC units to be included in proposed revised Certificate II in Electrotechnology Career Start.

- ITEM 6: Planned Future Actions
  a) Currently it is not known which organisation will operate as the new Service Skills Organisation for the HVACR industry.
  b) E-Oz will complete Project Report 5 which will provide a summary and relevant detail of the current status of the project
  c) No future Steering Committee Meetings are planned until after the details of the relevant Service Skills Organisation is announced.

2. Key Outcomes of the Consultations

2.1 Industry, RTO, State Training Authority and Regulator Consultations

2.1.1 Industry and Training Provider Consultations

The national consultation plan below was finalised and distributed with an information flyer (Appendix A) on 14th May 2014 to the Steering Committee, ITABs and RTOs for distribution through their networks to the refrigeration and air conditioning industry and teachers as well as relevant government training departments and regulators in each State and Territory.

Location	Training Provider Meeting	Industry Meeting	Govt. Dept. & Regulator Meeting
ACT - Canberra	Mon 2 June - am	Wed 11 June - am	Wed 11 June - pm
NSW - Sydney	Wed 25 June - am	Tues 24 June - am	Tues 24 June - pm
NSW - Newcastle	Thurs 31 July	Wed 30 July	N/A
NT - Darwin	Tues 15 July - am		Wed 16 July am
Queensland - Cairns	Thurs 10th July - am		N/A
Queensland - Brisbane	Fri 25 July	Thurs 24 July am	Thurs 24 July pm
SA - Adelaide	Fri 4 July - am	Thurs 3 July - am	Thurs 3 July - pm
Tasmania - Hobart	Tues 5 Aug – am		Wed 6 Aug - am
Victoria - Melbourne	Fri 27 June - pm	Thurs 26 June - am	Thurs 26 June - pm
WA - Perth	Mon 30th June - am	Tues 1 July - am	Tues 1 July - pm

The 3 hour consultation meetings were conducted by Noel Munkman (E-Oz) and Steve Smith (TAFE NSW WSI) per the consultation plan. A questionnaire was developed and completed by industry and training provider representatives during the consultation meetings. It gained information about the representative, their organisation and what they considered to be the:

a) Type of work and systems that a refrigeration/air conditioning mechanic who had just completed the trade course should be able to do
b) Minimum ESSENTIAL skills that every individual must possess on completion of the refrigeration and air conditioning apprenticeship course
c) Minimum RANGE of refrigeration and air conditioning systems/equipment to which every individual should be able to apply these essential skills
d) Skills and/or knowledge that should NOT be included in the refrigeration and air conditioning apprenticeship course
e) Other training they would like to see made available to the industry
f) Reasons and effects of increasing the trade qualification to a higher level.

A summary of the meeting participants is provided below:

a) Industry Representative Meetings were held in 10 cities, including all (8) capital cities and 2 regional cities:
   - a total of 79 attended and completed the questionnaire
   - another 13 representatives who did not attend completed the questionnaire.
   - therefore a total of 92 questionnaires were completed.
   - these included those working across a wide range of applications, including Residential, Small and Large Commercial/ Industrial and Transport Refrigeration, Ammonia and CO2 Refrigeration; Residential Small and Large Commercial/ Industrial Air and Transport Conditioning; Controls.

b) Training Provider Representative Meetings were held in 10 cities, including all (8) capital cities and 2 regional cities:
   - total of 65 attended and completed the questionnaire
   - another representative who did not attend completed the questionnaire.
   - therefore a total of 66 questionnaires were completed

c) A total of:
   - 144 industry and training provider representatives attended the meeting.
   - 156 industry and training provider representatives completed the questionnaire.

The Outcomes

During the meetings, the participants completed each question individually and then as a group discussed and reached general agreement on the responses which were recorded on a spreadsheet at each location. Later the responses from each questionnaire were cross checked against those on the spreadsheet to ensure nothing was missed.

Below is a summary of the key outcomes from all the meetings:

1. **Type of work and systems that a refrigeration/air conditioning mechanic who has just completed the trade course should be able do and work on**
   a) The work required to be carried out includes installing, commissioning, testing, fault finding, repairing, replacing components and maintenance.
   b) The current range of required RAC applications is too wide in the current qualification. No one can carry out all these task competently across all the following applications at the completion of an apprenticeship in refrigeration and air conditioning: Domestic refrigeration, Self-contained merchandising cabinets, Supermarket refrigeration, Commercial cool/freezer rooms, Industrial cold stores, Ventilation systems, Residential air conditioning, Package air conditioning, Central plant air conditioning, VAV's and chilled beams, Chilled and hot water systems.

2. **The minimum ESSENTIAL skills that every individual must possess on completion of the refrigeration and air conditioning apprenticeship course**
   a) The core should be revised to cover only the essential knowledge and skills required by all RAC mechanics irrespective of the area of specialisation. That is the generic skills required to install, commission, test, fault find, repair, replace components and maintain refrigeration and air conditioning systems.
   b) More time for the repetition of core skills is required.
   c) All current commonly used refrigerants, groups and classes must be covered, including natural refrigerants and synthetic flammables.
   d) Only calculations required to achieve competency will be assessed, others may be used as learning activities.
   e) Pressure enthalpy charts are not required to achieve competency, but may be used as learning activity to show visually the conditions of the refrigerant under normal and abnormal operating conditions.
   f) Psychrometric charts are not required to achieve competency, but may be used as a learning activity to explain the properties of air and air conditioning processes, but not to determine an air conditioning unit's cooling capacity.
   g) Simple single zone heat load estimations are to be included using "check figures" and manufacturer's quick heat load forms or simple Apps.
   h) The requirements for completing relevant workplace service reports/ documentation is an essential skill. This includes taking and recording relevant system conditions required by third parties, for example service manager, technical support.

i) Relevant National/State/Territory regulatory requirements including refrigerant handling and restricted electrical.

Based on all the feedback received, a draft list of Essential Skills and Knowledge was developed.

3. The minimum RANGE of refrigeration and air conditioning systems/equipment to which every individual should be able to apply these essential skills

a) The current range of required RAC applications is too wide in the current qualification.

b) The applications to be covered are to be limited to manufactured or unity equipment, for example:

- Refrigeration: single refrigerated normal and low temperature merchandising/display cabinets and small cool/cold rooms, including those with remote condensing units which are commonly found in commercial applications
- Air Conditioning: self contained, split or packaged air conditioning units, ventilation systems and evaporative coolers commonly used in residential and light commercial applications.

All apprentices should be able to access these systems to carry out required activities either at the workplace or the training provider's facility.

An overview of all other common refrigeration and air conditioning systems and applications will be provided but will not be assessed, for example Variable Refrigerant Volumes (VRV) and Variable Air Volume (VAV) boxes, central plants, bus and train air conditioning, supermarkets, cold stores, industrial refrigeration, Ammonia/C02 systems, secondary systems, truck refrigeration, ice makers, domestic fridges/freezers, post mix, beverage coolers, etc.

Specific training in each of these specialisations are to be able available in elective competency standard units in the Certificate IV qualification and in Skill Sets.

4. The skills and/or knowledge that should NOT be included in the refrigeration and air conditioning apprenticeship course

a) There is too much unnecessary knowledge content in the current qualification.

b) Designing systems, selecting equipment and pipe sizing are not required skills in the Certificate III. The focus is to ensure that appropriate components are replaced on a like for like basis.

c) The following will also be not covered in the Certificate III qualification: Extensive motor theories; Primary resistance and auto transformer motor starting; Irrelevant electrical calculations for example inductive reactance, combined series/parallel, maximum demand, voltage drop; Reactance, left and right hand rules, Sine waves, Phasor diagrams; DDC, PLC or Pneumatic control; Irrelevant refrigeration calculations for example compressor displacement calculations; Full air conditioning or refrigeration heat loads, but heat load factors will be covered; Do not assess Q=mctd, Q=mLH, Q=AUtd; Large commercial multiple evaporator or multiple compressor systems; Compressor overhauling; Belt and coupling alignment; Hand expansion valves, Thermo-electric valves, Low side floats, High side floats; Do not assess fan laws, fan curves or pitot tubes; Air and water balancing; Capillary sizing; Temprites; Gas laws.

5. Other training that should be made available to the industry

Additional post trade training is required in Skill Sets or higher level qualifications for a range of specialised and complex systems including: Ammonia systems, CO2 systems,

Hydrocarbons systems, R32 systems, Controls, DDC, BMS, DC motors/inverters, Electronic fault finding, Chillers, Advanced air conditioning, VRV/VRF, Advanced refrigeration, Industrial refrigeration, Supermarkets, Secondary systems, Advanced Commissioning, Water and air balancing, Advanced Fault finding, Maintenance requirements, System design, Standards/Codes of practice; Building / Construction basics. Building codes of Australia (BCA), Australian Standards, Local council regulations, Governing Body for the Trade, Trade Practices Act; Full electrical license, Customer relations, service reports, Essential services training, Working at heights, confined spaces, Gas furnaces, gas meter servicing, Contracting, business management, Employer accreditation to employ apprentices.

6. **Should the trade qualification be increased to a higher level?**
   Yes.
   The Certificate III qualification should cover the essential knowledge and skills required by all RAC mechanics irrespective of the area/s of specialisation. That is the generic skills required to install, commission, test, fault find, repair, replace components and maintain manufactured or unity equipment. This includes:
   - Refrigeration: single refrigerated normal and low temperature merchandising/display cabinets and small cool/cold rooms, including those with remote condensing units which are commonly found in commercial applications
   - Air Conditioning: self contained, split or packaged air conditioning units, ventilation systems, evaporative coolers commonly used in residential and light commercial applications.

   The Certificate IV qualification should, in addition to the Certificate III in its core, contain specialisation electives covering higher level or more complicated equipment and systems for example:
   - Variable Refrigerant Volumes (VRV)
   - Variable Air Volume (VAV) boxes,
   - Central plants,
   - Bus and train air conditioning,
   - Supermarkets,
   - Cold stores,
   - Industrial refrigeration,
   - Ammonia/C02 systems,
   - Secondary systems,
   - Truck refrigeration,
   - Ice makers,
   - Domestic fridges/freezers,
   - Post mix,
   - Beverage coolers.

7. **Other Points**
   a) The literacy and numeracy (L&N) ability of most students entering the trade course has declined. Can the new qualification have L&N entry requirements and/or be assessed before commencing the trade training?
   b) A high level of maths and science is required on entry to this trade course.
   c) Computer literacy is also required.
   d) More online support resources are required.
   e) Accelerated progression needs to be available

f) Greater communication between training provider and employer is required.
g) The new qual will include benchmark units to enable competency wage progression.
h) There was common agreement that the Restricted Split A/C Installation license was being widely abused to carry out other RAC work. The delivery and assessment of the Cert II Split A/C Installation qualification is being rorted by some RTOs.
i) There was common agreement that as the plumbers and electricians can get a Restricted Split A/C Installation license, RAC mechanics should be able to get a restricted electrical installation license for split systems, including installation of the manufacturers specified supply cable and the interconnecting cable.

2.1.2 State/Territory Training Authority Consultations

The consultation meetings were conducted by Noel Munkman (E-Oz) and Steve Smith (TAFE NSW WSI) per the consultation plan with every State/Territory Training Authority, except Victoria. The meetings were aimed at informing them about the review and clarifying each jurisdiction's training and apprenticeship requirements.

A summary of the responses is provided below:

1. The UEE32211 Certificate in Refrigeration and Air Conditioning qualification is available under an Apprenticeship in every State and Territory. Is it delivered in every State and Territory, except Western Australia where the MEM30205 Certificate III in Engineering - Mechanical Trade qualification is being delivered.
2. The only State that raised any issues or concerns about the structure or content of this qualification was New South Wales, which stated that it is a 'catch-all qualification'. This makes it difficult to facilitate specialist skills in one or the other area/s, it is too broad based.
3. The only States that raised issues or concerns with the delivery/ assessment of this qualification were:
   - New South Wales, which stated that the main concern in the delivery of this trade qualification relates to the RTOs capability to develop a Training Plan particularly given the employers capacity to provide work that is relevant and appropriate to the vocation and to the achievement of the competencies given the specialist nature of most employers, that is Air conditioning or Refrigeration. In a case where the employer may not be in a position to provide the on the job training for a particular unit of competency, the RTO, in consultation with the employer must outline alternative arrangements agreed to, to support the on the job component of the required training against that unit.
   - Tasmania, which stated that there was the growing problem of some apprentices not able to gain the required work performance of the range applications/ systems.
4. Certificate IV qualifications are funded as an Apprenticeship in every State and Territory as well as the Certificate III in the same trade area with industry support. For example, there are Cert III and IV apprenticeships in Electrotechnology Electrician.

2.1.3 State/Territory Regulator Consultations

The consultation meetings were conducted by Noel Munkman (E-Oz) and Steve Smith (TAFE NSW WSI) per the consultation plan with regulator representatives from every State/Territory. The meeting was aimed at informing them about the review and clarifying each jurisdiction's regulatory requirements.

A summary of the responses to these questions is provided below:

Refrigeration/air conditioning license

- ACT, Northern Territory, South Australia and Western Australia

Refrigeration/air conditioning work is not licensed except for the national refrigerant handling license.

- New South Wales

  A licence from Fair Trading is required before any air-conditioning and/or refrigeration work can be undertaken in NSW, regardless of the cost of the work and regardless of whether the work is residential, commercial or industrial. There is a Qualified Supervisor Certificate required for RAC Mechanics and an RAC Contractors license. The current requirement for the Qualified Supervisor Certificate is the:

  - Completion of one of the following courses:
    - UEE32211 Certificate III in Air conditioning and Refrigeration
    - UEE31307 Certificate III in Refrigeration and Air-Conditioning
    - UEE31306 Certificate III in Refrigeration and Air-Conditioning
    - UTE30999 Certificate III in Electrotechnology (Refrigeration and Air Conditioning)

  OR

  - If you have ever held a NSW licence in air conditioning and/or refrigeration and you apply for an equivalent licence, your former licence will be accepted in lieu of the current qualification requirements.

- Queensland

  There are 2 licenses:

  - Refrigeration, Air Conditioning and Mechanical Services including Limited Design which is required to:
    - Install, commission, service or repair refrigeration, air conditioning, mechanical ventilation and air handling systems for a building
    - Design and prepare plans and specifications for:
      - refrigeration systems for a building, or
      - air conditioning and mechanical ventilation and air handling systems for a building:
      - that is not more than 3 storeys, and
      - that has a floor area of not more than 2000m2

    Technical qualifications requirements, any 1 of the following:
    - successful completion of either of the following courses:
      - an apprenticeship in refrigeration and air conditioning
      - Certificate III in Engineering (Mechanical-Refrigeration and Air conditioning) MEM30298
      - Certificate III in Electrotechnology (Refrigeration and Air conditioning) UTE30999
    - successful completion of a course the commission considers equivalent to the courses above
    - a qualification or statement of attainment of required competency for the class of licence.
  - Refrigeration, Air Conditioning and Mechanical Services including Unlimited Design which is required to:
    - Install, commission, service or repair refrigeration, air conditioning, mechanical ventilation and air handling systems for a building
    - Design and prepare plans and specifications for refrigeration, air conditioning, mechanical ventilation and air handling systems for building if the plans and specifications are:
      - for the licensee's personal use, or
      - for use in building work to be performed by the licensee personally.

    Technical qualifications requirements, any 1 of the following:
    - successful completion of either of the following courses:

        - Diploma in Engineering (Refrigeration and Air Conditioning) CN941, or
        - Advanced Diploma of Refrigeration and Air Conditioning Engineering UEE60707
    - successful completion of a course the commission considers equivalent to the courses above
    - a qualification or statement of attainment of required competency for the class of licence
- Tasmania
  Does not license refrigeration and air-conditioning work except for the national refrigerant handling license; however, it does license mechanical services plumbing and is concerned primarily with the plumbing aspect of the work.
- Victoria
  A special class plumbing license - Refrigeration and Air Conditioning, is required to carry out RAC work over the value of $750 from the Victorian Building Authority which requires the Restricted Electrical License and the Cert III in RAC qualification. A contractor's licence is not issued.
  Does not license refrigeration and air-conditioning work except for the national refrigerant handling license.

Flammable refrigerants license

- ACT, New South Wales, South Australia, Tasmania, Victoria and Western Australia
  Flammable refrigerants are not licensed, although there may be some restrictions by Worksafe.
- Queensland
  It is a requirement to hold an occupational gas work licence (hydrocarbons refrigerant) for any person working with hydrocarbon refrigerants. The prerequisites required to obtain this licence include holding the Commonwealth Arctick licence and a Certificate III Refrigeration Mechanic qualification, equivalent air-conditioning certificate or qualification approved by the chief inspector plus formal competency training from a registered training authority, which includes up to an additional three units relating specifically to hydrocarbons.

Restricted electrical license

- ACT
  Restricted electrical license for refrigeration and air conditioning trade is required, based on relevant UEENEEP Disconnect/reconnect and fault finding units.
- New South Wales
  Associated electrical work is covered under the RAC Qualified Supervisor Certificate which includes electrical wiring work relating to the general servicing and maintenance of an air-conditioning system or a refrigeration system.
  Requires the achievement of the Cert III in RAC qualification including the relevant "P" units
- Northern Territory
  Restricted Electrical license for Disconnect/Reconnect and Fault Finding is required by RAC Mechanics based on the achievement of the Cert III in RAC qualification including the relevant P units and Profiling records to ensure at least 12 months relevant work experience.
- Queensland
  A license is required for Restricted Electrical work, Disconnect/Reconnect and Fault Finding, based on the Cert III qual and UEENEEP017A and UEENEEP012A.

The restricted electrical licence does not permit installation of or alteration to any part of the fixed electrical wiring system as this is electrical installation work.

- South Australia
  A license is required for Disconnection/reconnection, fault find & repair of refrigeration & air conditioning systems, but cannot perform electrical work in hazardous areas as defined in clause 1.4.3 of the AS/NZS 2381.1:1999. The license requires UEE or MEM Cert III qual and relevant restricted electrical units.
- Tasmania
  It is a requirement for refrigeration and air-conditioning workers to hold a restricted electrical licence to carry out activities involved in testing, fault finding, repairing, replacing and maintaining systems and equipment relating to refrigeration, air conditioning and air distribution including –
  a. the disconnection and reconnection of such systems, equipment and their components; and
  b. fault finding of such systems and equipment to determine component failure.

  A Restricted Electrical Work Licence – Refrigeration and Air Conditioning may be issued to a person who has completed either of the following qualifications within the relevant Training package
  a) Certificate III Electrotechnology – Refrigeration and Air Conditioning (UTE30999);
  b) Certificate III Refrigeration and Air Conditioning (UEE31307); or
  c) Certificate III Air Conditioning and Refrigeration (UEE32211);
- Victoria
  A license is required for Restricted Electrical work, Class 1 - including fault finding and Class 2 -Disconnect/Reconnect, based on Cert III qual and UEENEEP017A and UEENEEP012A.
- Western Australia
  It is a requirement for refrigeration and air-conditioning workers to hold a restricted electrical licence to disconnect and reconnect refrigeration and air-conditioning equipment if they are undertaking installation and repairs and working with equipment that is hard wired.
  Scope of Work:
  1. Disconnect/reconnect R&AC equipment.
  2. Fault find R&AC power and control circuits.
  3. Modify, replace or repair within the R&AC "package".
  4. Modify R&AC control circuits in switchboards/panels.
  5. Assemble factory supplied cable between R&AC split system components (up to 4kW).

  The licence does not authorise the holder to install or alter fixed wiring.
  This requires the completion of an approved Trade Certificate for the trade of 'Engineering Tradesperson (Mechanical)', the Certificate III in Engineering Mechanical Trade - Refrigeration and Air Conditioning and copy of the Record of Results, issued by the RTO listing all the Unit of Competence that have been completed successfully.
  There is also a lower level Restricted Electrical License available for those who have completed the UEE32211 Certificate III in Refrigeration and Air Conditioning qualification including the relevant P units. This license covers the standard Disconnect/Reconnect and Fault Finding restricted electrical license used on most other jurisdictions.

2.1.4 Recommendations

The following draft recommendations were developed based on the consultations with industry, training providers, State/Territory Training Authorities and Regulators:

1. The revised Certificate III in Refrigeration and Air Conditioning qualification should:
   a. Remain as an apprenticeship.
   b. Cover only the essential knowledge and skills required by all RAC mechanics irrespective of the area of specialisation. That is, the generic skills required to install, commission, test, fault find, repair, replace components and maintain manufactured or unity equipment. This includes:
      - Refrigeration: single refrigerated normal and low temperature merchandising/display cabinets and small cool/cold rooms, including those with remote condensing units which are commonly found in commercial applications
      - Air Conditioning: self contained, split or packaged air conditioning units, ventilation systems, evaporative coolers commonly used in residential and light commercial applications.
   c. Meet the relevant National/State/Territory regulatory requirements for Refrigerant Handling, Refrigeration and Air Conditioning Work and Restricted Electrical Work in every State/Territory, including Western Australia.
   d. Cover all current commonly used refrigerants, groups and classes, including natural refrigerants and synthetic flammables.
   e. Align with the:
      - Consultation Outcomes detailed in this report,
      - Final approved list of Essential Skills and Knowledge, and the
      - Final approved Essential Performance Capabilities.
   f. Include benchmark units to enable competency and/or wage progression.
2. A new Certificate IV in Advanced Refrigeration and Air Conditioning qualification should:
   a. Be established as an apprenticeship.
   b. Either have the Certificate III in Refrigeration and Air Conditioning qualification as an entry requirement or contain the Certificate III core units embedded in its core.
   c. Contain specialisation electives covering higher level or more complicated equipment and systems for example:
      Variable Refrigerant Volumes (VRV), Variable Air Volume (VAV) boxes, Central plants, Bus and train air conditioning, Supermarkets, Cold stores, Industrial refrigeration, Ammonia/C02 systems, Secondary systems, Truck refrigeration, Ice makers, Domestic fridges/freezers, Post mix, Beverage coolers.
3. Skills Sets consisting of one or more competency standard units should be created for the specialisation listed above to enable existing workers to undertake short courses as required without the need to enrol directly into the Certificate IV Advanced Refrigeration and Air Conditioning.
4. A new Certificate II in Refrigeration and Air Conditioning should be investigated based on the advice provided by NSW State Training Services that will provide vocational outcomes, specialist streams and a pathway into the Certificate III Trade qualification. Further consultations should be carried out to determine the acceptance by industry and the demand for this new qualification as a school based traineeship pathway which could increase the awareness of the refrigeration and air conditioning industry in high schools and encourage more capable students to enter it.

These recommendations were presented at Steering Committee Meeting No.3 on 18th September 2014 were it agreed that these 4 draft Recommendations be accepted in principle, subject to a review by the Steering Committee of the draft Certificate III in Refrigeration and Air Conditioning qualification's essential Skills, Knowledge and Capabilities.

2.2 Draft Essential Performance Capabilities

At the Steering Committee meeting in November 2014, it was agreed that we need to ensure that employers understand and accept a Cert III and Cert IV apprenticeship before it is adopted.

To assist this, an outline of the 2 qualifications was included in a draft Qualifications and Essential Performance Capabilities (EPCs) questionnaire distributed via the Steering Committee's industry associations to their members on 27 November 2014. It was also emailed on 1st December to the 158 industry and RTO representatives who completed the original questionnaire and to the 110 RAC TAC members on 9th December. Reponses were due by 19th December 2014. E-Oz also emailed the Questionnaire to each of the "Electrotechnology" State/Territory Industry Training Advisory Boards (ITABs) for their information on 28 November 2014. A copy of the questionnaire is attached in Appendix A.

The questionnaire responses were evaluated and the report on the findings was emailed to the Steering Committee to review on 20th February and discussed at the Steering Committee meeting on the 26th February, subsequently a draft list of Essential Performance Capabilities (EPCs) was developed. This was revised and finalised at E-Oz RAC TAC meeting on 21-22 May. A copy of the revised Essential Performance Capabilities (EPCs) is in Appendix C.

2.3 AMCA Submission

On the 20th February 2015 the Air conditioning and Mechanical Contractors Association (AMCA) sent a submission to E-Oz on the proposed new qualifications stating that it supports the review of the RAC trade qualification, however it is concerned about potential unintended consequences resulting from the division into a Certificate III and Certificate IV. Below is a summary of the main AMCA issues:

1. Incentives for the delivery of the Certificate IV qualification

AMCA is concerned that with the Certificate IV longer duration, higher level skills, lower student numbers and higher costs, there will be a lack of incentives for RTOs to offer and deliver it.

2. Changes to the workforce market in commercial refrigeration and air conditioning

AMCA is concerned that the increased training duration of the Certificate IV may act as a disincentive for potential apprentices in the large commercial and industrial refrigeration and air conditioning sector and lead to increased wage demands.

3. Business Productivity

AMCA is concerned that the increased training duration of the Certificate IV will lower productivity and profitability of the industry due to the additional time apprentices will spend at RTOs for off the job training near the end of their apprenticeship when their wages are at their highest.

4. Funding

AMCA is concerned about a possible lack of proportional government funding for the Certificate IV qualification.

5. Recognition of prior learning and current competency

AMCA is concerned that having both Certificate III and IV qualifications will result in a different skill set between the new apprentices and the existing mechanics

6. Licensing

AMCA is concerned about the implications on the regulatory requirements for the refrigerant handling licenses.

7. AMCA Recommendation

Based on the issues AMCA identified, it recommends that the RAC qualification remain a Certificate III.

To investigate and resolve these issues the Steering Committee formed a small Working Group which met in Sydney on the 23 April and 7 May. It reviewed E-Oz's draft response and resolved the issues. Based on the advice from the working group, E-Oz finalised its response and sent it to AMCA on 10th August 2015, copy attached is Appendix D.

2.4 Student Surveys

To determine the range of common and specialised applications that apprentices are expected the work on at the end of their apprenticeship, a Student Survey was conducted in March/April 2015.

At the Steering Committee meeting 6 on 13th May 2015, it was reported that the Student Survey Results report was sent to the Steering Committee on 17th April and it was explained that 491 surveys were completed from 9 RTOs (41%) by the due date of 30th March. The main conclusions were:

1. All of the identified refrigeration and air conditioning applications are valid but there is a varying requirement/need (2.7% Rail Car A/C to 88.4% Single Split Head A/C). Therefore, they all need to be covered in the Trade qualifications by either core or elective units of competency. However, the highest priority for development should be for those applications with over 20% demand.
2. The range of applications that an apprentice is exposed to and required by their employer varies from 2 applications to over 30. Some employers expect that when an apprentice completes their apprenticeship they should competently be able to work on all refrigeration and air conditioning applications.
3. The survey identified 52 Refrigeration and Air Conditioning applications and the average number of systems applications required by the 440 students was 15.1.
   - 12.3% of the students cover between 1 and 5 system applications
   - 25.7% of the students cover between 6 and 10 system applications
   - Most (42.4%) of the students cover between 11 and 20 system applications
   - 14.7% of the students cover between 21 and 30 system applications
   - 14.7% of the students cover between 23 and 40 system applications
   - 14.7% of the students cover between 41 and 52 system applications
4. Due to the range and number of different applications, an apprentice cannot achieve competency in all of them during the term of their apprenticeship. Therefore, they must attain the Essential Performance Capabilities which cover the core generic skills that are common across all of the applications. For example refrigeration, air conditioning, electrical principles, hand and trade skills, working safely with electricity and all classes of refrigerants, relevant regulatory/license requirements, etc. and apply them to install, commission, test, fault find, repair and maintain a range of both refrigeration and air conditioning applications.
5. There are two options for constructing revised Trade qualification/s to cover the required applications:
   - Option 1 – One Qualification – Certificate III in Refrigeration and Air Conditioning
     This qualification could have a reasonably small core set of units (2 years) so that all apprentices covered:
     - Refrigeration and air conditioning Essential Performance Capabilities, and
     - licensing requirements, and then
     - select from a wide choice of electives ranging from reasonably simple to very complex applications, for example Beverage Vending Cabinets to Large Central Plant A/C Chillers and Industrial Refrigeration Systems.

     However, due to their complexity, some the applications would meet the AQF level 4 requirements and therefore should not be included in the Certificate III.
     This would have the same nominal delivery duration (1060 hrs) as the current Certificate III, which is 3 years at an RTO and 4 year apprenticeship.
   - Option 2 – Two Qualifications– Certificate III and IV in Refrigeration and Air Conditioning

Certificate III qualification could have a larger core set of units (2.75 years) so that all apprentices covered;
- Refrigeration and air conditioning Essential Performance Capabilities, and licensing requirements, and
- residential and commercial unitary refrigeration and air conditioning applications, and then
- select from a wide choice of AQF level 3 electives covering a range of other unitary equipment applications, for example Beverage Vending Cabinets to Small A/C Chillers and Large Single Unit Cool Rooms.

Certificate IV qualification would have the same core as the Certificate III and a choice of AQF level 4 electives covering a range of complex applications, for example Large Central Plant A/C Chillers and Industrial Refrigeration Systems. This would have a nominal delivery duration of 1280 hrs and would be approximately 3.0 - 4 years at an RTO and with a nominal apprenticeship term of 4 years.

2.5 Revised Essential Knowledge and Skills (EKAS) Clauses

All competency standard units include Essential Knowledge and Skills (EKAS) Clause/s which lists the underpinning knowledge and skills required to achieve competence. The content EKAS clauses in the current Certificate III in Air Conditioning and Refrigeration need to be revised to remove unnecessary duplication across units, remove irrelevant content and add additional relevant content.

This review was initially carried out in 2015 by Noel Munkman, Stephen Smith and the refrigeration teachers at Newcastle TAFE reviewed the “Electrical” units. The EKAS clauses for the following revised units were reviewed at the E-Oz RAC TAC meeting on 21-22 May:
- UEENEEJ102A Prepare and connect refrigerant tubing and fittings
- UEENEEJ103A Establish the basic operating conditions of vapour compression systems
- UEENEEJ104A Establish the basic operating conditions of air conditioning systems

The EKAS clauses for the following units were reviewed by members of the E-Oz RAC TAC in June 2015:
- UEENEEE102A Fabricate, assemble and dismantle utilities industry components
- UEENEEE105A Fix and secure electrotechnology equipment
- UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications
- UEENEEJ108A Recover, pressure test, evacuate, charge and leak test refrigerants

All of the recommended changes are recorded in the following document:
- UEE11 Certificate III in RAC EKAS Details - proposed changes v4 - 15 7 15

These recommended changes to the current EKAS clauses will be utilised during the development of the Knowledge Specifications for the new competency standard units.

2.6 Proposed New Unit to Essential Performance Capabilities and Essential Knowledge and Skills Mapping

A mapping of the proposed New Unit to Essential Performance Capabilities and Essential Knowledge and Skills was drafted by Stephen Smith to assist the future development of the new competency standard units by ensuring all the relevant EKAS and EPCs are covered, but not overly duplicated. This mapping is recorded in the following document:
- New units to EPCs and EKAS - SS 10 8 15

3. Proposed Certificate III and Certificate IV Qualifications

Based on the extensive consultations with refrigeration and air conditioning industry, RTO, State Training Authority and Regulator representatives and current apprentices, the following revised qualifications will be developed are proposed:

Certificate III in Refrigeration and Air Conditioning Mechanic will:

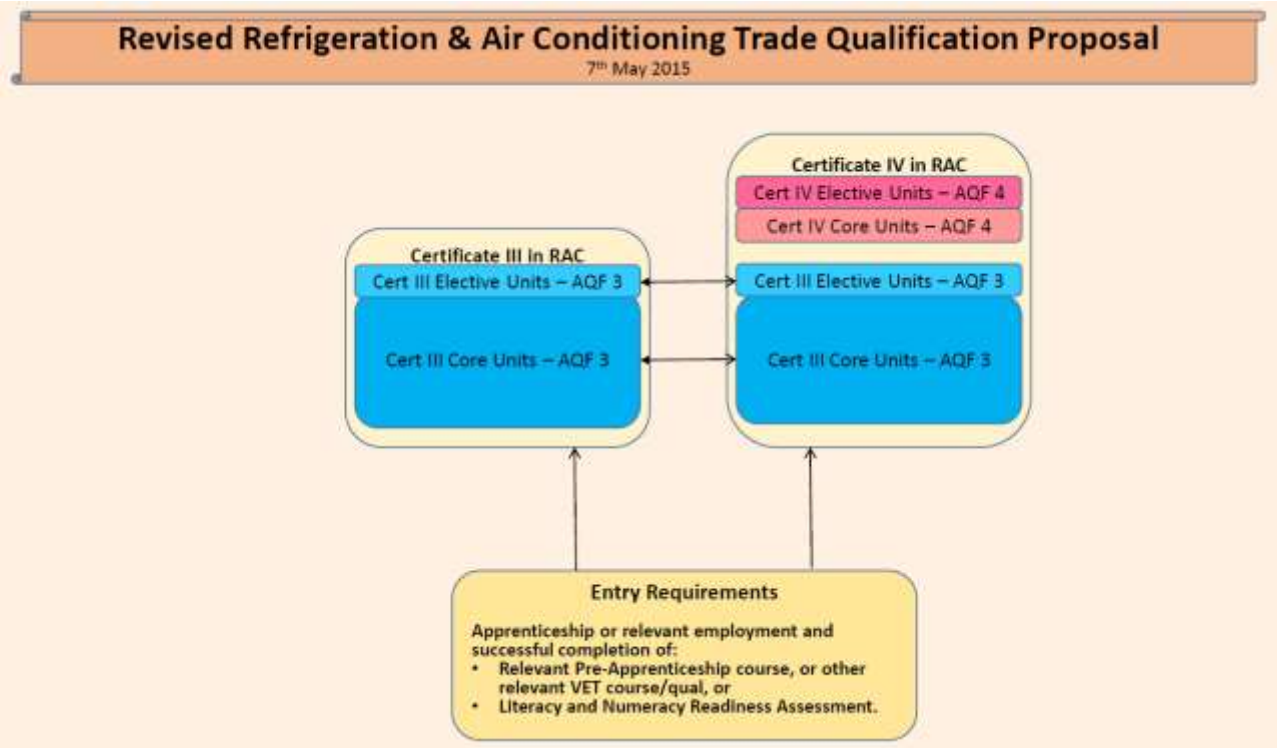
a) Remain as an apprenticeship.
b) Include the essential knowledge and skills required by all RAC mechanics irrespective of the area of specialisation. That is, the generic skills at AQF level 3 required to install, commission, test, fault find, repair, replace components and maintain manufactured or unity equipment. This includes:
   - Refrigeration: single refrigerated normal and low temperature merchandising/display cabinets and small cool/cold rooms, including those with remote condensing units which are commonly found in commercial applications
   - Air Conditioning: self contained, split or packaged air conditioning units, ventilation systems, evaporative coolers commonly used in residential and light commercial applications.
c) Meet the relevant National/State/Territory regulatory requirements for Refrigerant Handling, Refrigeration and Air Conditioning Work and Restricted Electrical Work in every State/Territory, including Western Australia.
d) Cover all refrigerants, groups and classes, including natural refrigerants and synthetic flammables.
e) Align with the:
   - Consultation Outcomes detailed in this report,
   - Final approved list of Essential Skills and Knowledge, and the
   - Final approved Essential Performance Capabilities.
f) Include benchmark units to enable competency and/or wage progression.

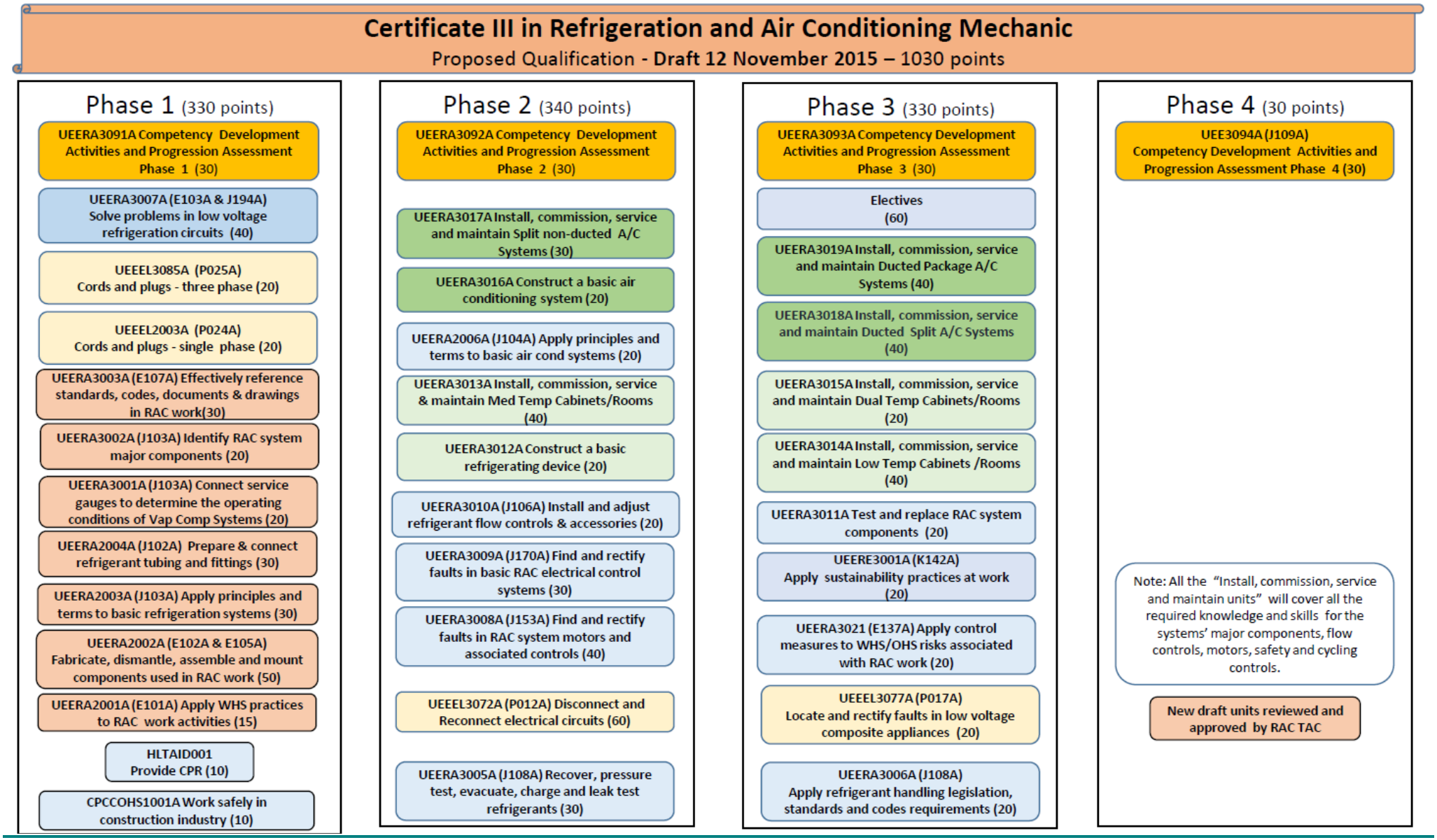
Certificate IV in Refrigeration and Air Conditioning Technician will:

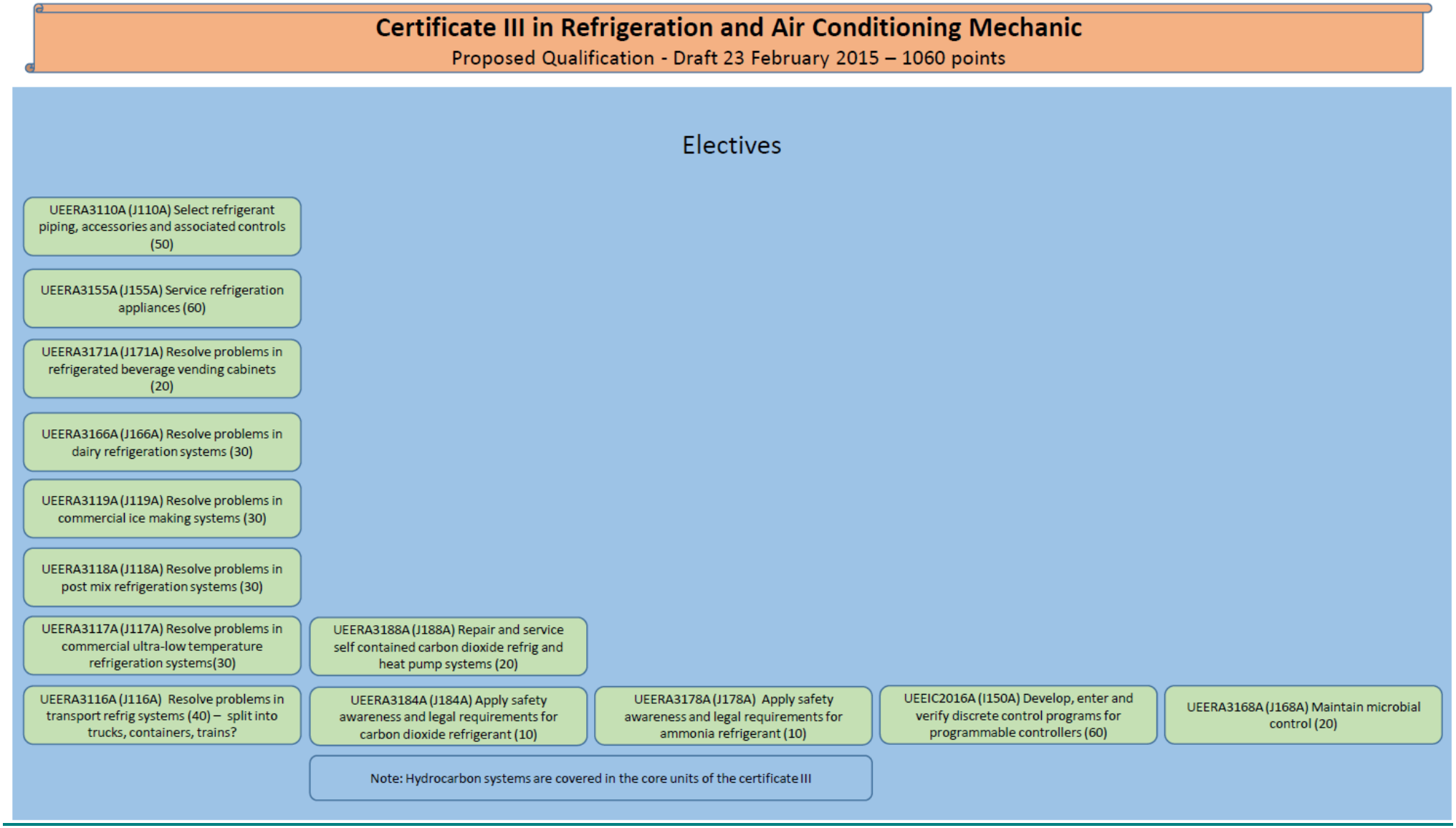
a) Be established as an apprenticeship.
b) Contain the Certificate III in Refrigeration and Air Conditioning units as well as AQF4 units in its core.
c) Contain specialisation AQF 4 electives covering higher level or more complicated equipment and systems for example Variable Refrigerant Volumes (VRV), Variable Air Volume (VAV) boxes, Central plants, Bus and train air conditioning, Supermarkets, Cold stores, Industrial refrigeration, Ammonia/C02 systems, Secondary systems, Truck refrigeration, Ice makers, Domestic fridges/freezers, Post mix, Beverage coolers.
d) Also meet the relevant National/State/Territory regulatory requirements for Refrigerant Handling, Refrigeration and Air Conditioning Work and Restricted Electrical Work in every State/Territory, including Western Australia.
e) Also cover all refrigerants, groups and classes, including natural refrigerants and synthetic flammables.
f) Align with the:
   a. Consultation Outcomes detailed in this report, and the
   b. Final approved Essential Performance Capabilities.
g) Also, include benchmark units to enable competency and/or wage progression.

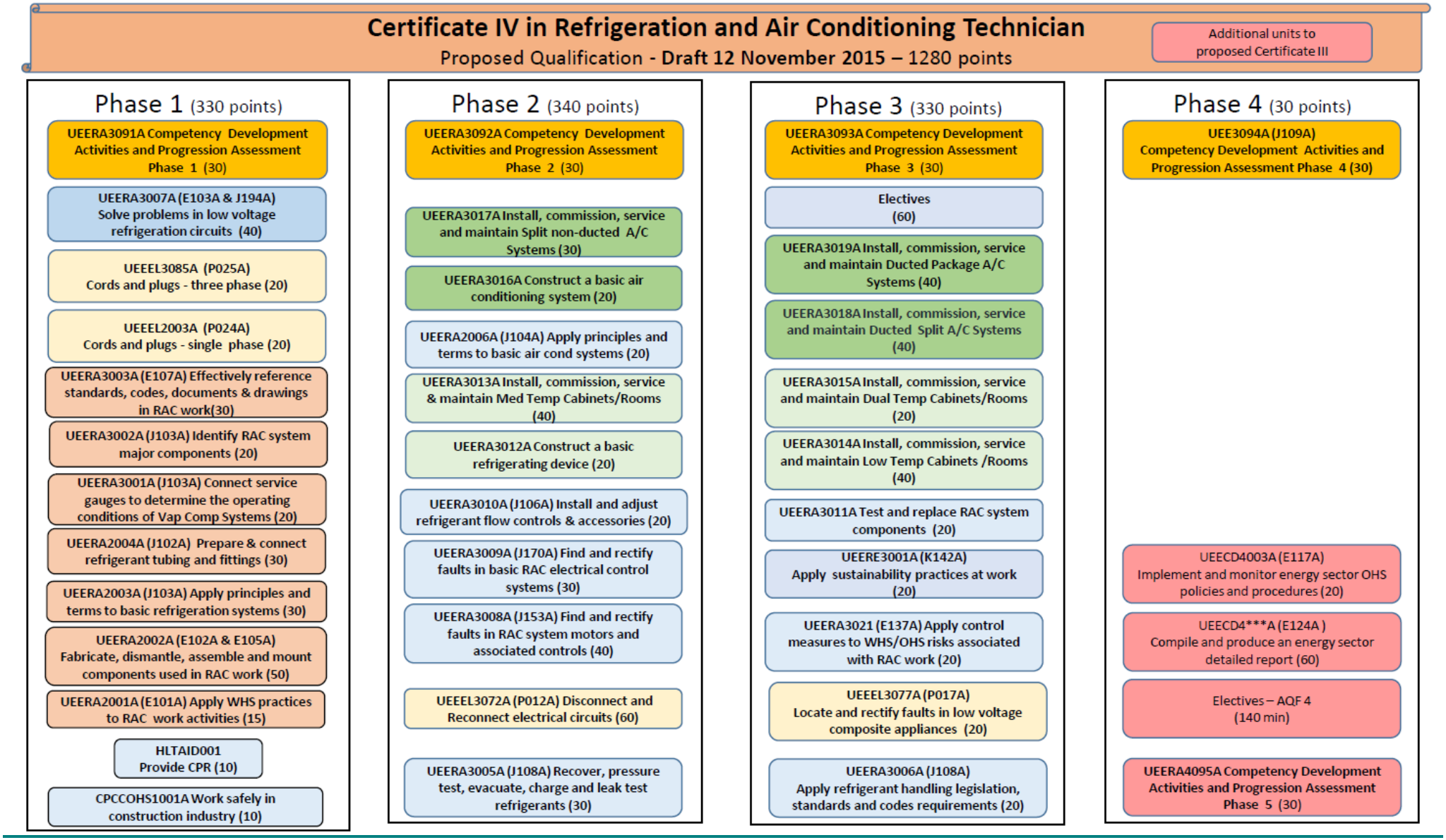
Both qualifications will include an Entry Requirements to ensure students starting the training have the required literacy and numeracy skills. These will include:

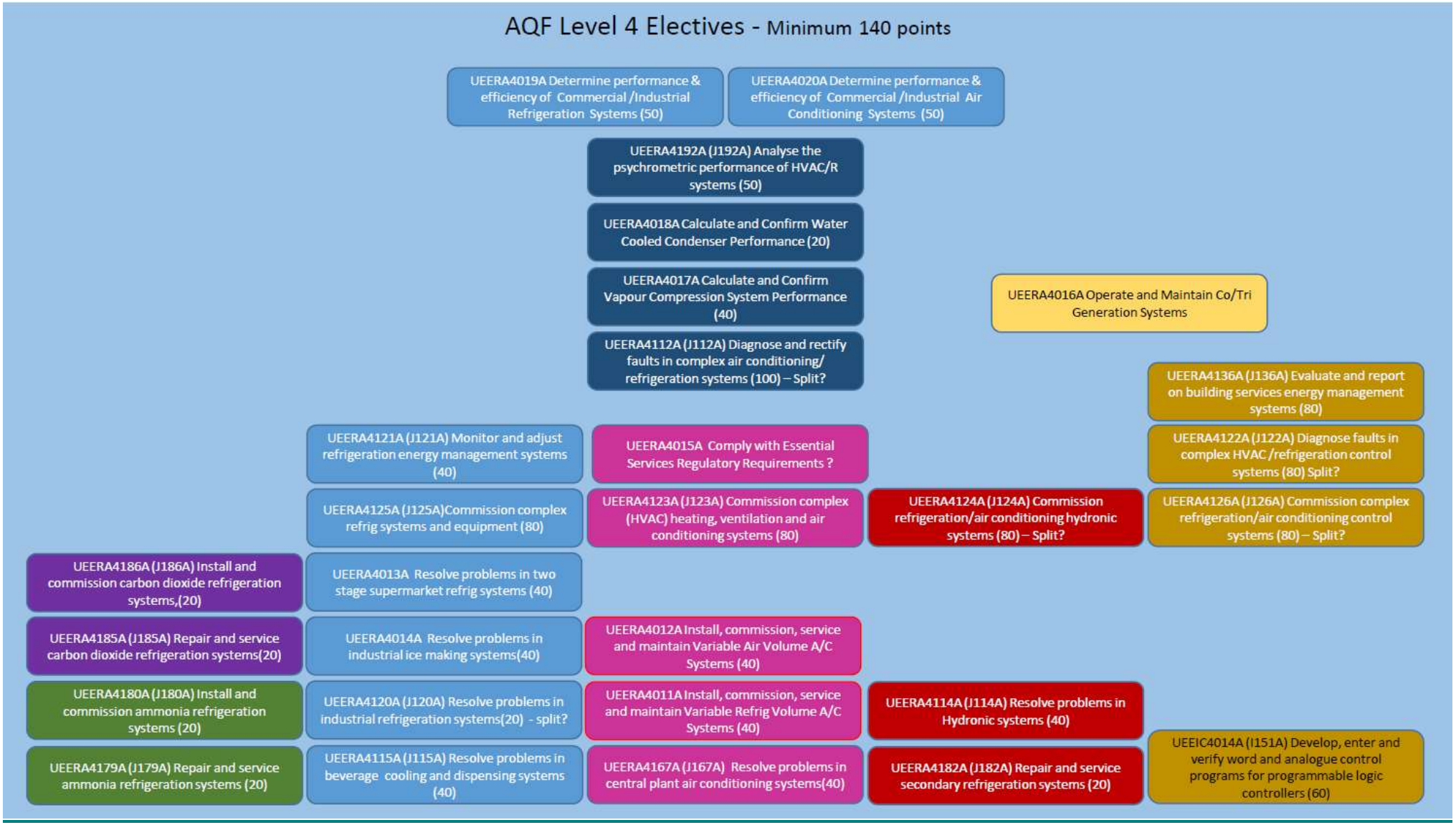
- Apprenticeship or relevant employment and successful completion of:
- Relevant Pre-Apprenticeship course, or other relevant VET course/qual, or
- Literacy and Numeracy Readiness Assessment.




Certificate III in Refrigeration and Air Conditioning Mechanic
Proposed Qualification - Draft 12 November 2015 – 1030 points
Phase 1 (330 points)
UEERA3091A Competency Development Activities and Progression Assessment Phase 1 (30)
UEERA3007A (E103A & J194A) Solve problems in low voltage refrigeration circuits (40)
UEEEL3085A (P025A) Cords and plugs - three phase (20)
UEEEL2003A (P024A) Cords and plugs - single phase (20)
UEERA3003A (E107A) Effectively reference standards, codes, documents & drawings in RAC work(30)
UEERA3002A (J103A) Identify RAC system major components (20)
UEERA3001A (J103A) Connect service gauges to determine the operating conditions of Vap Comp Systems (20)
UEERA2004A (J102A) Prepare & connect refrigerant tubing and fittings (30)
UEERA2003A (J103A) Apply principles and terms to basic refrigeration systems (30)
UEERA2002A (E102A & E105A) Fabricate, dismantle, assemble and mount components used in RAC work (50)
UEERA2001A (E101A) Apply WHS practices to RAC work activities (15)
HLTAID001 Provide CPR (10)
CPCCOHS1001A Work safely in construction industry (10)
Phase 2 (340 points)
UEERA3092A Competency Development Activities and Progression Assessment Phase 2 (30)
UEERA3017A Install, commission, service and maintain Split non-ducted A/C Systems (30)
UEERA3016A Construct a basic air conditioning system (20)
UEERA2006A (J104A) Apply principles and terms to basic air cond systems (20)
UEERA3013A Install, commission, service & maintain Med Temp Cabinets/Rooms (40)
UEERA3012A Construct a basic refrigerating device (20)
UEERA3010A (J106A) Install and adjust refrigerant flow controls & accessories (20)
UEERA3009A (J170A) Find and rectify faults in basic RAC electrical control systems (30)
UEERA3008A (J153A) Find and rectify faults in RAC system motors and associated controls (40)
UEEEL3072A (P012A) Disconnect and Reconnect electrical circuits (60)
UEERA3005A (J108A) Recover, pressure test, evacuate, charge and leak test refrigerants (30)
Phase 3 (330 points)
UEERA3093A Competency Development Activities and Progression Assessment Phase 3 (30)
Electives (60)
UEERA3019A Install, commission, service and maintain Ducted Package A/C Systems (40)
UEERA3018A Install, commission, service and maintain Ducted Split A/C Systems (40)
UEERA3015A Install, commission, service and maintain Dual Temp Cabinets/Rooms (20)
UEERA3014A Install, commission, service and maintain Low Temp Cabinets /Rooms (40)
UEERA3011A Test and replace RAC system components (20)
UEERE3001A (K142A) Apply sustainability practices at work (20)
UEERA3021 (E137A) Apply control measures to WHS/OHS risks associated with RAC work (20)
UEEEL3077A (P017A) Locate and rectify faults in low voltage composite appliances (20)
UEERA3006A (J108A) Apply refrigerant handling legislation, standards and codes requirements (20)
Phase 4 (30 points)
UEE3094A (J109A) Competency Development Activities and Progression Assessment Phase 4 (30)
Note: All the "Install, commission, service and maintain units" will cover all the required knowledge and skills for the systems' major components, flow controls, motors, safety and cycling controls.
New draft units reviewed and approved by RAC TAC


Certificate III in Refrigeration and Air Conditioning Mechanic
Proposed Qualification - Draft 23 February 2015 – 1060 points
Electives
UEERA3110A (J110A) Select refrigerant piping, accessories and associated controls (50)
UEERA3155A (J155A) Service refrigeration appliances (60)
UEERA3171A (J171A) Resolve problems in refrigerated beverage vending cabinets (20)
UEERA3166A (J166A) Resolve problems in dairy refrigeration systems (30)
UEERA3119A (J119A) Resolve problems in commercial ice making systems (30)
UEERA3118A (J118A) Resolve problems in post mix refrigeration systems (30)
UEERA3117A (J117A) Resolve problems in commercial ultra-low temperature refrigeration systems(30)
UEERA3188A (J188A) Repair and service self contained carbon dioxide refrig and heat pump systems (20)
UEERA3116A (J116A) Resolve problems in transport refrig systems (40) – split into trucks, containers, trains?
UEERA3184A (J184A) Apply safety awareness and legal requirements for carbon dioxide refrigerant (10)
UEERA3178A (J178A) Apply safety awareness and legal requirements for ammonia refrigerant (10)
UEEIC2016A (I150A) Develop, enter and verify discrete control programs for programmable controllers (60)
UEERA3168A (J168A) Maintain microbial control (20)
Note: Hydrocarbon systems are covered in the core units of the certificate III


Certificate IV in Refrigeration and Air Conditioning Technician
Proposed Qualification - Draft 12 November 2015 – 1280 points
Additional units to proposed Certificate III
Phase 1 (330 points)
UEERA3091A Competency Development Activities and Progression Assessment Phase 1 (30)
UEERA3007A (E103A & J194A) Solve problems in low voltage refrigeration circuits (40)
UEEEL3085A (P025A) Cords and plugs - three phase (20)
UEEEL2003A (P024A) Cords and plugs - single phase (20)
UEERA3003A (E107A) Effectively reference standards, codes, documents & drawings in RAC work(30)
UEERA3002A (J103A) Identify RAC system major components (20)
UEERA3001A (J103A) Connect service gauges to determine the operating conditions of Vap Comp Systems (20)
UEERA2004A (J102A) Prepare & connect refrigerant tubing and fittings (30)
UEERA2003A (J103A) Apply principles and terms to basic refrigeration systems (30)
UEERA2002A (E102A & E105A) Fabricate, dismantle, assemble and mount components used in RAC work (50)
UEERA2001A (E101A) Apply WHS practices to RAC work activities (15)
HLTAID001 Provide CPR (10)
CPCCOHS1001A Work safely in construction industry (10)
Phase 2 (340 points)
UEERA3092A Competency Development Activities and Progression Assessment Phase 2 (30)
UEERA3017A Install, commission, service and maintain Split non-ducted A/C Systems (30)
UEERA3016A Construct a basic air conditioning system (20)
UEERA2006A (J104A) Apply principles and terms to basic air cond systems (20)
UEERA3013A Install, commission, service & maintain Med Temp Cabinets/Rooms (40)
UEERA3012A Construct a basic refrigerating device (20)
UEERA3010A (J106A) Install and adjust refrigerant flow controls & accessories (20)
UEERA3009A (J170A) Find and rectify faults in basic RAC electrical control systems (30)
UEERA3008A (J153A) Find and rectify faults in RAC system motors and associated controls (40)
UEEEL3072A (P012A) Disconnect and Reconnect electrical circuits (60)
UEERA3005A (J108A) Recover, pressure test, evacuate, charge and leak test refrigerants (30)
Phase 3 (330 points)
UEERA3093A Competency Development Activities and Progression Assessment Phase 3 (30)
Electives (60)
UEERA3019A Install, commission, service and maintain Ducted Package A/C Systems (40)
UEERA3018A Install, commission, service and maintain Ducted Split A/C Systems (40)
UEERA3015A Install, commission, service and maintain Dual Temp Cabinets/Rooms (20)
UEERA3014A Install, commission, service and maintain Low Temp Cabinets /Rooms (40)
UEERA3011A Test and replace RAC system components (20)
UEERE3001A (K142A) Apply sustainability practices at work (20)
UEERA3021 (E137A) Apply control measures to WHS/OHS risks associated with RAC work (20)
UEEEL3077A (P017A) Locate and rectify faults in low voltage composite appliances (20)
UEERA3006A (J108A) Apply refrigerant handling legislation, standards and codes requirements (20)
Phase 4 (30 points)
UEE3094A (J109A) Competency Development Activities and Progression Assessment Phase 4 (30)
UEECD4003A (E117A) Implement and monitor energy sector OHS policies and procedures (20)
UEECD4***A (E124A) Compile and produce an energy sector detailed report (60)
Electives – AQF 4 (140 min)
UEERA4095A Competency Development Activities and Progression Assessment Phase 5 (30)


AQF Level 4 Electives - Minimum 140 points
UEERA4019A Determine performance & efficiency of Commercial /Industrial Refrigeration Systems (50)
UEERA4020A Determine performance & efficiency of Commercial /Industrial Air Conditioning Systems (50)
UEERA4192A (J192A) Analyse the psychrometric performance of HVAC/R systems (50)
UEERA4018A Calculate and Confirm Water Cooled Condenser Performance (20)
UEERA4017A Calculate and Confirm Vapour Compression System Performance (40)
UEERA4016A Operate and Maintain Co/Tri Generation Systems
UEERA4112A (J112A) Diagnose and rectify faults in complex air conditioning/ refrigeration systems (100) – Split?
UEERA4136A (J136A) Evaluate and report on building services energy management systems (80)
UEERA4121A (J121A) Monitor and adjust refrigeration energy management systems (40)
UEERA4015A Comply with Essential Services Regulatory Requirements ?
UEERA4122A (J122A) Diagnose faults in complex HVAC /refrigeration control systems (80) Split?
UEERA4125A (J125A)Commission complex refrig systems and equipment (80)
UEERA4123A (J123A) Commission complex (HVAC) heating, ventilation and air conditioning systems (80)
UEERA4124A (J124A) Commission refrigeration/air conditioning hydronic systems (80) – Split?
UEERA4126A (J126A) Commission complex refrigeration/air conditioning control systems (80) – Split?
UEERA4186A (J186A) Install and commission carbon dioxide refrigeration systems,(20)
UEERA4013A Resolve problems in two stage supermarket refrig systems (40)
UEERA4185A (J185A) Repair and service carbon dioxide refrigeration systems(20)
UEERA4014A Resolve problems in industrial ice making systems(40)
UEERA4012A Install, commission, service and maintain Variable Air Volume A/C Systems (40)
UEERA4180A (J180A) Install and commission ammonia refrigeration systems (20)
UEERA4120A (J120A) Resolve problems in industrial refrigeration systems(20) - split?
UEERA4011A Install, commission, service and maintain Variable Refrig Volume A/C Systems (40)
UEERA4114A (J114A) Resolve problems in Hydronic systems (40)
UEERA4179A (J179A) Repair and service ammonia refrigeration systems (20)
UEERA4115A (J115A) Resolve problems in beverage cooling and dispensing systems (40)
UEERA4167A (J167A) Resolve problems in central plant air conditioning systems(40)
UEERA4182A (J182A) Repair and service secondary refrigeration systems (20)
UEEIC4014A (I151A) Develop, enter and verify word and analogue control programs for programmable logic controllers (60)

4. Proposed Certificate III and Certificate IV units

Listed in the table below are the proposed core and elective units for the Certificate III in Refrigeration and Air Conditioning Mechanics qualifications, with their weighting points, AQF level, whether they have been submitted for endorsement and whether drafts have been completed.

Certificate III in Refrigeration and Air Conditioning Mechanic

Unit Code	Core Unit Title	Weighting Points	AQF	Unit Submitted for Endorsement	Unit Drafted
HLTAID001	Provide CPR	10		Current Unit	
CPCCOHS1001A	Work safely in construction industry	10		Current Unit	
UEERA2001A	Apply work health and safety practices to refrigeration and air conditioning work activities	15	2	Yes ?	Yes
UEERA2002A	Fabricate, dismantle, assemble and mount components used in refrigeration and air conditioning work	50	2	Yes ?	Yes
UEERA2003A	Apply principles and terms to basic refrigeration systems	30	2	Yes ?	Yes
UEERA2004A	Prepare and connect refrigerant tubing and fittings	30	2	Yes ?	Yes
UEERA2006A	Apply principles and terms to basic air conditioning systems	20	2	No	
UEEEL2003A	Attach cords and plugs to electrical equipment for connection to a single phase 230 Volt supply	20	2	Yes ?	Yes
UEERA3001A	Connect service gauges to determine the operating conditions of vapour compression systems	20	3	Yes ?	Yes
UEERA3002A	Identify refrigeration and air conditioning system major components	20	3	Yes ?	Yes
UEERA3003A	Effectively reference standards, codes, documents & drawings in refrigeration & air conditioning work	30	3	Yes ?	Yes
UEERA3005A	Recover, pressure test, evacuate, charge and leak test refrigerants	30	3	No	
UEERA3006A	Apply refrigerant handling legislative, standard and code requirements	20	3	No	
UEERA3007A	Solve problems in low voltage refrigeration circuits	40	3	No	
UEERA3008A	Find and rectify faults in refrigeration and air conditioning system motors and associated controls	40	3	No	
UEERA3009A	Find and rectify faults in refrigeration and air conditioning electrical control systems	30	3	No	
UEERA3010A	Install and adjust refrigerant flow controls and accessories	20	3	No	
UEERA3011A	Test and replace refrigeration and air conditioning system components	20	3	No	
UEERA3012A	Construct a basic refrigerating system	20	3	No	
UEERA3013A	Install, commission, service and maintain medium temperature cabinets and rooms	40	3	No	Yes
UEERA3014A	Install, commission, service and maintain low temperature cabinets and rooms	40	3	No	
UEERA3015A	Install, commission, service and maintain dual temperature cabinets and rooms	20	3	No	
UEERA3016A	Construct a basic air conditioning system	20	3	No	
UEERA3017A	Install, commission, service and maintain non-ducted split air conditioning systems	30	3	No	
UEERA3018A	Install, commission, service and maintain ducted split air conditioning systems	40	3	No	
UEERA3019A	Install, commission, service and maintain ducted package unit air conditioning systems	40	3	No	
UEERA3021A	Apply control measures to WHS/OHS risks associated with refrigeration and air conditioning work	10	3	No	
UEEEL3085A	Attach cords, cables & plugs to electrical equipment for connection to 1000 Va.c./1500 Vd.c. supply	20	3	Yes ?	Yes
UEEEL3072A	Disconnect / reconnect composite appliances connected to low voltage	60	3	Yes ?	Yes
UEEEL3077A	Locate and rectify faults in low voltage composite appliances using set procedures	20	3	Yes ?	Yes
UEERE3001A	Apply sustainability practices at work	30	3	Yes ?	Yes
UEERA3091A	Apply refrigeration and air conditioning industry benchmarks for Phase 1 competency progression	30	3	No	
UEERA3092A	Apply refrigeration and air conditioning industry benchmarks for Phase 2 competency progression	30	3	No	
UEERA3093A	Apply refrigeration and air conditioning industry benchmarks for Phase 3 competency progression	30	3	No	
UEERA3094A	Verify compliance, functionality & critical safety of refrigeration & air conditioning systems ~~installations~~	30	3	No	
Unit Code	**Elective Unit Title**	**Weighting Points**	**AQF**	**Unit Submitted for Endorsement**	**Unit Drafted**
UEERA3022A	Flammable refrigerants hazardous area unit/s	?	3	No	
UEERA3023A	WA Restricted RAC Electrical Licensing Requirements	?	3	No	
UEERA3024A	Handling A2 Flammable Refrigerants	20	3	No	
UEERA3110A	Select refrigerant piping, accessories and associated controls	50	3	No	
UEERA3116A	Resolve problems in transport refrigeration systems	20	3	No	
UEERA3117A	Resolve problems in ultra-low temperature refrigeration systems	20	3	No	
UEERA3118A	Resolve problems in post mix refrigeration systems	20	3	No	
UEERA3119A	Resolve problems in ice making systems	20	3	No	
UEERA3155A	Service refrigeration appliances	60	3	No	
UEERA3166A	Resolve problems in dairy refrigeration systems	20	3	No	
UEERA3168A	Maintain microbial control of refrigeration and air conditioning systems	20	3	No	
UEERA3171A	Resolve problems in refrigerated beverage vending cabinets	20	3	No	
UEERA3178A	Apply safety awareness and legal requirements for ammonia refrigerant	10	3	No	
UEERA3184A	Apply safety awareness and legal requirements for carbon dioxide refrigerant	10	3	No	
UEERA3188A	Repair and service self contained carbon dioxide refrigeration and heat pump systems	20	3	No	
UEEIC3016A	Develop, enter and verify discrete control programs for programmable controllers	60	3	Yes ?	Yes

Listed in the table below are the proposed additional core and elective units for the Certificate IV in Refrigeration and Air Conditioning Technician qualification, with their weighting points, AQF level, whether they have been submitted for endorsement and whether drafts have been completed.

Certificate IV in Refrigeration and Air Conditioning Technician - additional units to the Cert III					
Unit Code	**Core Unit Title**	**Weighting Points**	**AQF**	**Unit Submitted for Endorsement**	**Unit Drafted**
UEECD4003A	Implement and monitor energy sector WHS policies and procedures	20	4	Yes ?	Yes
UEECD4***A	Compile and produce an energy sector report	40	4	No	Yes
UEERA4095A	Apply refrigeration and air conditioning industry benchmarks for Phase 5 competency progression	30	3	No	
Unit Code	**Elective Unit Title**	**Weighting Points**	**AQF**	**Unit Submitted for Endorsement**	**Unit Drafted**
UEERA4112A	Diagnose and rectify faults in complex air conditioning/ refrigeration systems	100	4	Yes ?	Yes
UEERA4114A	Resolve problems in hydronic systems	40	3	No	
UEERA4115A	Resolve problems in beverage dispensers	40	3	No	
UEERA4120A	Resolve problems in industrial refrigeration systems	20	3	No	
UEERA4121A	Monitor and adjust refrigeration energy management systems	40	4	No	
UEERA4122A	Diagnose faults in complex HVAC /refrigeration control systems	80	4	No	
UEERA4123A	Commission complex (HVAC) heating, ventilation and air conditioning systems	80	4	No	
UEERA4124A	Commission refrigeration/ air conditioning hydronic systems	80	4	No	
UEERA4125A	Commission complex refrigeration systems and equipment	80	4	No	
UEERA4126A	Commission complex refrigeration/air conditioning control systems	80	4	No	
UEERA4136A	Evaluate and report on building services energy management systems	80	5	Yes ?	Yes
UEERA4167A	Resolve problems in central plant air conditioning systems	40	3	No	
UEERA4179A	Repair and service ammonia refrigeration systems	20	3	No	
UEERA4180A	Install and commission ammonia refrigeration systems, components and associated equipment	20	3	No	
UEERA4182A	Repair and service secondary refrigeration systems	20	3	No	
UEERA4185A	Repair and service carbon dioxide refrigeration systems	20	3	No	
UEERA4186A	Install and commission carbon dioxide refrigeration systems, components and associated equipment	20	3	No	
UEERA4192A	Analyse the psychrometric performance of HVAC/R systems	50	4	Yes ?	Yes
UEERA4011A	Install, commission, service and maintain Variable Refrigerant Volume A/C Systems	40	4	No	
UEERA4012A	Install, commission, service and maintain Variable Air Volume A/C Systems	40	4	No	
UEERA4013A	Resolve problems in two stage supermarket refrigeration systems	40	4	No	
UEERA4014A	Resolve problems in industrial ice making systems	40	4	No	
UEERA4015A	Comply with Essential Services Regulatory Requirements	40	4	No	
UEERA4016A	Operate and Maintain Co/Tri Generation Systems	40	4	No	
UEERA4017A	Calculate and Confirm Vapour Compression System Performance	40	4	No	
UEERA4018A	Calculate and Confirm Water Cooled Condenser Performance	20	4	No	
UEERA4019A	Determine performance & efficiency of Commercial/Industrial Refrigeration Systems	50	4	No	
UEERA4020A	Determine performance & efficiency of Commercial/Industrial Air Conditioning Systems	50	4	No	
UEEIC4014A	Develop, enter and verify word and analogue control programs for programmable logic controllers	60	4	Yes ?	Yes

5. Contact details of the project Steering Committee

Review of Refrigeration and Air Conditioning Trade – Project Steering Committee Contact Details
11th December 2015

Name	Organisation	Position	Email	Phone Number
Bob Taylor	EE-Oz Training Standards	CEO	Office@e-oz.com.au	(02) 6262 7055
Col Harris	Electrical Trades Union - NSW Branch		colharrisetu@gmail.com	0417 682 134
David Harpley	Appliance Industry Association (AIA)		dharpley@hotmail.com	0412 448273
Glenn Menzies	Plumbing Trades Employees Union		glenn@pteu.asn.au	
Gail Silman /	Australian Industry Group (AIG)	Senior Adviser - Education and Training	gail.silman@aigroup.asn.au	0419 266 725
Graham MacKrill	Air conditioning and Mechanical Contractors (AMCA)	Executive Director NSW and Qld	GMacKrill@amca.com.au	0418 994 812
John Bourke	Consumer Electronics Suppliers Association (CESA)	Fujitsu – National Product Manager	john.bourke@fujitsugeneral.com.au	0400 175 760
Ken Ball	Air conditioning and Refrigeration Equipment Manufacturers Association (AREMA)		kenneth.ball@teco.com.au	0433 215 649
Kevin O'Shea	Refrigeration and Air Conditioning Contractors Association (RACCA)	National President	kevin@coldrae.com.au	0425 273 200
Michael Mosslar	ACT Government, Environment & Planning Directorate (Representing ERAC)	Manager - Electrical Inspections	Michael.Mosslar@act.gov.au	(02) 6207 7941
Mike Ohlsen	TAFE NSW – Western Sydney Institute	Manager Education	Michael.Ohlsen@tafensw.edu.au	0419 752 249
Noel Munkman	EE-Oz Training Standards	Senior Project Officer	nmunkman@ulmi.com.au	0422 048 112
Norm Cahill	NSW Utilities & Electrotechnology ITAB	EO	norm@uensw.com.au	0404 844 606
Paul Wright	E-Oz Refrigeration and Air Conditioning TAC	Chair	Paul.Wright@cit.act.edu.au	0427 505 737
Peter Cashel	Consumer Electronics Suppliers Association (CESA)	Director	Peter.cashel@fujitsugeneral.com.au	0408 220 779
Phil Wilkinson/	Australian Institute of Refrigeration, Air conditioning and Heating (AIRAH)	CEO	Phil@airah.org.au	0415 296 918 /
Rod Cumming	Australian Refrigeration Council		rcumming@arctick.org	0411 334 796
Roy Sands	NECA	Technical Services	Roy.Sands@neca.asn.au	
Stephen Smith	TAFE NSW – Western Sydney Institute	Refrigeration Head Teacher	stephen.smith@tafensw.edu.au	0402 132 903
Tim Edwards	Australian Refrigeration Association (ARA)	President	tim.edwards@ausref.org.au	0405 324 834

b) Key activities still to be completed

This project is not complete and is behind schedule due to:

- The need to complete a Student Survey to determine the range of common and specialised applications that apprentices are expected the work on at the end of their apprenticeship. This was conducted on March/April 2015.
- The need to address the issues raised by AMCA in its February 2015 submission. These were investigated by the Working Group April/ May 2015 and addressed in E-Oz's response in August 2015
- Other E-Oz priorities caused by the changing federal government funding arrangements and requirements

At the present time, the following new arrangements for Training Package development from January 2016 are not known:

- which organisation will operate as the new Service Skills Organisation for the HVACR industry.
- which Industry Reference Committee will cover the HVACR industry
- if the necessary funding and resources will be provided for the continuation of this project.

This Project Report provides a summary and relevant detail of the activities carried out to date including:

- the key outcomes of the consultations, surveys and submissions
- proposed Certificate III and Certificate IV qualifications
- proposed Certificate III and Certificate IV units
- contact details of the project Steering Committee.

Key activities still to be carried out to complete this project are:

1) Developing of the proposed core and elective units, identified in section b) 4 Proposed Certificate III and Certificate IV units on page 24 per, the recommendations in section b):
   - 2.1.4 Recommendations
   - 2.2 Draft Essential Performance Capabilities
   - 2.3 E-Oz response the AMCA submission
   - 2.4 Student Surveys
   - 2.5 Revised Essential Knowledge and Skills (EKAS) Clauses
   - 3 Proposed Certificate III and Certificate IV Qualifications

   This will require the completion of the New Unit to Essential Performance Capabilities and Essential Knowledge and Skills Mapping. A major part will be to review the current refrigeration electrical units with the restricted electrical units to remove the duplication and unnecessary content.

2) Reviewing the draft units by the RAC TAC, Project Steering Committee member association representatives, Regulators and finally State Training Authorities.

3) Drafting of the Case for Endorsement

4) Conducting industry information sessions nationally for feedback on the proposed qualifications and units.

5) Carrying out a final revision of proposed qualifications and units

6) Finalising and submitting the Case for Endorsement

c) Project Action Plan - Progress Report at 10 December 2015

Item	Dates	• Actions	• Progress Report
1	March 2014	• Develop project plan • *Establish project Steering Committee and hold first meeting* • Gain Steering Committee approval for the project and the project plan	• Completed 14 March • Completed, first meeting held on 20th March 2014 • Completed, approved at first meeting on 20th March 2014
2	April 2014	• Develop national consultation plan • *Steering Committee meeting 2* • Create project Forum on E-Oz website • Project Report 1 outlining the following: - An overview of activity undertaken during the reporting period, - Key activities to be completed during the next reporting period. • Book travel and venue arrangements for consultations	• Ongoing, RTOs and ITABs advised about project on 22 & 23 April respectively. Draft consultation meeting timetable to be completed by 2 May and confirmed by 9 May and distributed. Website Registration form to be available by 9 May. First meetings will be held in the ACT on 2 June and continue to end of July. Plan and flyer completed and distributed on 14th May which contained a link to the project website which contained details of the consultation meetings and the online Registration Form. • Conducted on 1 May. • SC Forum created on 7 April • Completed on 8 May • Completed progressively from mid-May to mid-August.
3	May 2014	• Conduct multi-level consultations in Qld, NSW and ACT	• Completed from 2nd June until 5th August 2014.
4	June 2014	• Conduct multi-level consultations in Vic, Tas and SA	
5	July 2014	• Conduct multi-level consultations in WA and NT	
6	August 2014	• Compile report on outcomes of the consultations • Draft recommendations	• Draft outcomes presented at the Steering Committee meeting 3 on 22 August

		• Steering Committee meeting 3 • Project Report 2	• Project Report 2 completed 18 September 2014
7	September 2014	• Gain feedback on the report and recommendations	• Abridged version of Project Report 2 sent to SC and all those who completed the consultation questionnaire and ITABs seeking feedback on the recommendations, required knowledge and skills and Essential Performance Capabilities on 19th Sept. Six responses received.
8	October 2014	• Draft new qualifications and competency standard unit titles	• Drafted Certificate III and IV qualification scopes, core and elective units and completion requirements drafted and sent to SC on 13 November to review.
9	November 2014	• Consult and reach agreement with key stakeholders on proposed new qualifications and competency standard units • *Steering Committee meeting 4*	• Questionnaire on the proposal Cert III and IV qualification scopes and the Essential Performance Capabilities sent to the SC on 27th November for distribution to their association members. 27 November 2014. It was also emailed to the industry and RTO representatives who completed the original questionnaire on 1st December and to the RAC TAC members on 9th December. Reponses due by 19th December 2014. • SC meeting 4 held on 19th November in Sydney
10	December 2014	• Develop plan to fully develop new qualifications and competency standard units • Project Report 3	• Plan drafted on 16th November and revised on 1st December 2014 • Project Report 3 completed 12 December 2014

11	January 2015	• Draft new units and assessment requirements	• Industry survey on draft qualifications and EPCs conducted • Student survey conducted on the types of systems and tasks that they will be required carry out, with their current employer at the end of their apprenticeship. • The following 3 new units and assessment requirements drafted for the proposed Cert III qualification: ○ UEERA2102A (J102A) ○ UEERA3103A (J103A) ○ UEERA2104A (J104A) • Draft mapping completed of EPC's to EKAS Clauses (knowledge) and Performance Criteria and Critical Aspects
12	February 2015		
13	March 2015		
14	April 2015		
15	May 2015	• Review of draft units and assessment requirements • *Steering Committee meeting 5* • *Steering Committee meeting 6* • Project Report 4	• Working Group meetings meeting held to address AMCA issues • The following 3 new units and assessment requirements have been reviewed by the RAC TAC for the proposed Cert III qualification: ○ UEERA2102A (J102A) ○ UEERA3103A (J103A) ○ UEERA2104A (J104A) • Meeting 5 held on 26th February 2015 • Meeting 6 held on 13th May 2015 • Project Report 4 drafted on 30 June 2015
16	June 2015	• Revise draft qualifications and unit	• RAC TAC reviewed the EKAS clauses of 20 current Cert III units and provided feedback.
17	July 2015	• Final review of draft units and assessment requirements • *Steering Committee meeting 6*	• • SC Meeting 6 held on 13th May 2015

18	August 2015	• Draft Case for endorsement • Project Report 5	• Due to issues raised by AMCA and other ISC priorities, units not drafted and case for endorsement not completed. • Steering Committee meeting 7 conducted on 6th August 2015 • Project Report 5 completed 10th December 2015
19	September 2015	• Finalise consultations, agreements and support	• Draft quals and units reviewed at RAC TAC meeting on 14-15th September
20	October 2015	• Submit proposed new qualifications and competency standard units to NSSC for endorsement	• Submission not made due to project delays and other ISC priorities
21	November 2015	• *Steering Committee meeting 7*	• Steering Committee meeting 8 conducted on 20th November 2015
22	December 2015	• NSSC meeting • Publish new qualifications and units on TGA • Final Project Report	• Case for endorsement not submitted for new qualifications • Project Report 5 completed 10th December 2015
23	Feb-March 2016	• Conduct information sessions nationally	

Appendix A: Minutes of Steering Committee Meeting 7

Review of Refrigeration and Air Conditioning Trade Qualification Project

Steering Committee Meeting 7 – Draft Minutes Version 1

Date: 6th August 2015.
Time: 10:30 am to 12:00 pm

Venue: NECA Group Training Room
Chullora TAFE
Sydney

Chair: Noel Munkman

Attendance:

Name	Organisation
George Thomson	Australian Refrigeration Council
Graham MacKrill – via phone	Air conditioning and Mechanical Contractors (AMCA)
Ken Ball	Air conditioning and Refrigeration Equipment Manufacturers Association (AREMA)
Mike Ohlsen	TAFE NSW – Western Sydney Institute
Noel Munkman	E-Oz Energy Skills Australia
Norm Cahill	NSW Utilities & Electrotechnology ITAB
Stephen Smith	TAFE NSW – Western Sydney Institute

Apologies:

Name	Organisation
Bob Taylor	E-Oz Energy Skills Australia
Col Harris	Electrical Trades Union - NSW Branch
David Harpley	Appliance Industry Association (AIA)
Gail Silman	Australian Industry Group (AIG)
Glenn Menzies	Plumbing Trades Employees Union
Kevin O'Shea	Refrigeration and Air Conditioning Contractors Association (RACCA)
Michael Mosslar	ACT Government, Environment & Planning Directorate (Representing ERAC)
Paul Wright	E-Oz Refrigeration and Air Conditioning TAC
Phil Wilkinson	Australian Institute of Refrigeration, Air conditioning and Heating (AIRAH)
Peter Cashel	Consumer Electronics Suppliers Association (CESA)
Roy Sands	NECA
Tim Edwards	Australian Refrigeration Association (ARA) - Teleconference

Meeting Commenced: 10:30 am

ITEM 1 - Welcome & Apologies
The Chair welcomed the members to the meeting. Apologies had been received per the list above.

ITEM 2 – Review of Minutes of Previous Meeting
Noel addressed the Minutes of the previous meeting and called for the receipt and acceptance of the minutes.

Resolution 1: The minutes of the previous meeting were received and accepted as a true and accurate record of the meeting.

ITEM 3 – Matters Arising from the Previous Meeting
Noel addressed the Actions from the minutes of the previous meetings as summarised below and Appendix A:

Action 1: The draft EKAS clauses and mapping are to be revised and finalised at E-Oz RAC TAC meeting on 21-22 May.

Status:
Completed, Noel reported that at the RAC TAC meeting the following draft units were reviewed including their EKAS clauses and a number of recommended changes were made:

- UEENEEJ102A Prepare and connect refrigerant tubing and fittings
- UEENEEJ103A Establish the basic operating conditions of vapour compression systems
- UEENEEJ104A Establish the basic operating conditions of air conditioning systems

Those that attended the meeting also volunteered to review the EKAS clauses of most remaining core units by 1st July 2015.

Action 2: Add proposed new units as electives to the new Cert IV:

- Regulatory compliance for essential services, covering for example fire dampers, stairwell pressurisation, etc.
- Co/Tri Generation systems

Status:
Completed, refer to Agenda Item 5

Action 3: Revise the unit development plan
Status:
Completed, refer to Agenda Item 5

Action 4: Noel will draft a response to each of the points in the Yes Summary of the report and email it to the Steering Committee for review.
Status:
Completed, refer to Agenda Item 4c

Action 5: Noel will review the student survey data and determine the number of apprentices who only install wall hung split air conditioners and the number who only install residential air conditioners
Status:
Completed, Agenda Item 4d

Action 6: Noel to revise the draft response to AMCA's Position Paper based on the outcomes from the meetings and send to AMCA.
Status:
Completed, Agenda Item 4e

Action 7: Noel and/or Steve are to present information on the qualification proposals to various associations and develop an Information Sheet on them for distribution to the associations' membership and ARC stationary systems license holders.
The first presentations are planned for:

- CESA at Bankstown Sports Club on 2nd June at 2:00pm
- AREMA at Box Hill TAFE on 11th June at 9:00am

Status:
Completed, Steve and Noel provided a brief report. Noel also had a meeting with a representative of AMCA and RACCA/NECA in Sydney on 23 July.

ITEM 4 - Report on Actions since last meeting

a) E-Oz update

Noel explained that E-Oz's funding agreement with the federal department expired on 30th June. However, as the new arrangements will not be in place until January 2016, the Dept. offered all Industry Skills Councils (ISC) a new funding agreement until 31 Dec 2015, to maintain Training Packages and update as many qualifications as possible with units converted into the new template. However, it also required the ISCs to permit access by the Dept. to ISC Intellectual Property. As a result, a number of ISCs including E-Oz have not this stage accepted this proposed agreement. E-Oz has submitted a revised proposal to the Dept. for their consideration.
Therefore, at this time E-Oz is not a recognised ISC and therefore it cannot submit for endorsement changes to Training Packages.

E-Oz will be submitting an expression of interest to develop and maintain Training Packages from January 2015.

However, E-Oz at this time is still committed to develop the revised Refrigeration and Air Conditioning Certificate III and IV qualifications between now and end of 2015, based on the extensive industry and student consultations conducted over the past 18 months.

The committee strongly supports the action by E-Oz to develop the relevant competency units as an outcome of this project, which will hopefully be endorsed sometime in the near future.

b) Project Report 4
Noel stated that this report was completed on 30th June and emailed to the Steering Committee and E-Oz management on 8th July 2015.
It was also uploaded to the Steering Committee Forum website on 7 August and an abridged version was uploaded to the Project webpage on 7 August.

c) Additional Information on the Draft Qualifications and Essential Performance Capabilities Consultations
As agreed at the Steering Committee meeting on 26th February 2015, Noel on behalf of E-Oz wrote a response to each of the points in the Yes Summary of the Draft Qualifications and Essential Performance Capabilities Consultations Report and it was emailed to the Steering Committee on 8th July 2015. This document was discussed and accepted during this meeting.

d) Additional Information from Student Survey results
As agreed at the May Steering Committee meeting, Noel reviewed the student survey data to determine the number of apprentices who only install wall hung split air conditioners and the

number who only install residential air conditioners and produce a report. This report was completed and emailed to the Steering Committee on 27th July 2015.
It was noted that there are also a low number of apprentices carrying out work on Transport refrigeration and air conditioning and that when developing these competency units, the relevant licenses will need to be clarified.

e) E-Oz draft response to AMCA's submission
As agreed at the May Steering Committee meeting, Noel revised the draft response to AMCA's Position Paper based on the outcomes from the Steering Committee meeting and emailed it to Graham MacKrill on 3rd July. Graham distributed it to the AMCA's Executive Directors and it was discussed and accepted during their conference call meeting on 7th July.

Subsequently, a meeting was arranged and conducted on 23 July in Sydney to discuss the response in detail between Noel and:
- Chris Rankin AMCA National President and SA Executive Director
- Larry Moore, NECA and RACCA SA Executive Director
- Kevin O'Shea, RACCA National President

This draft response to AMCA's Position Paper was emailed to the Steering Committee on 27th July 2015.

Action 1:
Noel to revise and finalise the Response to AMCA's Position Paper and send it the AMCA via Graham MacKrill asap.

f) Report on industry association meetings
Noel and Steve presented information on the qualification proposals to CESA at Bankstown Sports Club on 2nd June which was attended by about 25 members.

Steve presented information on the qualification proposals to AREMA at Box Hill TAFE which was attended by about 25 members.

Noel wrote an article on the qualification proposal which was published in the ARC Cool Change July 2015 newsletter and distributed to its 70,000 ARC license holders.

ITEM 5 - Planned Actions prior to next meeting
- **Plan for the development of qualifications and units**

Noel presented a revised plan (sent with these minutes) for the development of proposed Certificate III and Certificate IV qualifications and 90 units of competency over the next 10 weeks. However, Noel explained that due to the uncertainty about E-Oz's status as an ISC, this timeline may be unrealistic. However, the development will continue this year.

ITEM 6 - Other Items
- It was noted that when writing the new qualifications, they should not state or infer that those with the Certificate III do not have the generic skills required for the more complex and specialised unit in the Certificate IV.

ITEM 7 - Next Steering Committee Meetings
The next meeting is scheduled for the 12th of November.

Meeting Close:
The Chair thanked everyone for their participation and closed the meeting at 12:00 pm.

Appendix A:

Review of Refrigeration and Air Conditioning Trade Qualification Project

Steering Committee Meeting Action Status at 12th May 2015

Meeting Date	Action No.	Action	Report Date	Progress	Complete/ Ongoing
13 May 15	1	Action 1: The draft EKAS clauses and mapping are to be revised and finalised at E-Oz RAC TAC meeting on 21-22 May.	6 Aug 15	Noel reported that at the RAC TAC meeting the following draft units were reviewed including their EKAS clauses and a number recommended changes were made: • UEENEEJ102A Prepare and connect refrigerant tubing and fittings • UEENEEJ103A Establish the basic operating conditions of vapour compression systems • UEENEEJ104A Establish the basic operating conditions of air conditioning systems Also those who attend the meeting also volunteered to review the EKAS clauses of most remaining core units by 1st July 2015.	Completed
	2	Add proposed new units as electives to the new Cert IV: • Regulatory compliance for essential services, covering for example fire dampers, stairwell pressurisation, etc. • Co/Tri Generation systems	12 May 15	Units added as electives to the proposed Certificate IV.	Completed
	3	Revise the unit development plan	12 May 15	Completed, refer to Agenda Item 6	Completed
	4	Noel will draft a response to each of the points in the Yes Summary of the report and email it to the Steering Committee for review.	12 May 15	Completed, refer to Agenda Item 4c	Completed
	5	Noel will review the student survey data and determine the number of apprentices who only install wall hung split air conditioners and the number who only install residential air conditioners		Completed, refer to Agenda Item 4d	Completed
	6	Noel to revise the draft response to AMCA's Position Paper based on the outcomes from the meetings and		Completed, refer to Agenda Item 4e	Completed

		send to AMCA.			
	7	Noel and/or Steve are to present information on the qualification proposals to various associations and develop an Information Sheet on them for distribution to the associations' membership and ARC stationary systems license holders. The first presentations are planned for: • CESA at Bankstown Sports Club on 2nd June at 2:00pm • AREMA at Box Hill TAFE on 11th June at 9:00am		Completed, Steve and Noel provided a brief report. Noel also had a meeting with an AMCA and a RACCA/NECA representative in Sydney on 23 July.	Completed

Appendix B: Minutes of Steering Committee Meeting 8

ENERGY SKILLS

Review of Refrigeration and Air Conditioning Trade Qualification Project

Steering Committee Meeting 8 – Draft Minutes Version 1

Date: 20th November 2015.
Time: 10:30 am to 12:30 pm
Venue: NECA Group Training Room
Chullora TAFE
Sydney
Chair: Noel Munkman

Attendance:

Name	Organisation
Bob Taylor	E-Oz Energy Skills Australia – via phone
Col Harris	Electrical Trades Union - NSW Branch
Gail Silman	Australian Industry Group (AIG)
Graham MacKrill	Air conditioning and Mechanical Contractors (AMCA)
John Bourke	Consumer Electronics Suppliers Association (CESA)
Ken Ball	Air conditioning and Refrigeration Equipment Manufacturers Association (AREMA)
Kevin O'Shea	Refrigeration and Air Conditioning Contractors Association (RACCA)
Michael Mosslar	ACT Government, Environment & Planning Directorate (Representing ERAC)
Mike Ohlsen	TAFE NSW – Western Sydney Institute
Noel Munkman	E-Oz Energy Skills Australia
Norm Cahill	NSW Utilities & Electrotechnology ITAB
Paul Wright	E-Oz Refrigeration and Air Conditioning TAC
Peter Cashel	Consumer Electronics Suppliers Association (CESA)
Rod Cumming	Australian Refrigeration Council
Stephen Smith	TAFE NSW – Western Sydney Institute

Apologies:

Name	Organisation
David Harpley	Appliance Industry Association (AIA)
Glenn Menzies	Plumbing Trades Employees Union
Phil Wilkinson	Australian Institute of Refrigeration, Air conditioning and Heating (AIRAH)
Roy Sands	NECA
Tim Edwards	Australian Refrigeration Association (ARA) - Teleconference

Meeting Commenced: 10:20 am

ITEM 1 - Welcome & Apologies
The Chair welcomed the members to the meeting. Apologies had been received per the list above.

ITEM 2 – Review of Minutes of Previous Meeting
Noel addressed the Minutes of the previous meeting and called for the receipt and acceptance of the minutes.

Resolution 1: The minutes of the previous meeting were received and accepted as a true and accurate record of the meeting.

ITEM 3 – Matters Arising from the Previous Meeting
Noel addressed the Actions from the minutes of the previous meeting as summarised below:

ITEM 4 - Report on Actions since last meeting

b) Project Report 4
Noel reported that Project Report 4 was uploaded to the Steering Committee Forum website on 7 August and an abridged version was also uploaded to the Project webpage on 7 August.

e) E-Oz draft response to AMCA's submission
Action 1:
Noel advised that the E-Oz Response to AMCA's Position Paper was finalised and sent to AMCA via Graham MacKrill on 10th August.

ITEM 4 - E-Oz update and how Training Packages will be revised from 2016

a) New Training Package Development Plan
At the last meeting in August, Noel explained that E-Oz's funding agreement with the federal department expired on 30th June. However, as the new arrangements will not be in place until January 2016, the Dept. offered all Industry Skills Councils (ISC) a new funding agreement until 31 Dec 2015, to maintain Training Packages and update as many qualifications as possible with units converted into the new template. However, it also required the ISCs to permit access by the Dept. to ISC Intellectual Property. As a result, a number of ISCs including E-Oz had not accepted this proposed agreement. E-Oz has submitted a revised proposal to the Dept. for their consideration. Therefore, at that time E-Oz was not a recognised ISC and therefore it could not submit for endorsement any changes to Training Packages.

Near the end of August, E-Oz signed a funding agreement for the period July to December 2015 with the Dept. and had commenced updating as many qualifications as possible with units converted into the new template. Noel and others at E-Oz were undertaking this work which had to be submitted by the end of November.

This meant that the development of the revised Refrigeration and Air Conditioning Certificate III and IV qualifications and competency units could not be completed by the end of 2015.

E-Oz had submitted two expressions of interest to develop and maintain Training Packages from January 2015, one by itself and the other in partnership with the Construction ISC and was awaiting an announcement on whether either was successful.

b) **Australian Industry and Skills Committee**
Noel referred to the New Training Package Development Model diagram in Appendix A and explained the roles of the Australian Industry and Skills Committee, the Industry Reference Committees and the Skills Service Organisations which will replace the current Industry Skills Councils.

c) **Bob Taylor, E-Oz CEO**
Bob joined the meeting via telephone and explained that late yesterday the Dept. had advised him that E-Oz's joint expression of interest with the Construction ISC to become a Skills Service Organisations in partnership was successful and they had been invited to submit a tender by 2 December for the development and maintenance of training packages covering the following industries:
Construction and Property, Utilities, Engineering, Information and Telecommunications, and Property – Surveying and Spatial Information Services.

An announcement would be made on the successful tenders on 15th December and the new Skills Service Organisations will be operational from January 2016.

Bob thanked the committee members for their strong support in this project and for E-Oz in general and hoped that it would continue in the future.

ITEM 5 - Report on Actions since last meeting
Noel tabled a report (Appendix B) and explained the actions since last meeting. The key points were:

- At the RAC TAC meeting held at the Canberra Institute of Technology on 14-15th September, seven proposed new Cert III units were reviewed and constructive feedback was provided which was incorporated into the final drafts, which are now available on the RAC TAC Forum site.
- The earlier draft Certificate III qualification was revised based on the revised draft units, refer to Attachment B.
- There is a lot of duplication in the refrigeration electrical and the restricted electrical units and therefore a major review of them is required. Newcastle TAFE refrigeration teachers provided a mapping of the duplicate Essential Knowledge and Skills for UEENEEE103A, UEENEEJ194A, UEENEEJ153A, UEENEEP012A and UEENEEP017A. Steve Smith also developed a mapping document for all of the "electrical" units which recommended the changes to the Essential Knowledge and Skills required to each unit to remove the duplication and some unnecessary content. This information will be used to draft revised "electrical" units for the Certificate III.
- The following new RAC units will be included in proposed revised Certificate II in Electrotechnology Career Start per attachment:
  - UEERA2003A Apply principles and terms to basic refrigeration systems
  - UEERA2004A Prepare and connect refrigerant tubing and fittings.

ITEM 6 – Required Future Actions
Noel tabled a report (Appendix C) and explained the required future actions. The key points are:

- currently it is not known which organisation will operate as the new Service Skills Organisation for the HVACR industry.
- E-Oz will complete Project Report 5 which will provide a summary and relevant detail of the current status of the project, including:
  - the key outcomes of the consultations, surveys and submissions
  - proposed Certificate III and Certificate IV qualifications and drafts of unit descriptors and assessment requirements that are completed
  - List of proposed Certificate III and Certificate IV units still to be drafted with relevant comments from research on the issues and requirements
  - Contact details of the project Steering Committee.

A copy of the report is to be provided to the Steering Committee members, Australian Industry and Skills Committee and the relevant Industry Reference Committee.

ITEM 7 - Other Business

- Ken enquired about the status of the training for R32. Steve explained that the draft for the new unit of competency "Handling A2L refrigerants" was finalised. Noel explained that this unit would be included with other migrated units in the new template, in E-Oz's Electrotechnology Training Package submission to the Dept. for endorsement on 30th November 2015. Steve also explained that TAFE NSW Western Sydney Institute had already developed delivery and assessment resources for it with the assistance of AREMA.

ITEM 8 – Future Meeting 2016

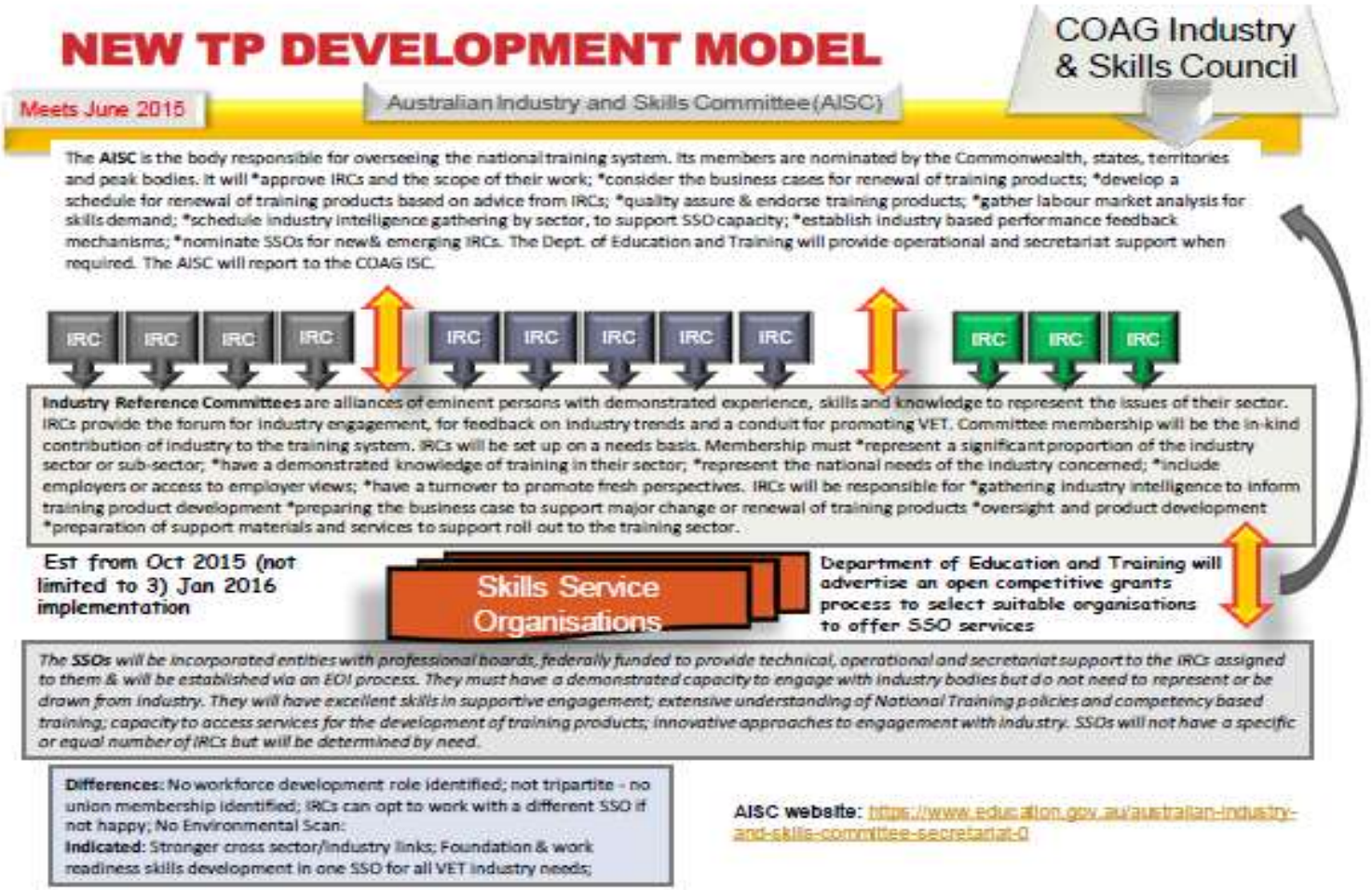
To be advised once the decision on the Service Skills Organisation is announced.

Meeting Close:

The Chair thanked everyone for their participation, assistance and strong support of this project over the past 18 months. The committee thanked both Noel and Steve for their time, efforts and commitment to this project.

The meeting closed at 12:00 pm and lunch was provided.

Appendix A



UEENEEJ153A Find and rectify faults in motors and associated controls in refrigeration and air conditioning systems

UEENEEP012A Disconnect / reconnect composite appliances connected to low voltage installation wiring

UEENEEP017A Locate and rectify faults in low voltage composite appliances using set procedures

UEENEEP024A Attach cords and plugs to electrical equipment for connection to a single phase 230 Volt supply

UEENEEP025A Attach cords, cables and plugs to electrical equipment for connection to 1000 Va.c. or 1500 Vd.c. supply.

Newcastle TAFE refrigeration teachers provided a mapping of the duplicate Essential Knowledge and Skills for UEENEEE103A, UEENEEJ194A, UEENEEJ153A, UEENEEP012A and UEENEEP017A.

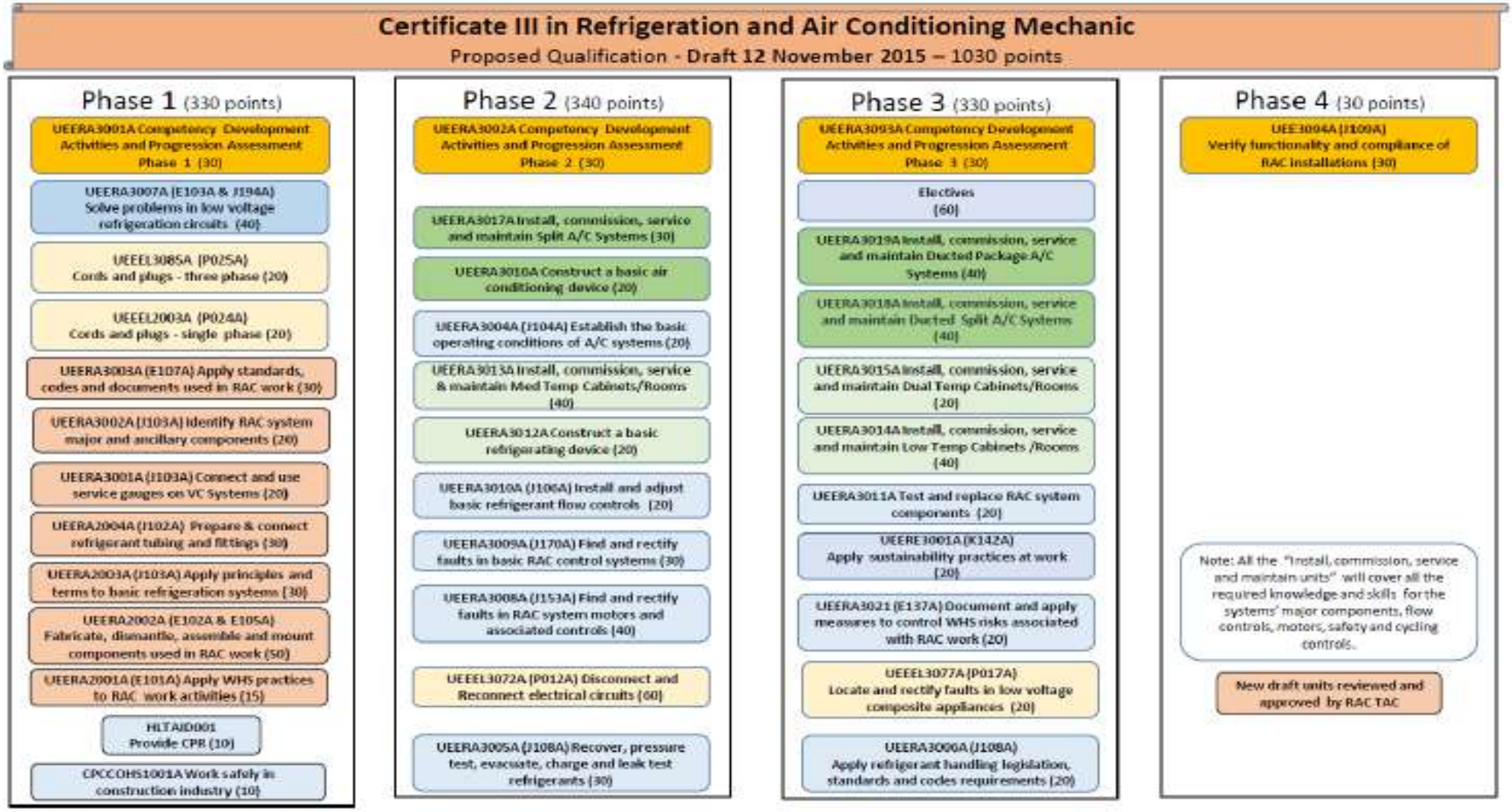
Steve Smith developed a mapping document for all of the "electrical" units which recommended the changes to the Essential Knowledge and Skills required to each unit to remove the duplication and some unnecessary content.

This information will be used to draft revised "electrical" units for the Certificate III.

7. **Inclusion of New RAC units in proposed revised Certificate II in Electrotechnology Career Start**

The following two new RAC units have been included as electives in this revised qualification per attachment:

- UEERA2003A Apply principles and terms to basic refrigeration systems
- UEERA2004A Prepare and connect refrigerant tubing and fittings


Certificate III in Refrigeration and Air Conditioning Mechanic
Proposed Qualification - Draft 12 November 2015 – 1030 points
Phase 1 (330 points)
UEERA3001A Competency Development Activities and Progression Assessment Phase 1 (30)
UEERA3007A (E103A & J194A) Solve problems in low voltage refrigeration circuits (40)
UEEEL3085A (P025A) Cords and plugs - three phase (20)
UEEEL2003A (P024A) Cords and plugs - single phase (20)
UEERA3003A (E107A) Apply standards, codes and documents used in RAC work (30)
UEERA3002A (J103A) Identify RAC system major and ancillary components (20)
UEERA3001A (J103A) Connect and use service gauges on VC Systems (20)
UEERA2004A (J102A) Prepare & connect refrigerant tubing and fittings (30)
UEERA2003A (J103A) Apply principles and terms to basic refrigeration systems (30)
UEERA2002A (E102A & E105A) Fabricate, dismantle, assemble and mount components used in RAC work (50)
UEERA2001A (E101A) Apply WHS practices to RAC work activities (15)
HLTAID001 Provide CPR (10)
CPCCOHS1001A Work safely in construction industry (10)
Phase 2 (340 points)
UEERA3002A Competency Development Activities and Progression Assessment Phase 2 (30)
UEERA3017A Install, commission, service and maintain Split A/C Systems (30)
UEERA3010A Construct a basic air conditioning device (20)
UEERA3004A (J104A) Establish the basic operating conditions of A/C systems (20)
UEERA3013A Install, commission, service & maintain Med Temp Cabinets/Rooms (40)
UEERA3012A Construct a basic refrigerating device (20)
UEERA3010A (J106A) Install and adjust basic refrigerant flow controls (20)
UEERA3009A (J170A) Find and rectify faults in basic RAC control systems (30)
UEERA3008A (J153A) Find and rectify faults in RAC system motors and associated controls (40)
UEEEL3072A (P012A) Disconnect and Reconnect electrical circuits (60)
UEERA3005A (J108A) Recover, pressure test, evacuate, charge and leak test refrigerants (30)
Phase 3 (330 points)
UEERA3003A Competency Development Activities and Progression Assessment Phase 3 (30)
Electives (60)
UEERA3019A Install, commission, service and maintain Ducted Package A/C Systems (40)
UEERA3018A Install, commission, service and maintain Ducted Split A/C Systems (40)
UEERA3015A Install, commission, service and maintain Dual Temp Cabinets/Rooms (20)
UEERA3014A Install, commission, service and maintain Low Temp Cabinets /Rooms (40)
UEERA3011A Test and replace RAC system components (20)
UEERE3001A (K142A) Apply sustainability practices at work (20)
UEERA3021 (E137A) Document and apply measures to control WHS risks associated with RAC work (20)
UEEEL3077A (P017A) Locate and rectify faults in low voltage composite appliances (20)
UEERA3006A (J108A) Apply refrigerant handling legislation, standards and codes requirements (20)
Phase 4 (30 points)
UEE3004A (J109A) Verify functionality and compliance of RAC installations (30)
Note: All the "Install, commission, service and maintain units" will cover all the required knowledge and skills for the systems' major components, flow controls, motors, safety and cycling controls.
New draft units reviewed and approved by RAC TAC

UEE22015 Certificate II in Electrotechnology (Career Start)

Description

Scope

This qualification covers competencies for work entry program providing grounding in safety and basic skills and knowledge for work in any electrotechnology discipline.

Packaging Rules

Completion requirements

The requirements for granting this qualification will be met when competency is demonstrated and achieved for:

- All the Core competency standard units, defined in the Core Competency Standard Units table below and
- A combination of Elective competency standard units to achieve a total weighting of 120 points in accordance with the Elective Competency Standard Units table below.

Core Competency Standard Units All Core competency standard units to be achieved		**Weighting Points**
UEECD2001A	Apply Workplace Health and Safety regulations, codes and practices in the workplace	20
UEECD2011A	Use of routine equipment/plant/technologies in an energy sector environment	60
UEECD2016A	Carry out routine work activities in an energy sector environment	40
UEECD2019A	Identify and select components, accessories and materials for energy sector work activities	20
UEERE2001A	Promote sustainable energy practices in the community	40
Total points in core		**180**

Elective Competency Standard Units Complete Elective units to achieve a total of weighting of 120 points from the following groups:			
Group		**Minimum points**	**Maximum points**
A	**Imported and Common Elective Units** Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 2. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points.	0	50
B	**Group B – Qualification Elective Units** You may select all your elective units from this Group	70	120

Group A – Imported and Common Elective Units You may complete units to a maximum weighting of 60		Weighting Points
UEECO2001A	Maintain documentation	20
UEECO2003A	Deliver a service to customers	20
UEECD2005A	Provide basic instruction in the use of electrotechnology apparatus	20
CPCCOHS1001A	Work safely in the construction industry	10
HLTAID001	Provide cardiopulmonary resuscitation	10
	Imported units from other training packages and/or state accredited courses can be added to this group, but they must be selected from qualifications where the unit is first packaged at AQF level 2. If units have not being assigned a weighting by the relevant EE-Oz Industry Technical Advisory Committee, their weighting will be 10 points. Note: For further information see Application of the NQC Flexibility Formula, UEE11 Electrotechnology Training Package, Version 1, Volume 1 Qualification Framework	Up to 50 Points
Group B – Qualification Elective Units Complete units to a minimum weighting of 70 You may select all your elective units from this Group		Weighting Points
UEEEC2011A	Assemble electronic components	40
UEEEC2012A	Select electronic components for assembly	20
UEECD2006A	Carry out preparatory energy sector work activities	60
UEECD2008A	Provide solutions and report on routine electrotechnology problems	60
UEECD2013A	Produce routine tools/devices for carrying out energy sector work activities	60
UEEEC2001A	Repair basic computer equipment faults by replacement of modules/sub-assemblies	40
UEEEC2002A	Repairs basic electronic apparatus faults by replacement of components	40
UEERA2003A	*Apply principles and terms to basic refrigeration systems*	*30*
UEERA2004A	*Prepare and connect refrigerant tubing and fittings*	*30*
UEEEL2003A	Attach cords and plugs to electrical equipment for connection to a single phase 230 Volt supply	20
UEECD2003A	Using electrotechnology basic drawings and diagrams	40

Note:
1. Pre-requisite pathways shall be identified and met for all elective units selected.
2. In selecting elective units considerations to career planning advice should be given to units that form part of a pre-requisite pathway for the progression to achieve particular competencies or qualification at a higher level

END OF QUALIFICATION

Appendix C

Review of Refrigeration and Air Conditioning Trade Qualification
Required Future Actions
18 November 2015

8. **Project Steering Committee Meeting 8**
   Draft minutes of 20 November meeting and complete any "quick actions".

9. **Complete Project Report 5**
   This will provide a summary and relevant detail of the:
   a. Key Activities completed to date
   b. Key outcomes of the:
      - industry, RTO, State Training Authorities and Regulators
      - Student Surveys
      - AMCA submission
   c. Proposed Certificate III and Certificate IV qualifications with relevant comments from research on the issues and requirements
   d. List of proposed Certificate III and Certificate IV qualifications and drafts of unit descriptors and assessment requirement that are completed.
   e. List of proposed Certificate III and Certificate IV units still to be drafted with relevant comments from research on the issues and requirements
   f. Contact details of the project Steering Committee.

   A copy of the report is to be provided to the Steering Committee members, Australian Industry and Skills Committee and the relevant Industry Reference Committee.

10. **Future Meetings?**

11. **Thanks**
    Send advice on the project's status and a vote of thanks to all those who have contributed to the project.

Appendix C: Draft Essential Performance Capabilities (EPCs)

Draft Refrigeration and Air Conditioning Essential Performance Capabilities (EPCs)
Revised 21st May 2015

Mechanical (7)	
1	Apply safe practices to mechanical work
2	Apply fixings & securings
3	Read and interpret mechanical diagrams and floor plans
4	Fabricate basic metal items using hand and power tools
5	Diagnose and repair basic mechanical faults
6	Assemble and disassemble mechanical devices and components
7	Fabricate and install condensate pipe runs
Vapour Compression System (18)	
8	Identify refrigerant tubes and fittings
9	Identify major components of vapour compression systems
10	Identify vapour compression system ancillary valves and components
11	Use refrigerant pressure and temperature measuring instruments
12	Safely connect and operate system access valves
13	Use a Pressure/Temperature chart to determine operating saturation temperatures
14	Measure and record the systems operating values
15	Fabricate and install refrigerant pipe work and components
16	Recognise the properties and applications of each refrigerant group
17	Recover refrigerants safely with minimum refrigerant loss
18	Pressure and leak test systems to the required pressures
19	Evacuate systems to the required vacuum
20	Charge systems with the correct quantity of refrigerant
21	Measure and adjust TX Valve superheat settings
22	Replace system components (Like for Like)
23	Test and replace compressor oil
24	Test compressor pumping efficiency
25	Identify the effects of incorrectly sized or installed refrigerant pipework
Refrigeration Systems (10)	
26	Apply safe practices to refrigeration work
27	Read and draw basic schematic piping diagrams for refrigeration systems
28	Identify the correct storage conditions for ~~to~~ various products
29	Determine refrigerant flow control, cycling and safety control settings for basic refrigeration systems
30	Adjust refrigerant flow controls, cycling and safety controls of refrigeration systems
31	Install medium temperature refrigerated cabinet or coolroom systems
32	Install low temperature refrigerated cabinet or freezer room systems
33	Commission basic refrigeration systems
34	Perform routine maintenance procedures on basic refrigeration systems
35	Diagnose and rectify basic refrigeration system faults

Air Conditioning Systems (13)	
36	Apply safe practices to air conditioning work
37	Read and draw basic schematic piping diagrams for air conditioning systems
38	Identify the correct space conditions for ~~to~~ various applications
39	Identify and replace fan motors and blades
40	Identify and install air distribution systems
41	Measure and record air temperature, humidity, pressure and flow values
42	Determine refrigerant flow control, cycling and safety control settings for basic air conditioning systems
43	Adjust refrigerant flow controls, cycling and safety controls for air conditioning systems
44	Install non-ducted split systems
45	Install residential/light commercial split ducted systems
46	Commission a basic air conditioning systems
47	Perform routine maintenance procedures on air conditioning systems
48	Diagnose and rectify basic air conditioning system faults
Electrical (11)	
49	Applying safe practices to electrical work
50	Disconnect and reconnect refrigeration and air conditioning system's electrical circuits
51	Use electrical measuring instruments
52	Test and replace electrical cycling and safety controls
53	Terminate cables (extra low voltage and communications)
54	Fit a plug to a single and three phase cable
55	Read and interpret electrical wiring and circuit diagrams
56	Draw electrical circuit diagrams for basic refrigeration and air conditioning systems
57	Identify, test and replace motors, starters and protection devices
58	Test capacitors
59	Diagnose and rectify-refrigeration and air conditioning system's electrical faults
General (9)	
60	Identify, access and apply relevant federal/state/territory legislation, regulations, standards and codes
61	Apply environmentally sound procedures to work practices
62	Use computer technology in the workplace
63	Produce service and compliance reports
64	Produce and apply SWM's (JSA's)
65	Source and interpret manufacturers specifications
66	Plan work activities
67	Communicate effectively with others
68	Recognise technical trade terms

Appendix D: E-Oz Response to AMCA Submission

ENERGY SKILLS AUSTRALIA

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

Mr Graham MacKrill
Executive Director
AMCA Queensland and NSW
PO Box 551, ASHGROVE QLD 4060

10 August 2015

RE: REVIEW OF THE REFRIGERATION AND AIR CONDITIONING TRADE QUALIFICATION

Dear Graham,

Thank you for AMCA's submission on the Review of the Refrigeration and Air Conditioning Trade Qualification dated 20 February 2015.

E-Oz appreciates AMCA's support of this review which is being conducted to ensure it meets the current and future needs of the industry. We acknowledge the issues raised in the submission about the possible consequences resulting from the implementation of both a Certificate III and a Certificate IV trade qualification which include funding, licensing, workforce and commercial considerations.

The submission was presented and discussed at the project Steering Committee meeting on the 26 February where it was agreed to form a small working group made up of the following Steering Committee members to investigate and seek resolutions to the issues raised and report back to the Steering Committee:

- Graham MacKrill – AMCA, Kevin O'Shea – RACCA, Steve Smith – TAFE NSW, Ken Ball – AREMA, Peter Cashel – CESA, Noel Munkman – E-Oz.

E-Oz drafted a response to AMCA's submission which was reviewed by the Working Group at its meetings in Sydney on the 23 April and 7 May. The main agreements of the Working Group meetings are listed below:

1. The current Certificate III needs revising so that it focuses on the core knowledge and skills required by all refrigeration and air conditioning mechanics irrespective of which industry sector they work in. This includes covering the;
   - Refrigeration and air conditioning Essential Performance Capabilities
   - licensing requirements for refrigerant handling and restricted electrical work
   - residential and commercial unitary refrigeration and air conditioning applications
   - a choice of AQF level 3 electives covering a range of other unitary equipment applications.
2. The new Certificate III would still be used for assessing overseas applicants against the ASCO code as it would still contain the minimum skills and knowledge required by a RAC mechanic.
3. The new Certificate III would meet the minimum requirements for ARC's full refrigerant handling licence as it would still contain the minimum skills and knowledge required by an RAC mechanic.
4. The more complex system applications meet the requirements of Australia Qualifications Framework (AQF) level 4 competency units and therefore should be part of a Certificate IV qualification.

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PROVIDING ENERGY SKILLS STANDARDS

5. The proposed Certificate IV RAC Apprenticeship should have a nominal term of 4 years or until the relevant competencies are achieved.

6. Having the Certificate IV as an apprenticeship increases the relevant State/Territory funding for its delivery and therefore the RTO's student fees are lower than if it was delivered as a Post Trade course.

7. Pre-apprenticeships would greatly assist raising the entry levels of some of those entering the trade as apprentices. It works successfully for electricians and plumbers and this should be investigated. Part of the problem is also the low number of applicants for RAC apprenticeships due to the lack of general awareness of refrigeration and air conditioning by high school students and career advisors. It was agreed that both of these are industry wide issues that need to be taken up by all of the relevant associations in a coordinated way. Noel proposed to raise it at the next PRIME meeting to see if they can be one if its projects.

8. The new qualifications should have an Entry Requirement set by industry, for example:
   - Apprenticeship or relevant employment and successful completion of:
   - Relevant VET qualification for e.g. Certificate II in Pre-Vocation, or
   - Successful completion of a Literacy and Numeracy Readiness Assessment

9. Information sessions will be conducted on the qualification proposals to various industry associations and an information sheet would also be developed for distribution to the industry associations' membership and ARC stationary system license holders. The following presentations have already been conducted:
   - CESA at Bankstown Sports Club on 2nd June
   - AREMA at Box Hill TAFE on 11th June

   An article was also published in ARC's July 2015 Cool Change newsletter. Previous articles on the project were in Cool Change newsletter's July 2014 and April 2015 editions which are delivered to over 70,000 licensed technicians and businesses throughout Australia.

10. RTOs will be encouraged to offer flexible delivery and assessment arrangements to reduce costs to employers, for example:
    - Delivering stage 1 and 2 units in the first year of an apprenticeship.
    - Using scenarios for the specialised elective units in the proposed Cert IV that students are actually working in, for example large A/C chillers, to collect relevant evidence of the student's performance, skills and knowledge, which would reduce the time the student would be required at the RTO.

These points were discussed and accepted by the Steering Committee at its meeting on 26th May. Based on this, E-Oz's draft response to the issues was developed and emailed to you on 3rd July.
It was subsequently raised at AMCA's Executive teleconference on 7 July after which a meeting was organised and conducted on 23 July in Sydney to discuss and clarify the response in detail between myself,

- Chris Rankin, AMCA National President and SA Executive Director
- Larry Moore, NECA and RACCA SA Executive Director
- Kevin O'Shea, RACCA National President

Therefore, we trust this final response adequately addresses the issues raised by AMCA. However, if AMCA still has concerns about the current proposals, please do not hesitate to contact either myself or Bob Taylor, CEO. We look forward to AMCA's continued support, assistance and advice during this review of the Refrigeration and Air Conditioning trade qualification.

Yours Sincerely

Noel Munkman
Senior Project Officer
E-Oz Energy Skills Australia

E-Oz Response to AMCA's Submission

To address the issues raised in AMCA's submission, below is:

- An overview of the proposed Certificate III and IV qualifications
- E-Oz response to each of the issues.

Overview of the Proposed Certificate III and IV qualifications

The proposed:

- Certificate III in Refrigeration and Air Conditioning Mechanic qualification will cover the:
  - Essential Performance Capabilities required by all refrigeration and air conditioning mechanics
  - Relevant competencies to install, commission, test, fault find, repair and maintain unitary refrigeration and air conditioning systems including low, medium and dual temperature refrigerated cabinets/rooms and ducted split and package unit air conditioning systems.
  - regulatory requirements for purchasing and handling refrigerants
  - regulatory requirements for relevant restricted electrical work.

- Certificate IV in Refrigeration and Air Conditioning Technician qualification will cover the contents of the Certificate III plus complex and specialised refrigeration and air conditioning systems, for example industrial refrigeration systems, supermarket refrigeration systems, central plants, chilled beams, VAV, VRF and chilled/hot water air conditioning systems.

- It is proposed that both qualifications be offered as an Apprenticeship with the same Term of 48 months or until the relevant competencies are achieved.

E-Oz Response to Each of the Issues

1. Incentives for the delivery of the Certificate IV qualification

AMCA is concerned that with the Certificate IV longer duration, higher level skills, lower student numbers and higher costs, there will be a lack of incentives for RTOs to offer and deliver it.

E-Oz Response:

The current UEE11 Electrotechnology Training Package Certificate III in Refrigeration and Air Conditioning qualification is offered in every State/Territory as an apprenticeship and is delivered by 26 Registered Training Organisations (RTOs) across the country except Western Australia.

The current UEE42711 Certificate IV in Air-conditioning and Refrigeration Servicing qualification provides competencies in high level fault diagnosis and rectification, commissioning and maintenance of complex refrigeration, air-conditioning and air distribution systems and equipment. It is not offered as an apprenticeship in any State/Territory and the only RTOs approved to deliver it are:

- RMIT, Melbourne
- Western Sydney Institute of TAFE, Sydney
- TAFE SA, Adelaide

However, it is rarely delivered by these RTOs. This is due to the fact that governments provide substantially greater funding to the RTOs for apprenticeship qualifications than for non-apprenticeship qualifications. During E-Oz consultations with every State/Territory Training Authority, all stated that a trade can be covered by both a Certificate III and IV apprenticeship qualification provided there is a clear difference in the outcomes and there is strong industry support.

Having a Certificate IV qualification as an apprenticeship will result in increased government funding for it to the RTOs and lower costs to the student. For example, in NSW under the new Smart and Skilled funding arrangements, the cost to the apprentice would be the same for the Certificate IV as it is for the Certificate III, which is $2,000. The maximum course fee to be claimed by the RTO from the State Training Services for the Certificate III is $12,820 and for the Certificate IV it is $14,150.

For non-apprentices, the fees vary as follows:	Cert III	Cert IV
• a non apprentice who has no other qualification	$3270	$4220
• a non apprentice who has one other qual equal/lower than the AQF level	$3920	$4,990
• a non apprentice who already possesses a qual above AQF level for the qual	$12,820	$14,150

Below are the details of the student fees charged by various RTOs across the country for the Certificate III and IV RAC qualifications, based on information from Head Teachers and RTO websites.

RTO/State	Cert III RAC Apprenticeship	Cert IV RAC Apprenticeship	Cert IV RAC Post Trade
CIT/ACT	$1.90/hr x 1060 hr = $2,000 approx.	*$1.90/hr x 1280 hr = $2,430 estimate*	N/A
TAFE NSW	$2,000 ($2.32/hr x 864hr)	$2,000	$4,990
SkillsTech/Qld	$1.60/hr x 1060 hr = $1,696	*$1.60/hr x 1280 hr = $2,048 estimate*	N/A
PEER VET/SA	$2.00/hr x 1060 hr = $2,120	N/A	N/A
TAFE SA/SA	$2.80/hr x 1060 hr = $2,958	$2.80/hr x 1280 hr = $3,584	$5,760 complete qual or $4.50/hr x 220 hr = $990 after Cert III
TasTAFE/Tas	$2.03/hr x 1060 hr = $2,152	$2.03.hr x 1280 hr = $2,598	N/A
Box Hill TAFE/Vic	$3.25/hr x 1060 hr = $3,445	*$3.25/hr x 1280 hr = $4,160 estimate*	$11.00/hr x 220hr = $2,420

In summary, for the Certificate III apprenticeship, the student fees at:

- 5 RTOs are approximately $2,000
- 1 RTO is approximately $3,000
- 1 RTO is approximately $3,500

For the Certificate IV apprenticeship, the student fees would be at:

- 2 RTOs approximately $2,000
- 2 RTO approximately $2,500
- 1 RTO approximately $3,500
- 1 RTO is approximately $4,000

In most cases the RTO's student fees for the Certificate IV apprenticeship are approximately $500 higher than those for the Certificate III apprenticeship due to the additional nominal delivery hours, except for NSW where the fees remain the same.

However, if the Certificate IV is completed as a Post Trade qualification, the cost per hour is dramatically higher for example:

- TAFE SA it increases $2.80/hr to $4.50/hr
- Box Hill it increases from $3.25/hr to $11/hr

Therefore, having the Certificate IV as an apprenticeship as well as the Certificate III will result in:

- increased State/Territory funding for its delivery
- lower RTO student fees than if it was delivered as a Post Trade course.
- increased demand from industry for the qualification
- more RTOs offering the qualification
- more students gaining higher level skills

2. Changes to the workforce market in commercial refrigeration and air conditioning

AMCA is concerned that the increased training duration of the Certificate IV may act as a disincentive for potential apprentices in the large commercial and industrial refrigeration and air conditioning sector and lead to increased wage demands.

E-Oz response:

Traditionally, most refrigeration and air conditioning mechanics are paid above those provided in industrial awards, especially those working in the large commercial and industrial refrigeration and air conditioning sector.

However, the following industrial awards would be affected:

Award	Cert III		Cert IV	
Electrical	Grade 5	$746.00	Grade 8	$855.50
Metals	Grade 10	$746.20	Grade 7	$814.20

Therefore, those achieving the Certificate IV qualification and exercising the higher level skills and knowledge gained during that apprenticeship will be classified at a higher award wage grade. But in most cases this would not be higher than the above award wages already paid to tradespersons in this sector. This higher level award wage should counteract any disincentive for potential apprentices caused by the increased training duration of the Certificate IV apprenticeship.

Below is a table showing in the worst case scenario, that the extra costs an employer would have for a Certificate IV apprentice to attend an RTO, due to the higher award wage and additional year (320 hrs) for attending training would be $7,587 ($18,304 - $10,717).

App Yrs	Wage %	Certificate III			Certificate IV		
		$/Hr	Hrs at RTO	Total $/Yr	$/Hr	Hrs at RTO	Total $/Yr
1	45%	8.83	320	2,825.6	10.58	320	3,385.6
2	57%	11.19	320	3,580.8	12.83	320	4,105.6
3	70%	13.74	320	4,310.4	15.75	320	5,049.6
4	82%				18.01	320	5,763.2
5	N/A						
Total			960	10,716.8		1280	18,304
Tradesperson's Award Wage		19.63/hr 746/w			22.50/hr 855/w		

However, the additional training time at an RTO could be reduced if the apprentice undertakes specialist units that align with their workplace activities, for example if the apprentice services chillers at work regularly, a record of these activities should reduce time spent learning about it at an RTO. Therefore, in the best case scenario, a Certificate IV apprentice could complete their required attendance at the RTO in 3 years, resulting in an additional cost to the employer due to the higher wage of only $1,824 ($12,541 - $10,717).

3. **Business Productivity**

AMCA is concerned that the increased training duration of the Certificate IV will lower productivity and profitability of the industry due to the additional time apprentices will spend at RTOs for off the job training near the end of their apprenticeship when their wages are at their highest.

E-Oz Response:

Traditionally, a Certificate III RAC apprenticeship has a nominal duration of 4 years with up to 3 years of 35 – 40 days per year off the job training at an RTO, however all apprenticeships now permit competency based completion. A Certificate IV RAC apprenticeship would have the same nominal duration of 4 years with up to 4 years of 35 – 40 days per year off the job training at an RTO however, the apprenticeship again permits competency based completion.

It is envisaged that the Certificate IV apprentice would gain most of the knowledge and skills required for the later higher level competencies (4th year) on the job as most RTOs do not have the required complex/specialised systems or the expertise in their institution. That is, the RTO would deliver the basic underpinning knowledge for the high level competencies and the employer would provide on the job training on the required complex/ specialised systems and provide evidence of that training to the RTO for their assessment. This would result in more time on the job and much less than 35 days at the RTO during the 4th year of the apprenticeship. With competency based completion of apprenticeships, once an apprentice completes all the required competencies to achieve the qualification, they will complete their apprenticeship after sign off from the employer. Therefore, the Certificate IV should be completed in 3 to 4 years.

Another option to reduce the costs to the employer for the training time at an RTO is for the apprentice to attend the RTO for 2 days per week in the first year when their wages are lower.

4. Funding

AMCA is concerned about a possible lack of proportional government funding for the Certificate IV qualification.

E-Oz Response:

As explained in Issue 1, the current Certificate IV's are only offered by 3 RTO's as they are not government funded as apprenticeships and are offered only as commercial courses.

Therefore, having the Certificate IV as an apprenticeship would result in:

- Greater government funding to the RTO for the delivery of the qualification
- Lower fees for the student
- Increased demand from industry
- More RTOs offering the qualification
- More students gaining higher level skills

5. Recognition of prior learning and current competency

AMCA is concerned that having both Certificate III and IV qualifications will result in a different skill set between the new apprentices and the existing mechanics.

E-Oz Response:

The core skills in the proposed new Certificate III and Certificate IV qualifications and the current and previous trade courses are the same. They all cover the knowledge and skills required to install, commission, test, fault find, repair and maintain refrigeration and air conditioning systems and include the same regulatory requirements for purchasing and handling refrigerants and relevant restricted electrical work.

They all also include elective units covering specialized systems and equipment. What is different in this proposal is that the more complex systems are in the Certificate IV qualification to align with Australian Qualification Framework (AQF) levels.

The revised UEE Electrotechnology Training Package will include more Skill Sets (one or more competency units) on specialized systems and equipment for those with a Certificate III or IV to select. Individuals with the current Certificate III, who already have or who complete the appropriate competencies, would meet the requirements for the new Certificate IV.

6. Licensing

AMCA is concerned about the implications on the regulatory requirements for the refrigerant handling licenses.

E-Oz Response:

At present the current UEE32211 Certificate III in Refrigeration and Air Conditioning qualification meets the training requirements for the Full Refrigeration and Air Conditioning refrigerant handling license per the ARC information brochure available at:
(https://www.arctick.org/pdf/RHL%20Information%20Brochure.pdf)
So do the following 11 other qualifications:

- MEM30205 Certificate III in Engineering Mechanical Trade (Refrigeration and Air Cond); or
- UEE42711 Certificate IV in Air conditioning and Refrigeration Servicing; or
- UEE42811 Certificate IV in Air conditioning Systems Energy Management and Control; or
- UEE42911 Certificate IV in Refrigeration and Air conditioning Systems; or
- UEE50311 Diploma of Electrical and Refrigeration and Air conditioning; or
- UEE51211 Diploma of Air conditioning and Refrigeration Engineering; or
- UEE62511 Advanced Diploma of Air conditioning and Refrigeration Engineering; or

- MEM30298 Certificate III in Engineering – Mechanical – Refrigeration and Air conditioning; or
- UEE31307 Certificate III in Refrigeration and Air conditioning; or
- UEE31306 Certificate III in Refrigeration and Air conditioning; or
- UTE30999 Certificate III in Electrotechnology Refrigeration and Air conditioning.

Note, that this list includes 3 current Certificate IVs, 2 Diplomas and an Advanced Diploma because they all contain the same core competencies.

E-Oz has consulted with ARC and they agree that if the proposed new Certificate III and IV are approved, they will simply add them to this list because both will contain the same core competencies and meet the national license requirements.

7. AMCA Recommendation

Based on the issues AMCA identified, it recommends that the RAC qualification remain a Certificate III with the following points of emphasis:

E-Oz Response:

E-Oz has conducted extensive consultations with the HVACR industry associations, employers, mechanics, apprentices, regulators and training providers over the past 18 months on the core skills required by all refrigeration and air conditioning tradespersons at the end of an apprenticeship and the range of applications they work in. These consultations have included:

- Project Steering Committee, made up of 19 representatives from employer, employee, regulator and training provider bodies
- National consultation meetings in every State/Territory attended by 160 HVACR employers and tradespeople and training providers as well as the Regulators and Training Authorities.
- Draft Qualification and Essential Performance Capabilities Questionnaire, distributed via the Steering Committee's industry associations to their members, plus the 160 industry and RTO representatives originally consulted and 110 RAC teachers/trainers.
- Student Survey completed by 490 refrigeration and air conditioning apprentices on the types of systems and tasks that they will be required carry out, with their current employer at the end of their apprenticeship.
- E-Oz Refrigeration and Air Conditioning Technical Advisory Committee (RAC TAC) made up of 110 RAC teachers/trainers from across the country.
- Presentations to AREMA, CESA and AMCA committees
- Articles in ARC's Cool Change Newsletter.

Based on this input, E-Oz has developed and refined the proposal for a Certificate III and Certificate IV trade qualifications as outlined in the first part of this response. The reasons for the proposed Certificate IV are:

- **Australian Qualification Framework (AQF)**
  The AQF requirements define the types of knowledge and skills applicable for various qualification levels. The knowledge and skills required by a RAC mechanic to work on large A/C chillers is clearly higher than those required to work on a self contain bottle cabinet. A review of the AQF requirements shows that the knowledge and skills required by a RAC mechanic to work on simpler unitary equipment are at AQF level 3. But, the knowledge and skills required by a RAC mechanic to work on complex, specialised and interconnecting systems are at AQF level 4 and therefore should be in a Certificate IV qualification.
- **Essential Performance Capabilities (EPC)**
  Industry agrees that all RAC apprentices at the end of their apprenticeship should have a minimum core set of skills no matter what type of RAC equipment they work on. For example,

they should all be able to safely handle refrigerant. As a part of this project, E-Oz in consultation with industry developed a draft list of these core skills known as Essential Performance Capabilities (EPC).

These will be covered in the compulsory core units of the Certificate III and Certificate IV qualifications. Then, in the Certificate III the apprentice can select relevant AQF 3 elective units depending on the type of equipment they work on. The Certificate IV apprentice can select relevant AQF 3 as well as AQF 4 elective units depending on the type of equipment they work on.

- **Range of Applications**
  Based on the HVACR industry consultations, a lot of RAC apprentices work on a limited number and range of applications for example, some only work on residential air conditioning systems. While others work on a wide range of applications.
  Those working on limited applications will be able to apply the Essential Performance Capabilities (EPC) to these applications as well as those applications that RTO has required resources to simulate workplace activities on, for example self contained normal temperature cabinets. This will ensure all Certificate III apprentices apply the Essential Performance Capabilities (EPC) to a minimum range of both refrigeration and air conditioning applications.

  Those working on a wide range of applications including more complex systems will be able to apply the Essential Performance Capabilities (EPC) to all these applications in the field and cover more than the minimum range of both refrigeration and air conditioning applications required for the Certificate III and at a higher AQF level, therefore they will meet the requirements for the Certificate IV.

7.1 Strengthen the pre-apprenticeship to better prepare apprentices for the undertaking of core units contained in Year 1 and 2 of the apprenticeship.

E-Oz Response:
An appropriate pre-apprenticeship qualification can be developed, but to date there has been no way of ensuring that all apprentices have successfully completed a relevant pre-apprenticeship course before they become an apprentice.

However, to ensure students have the relevant entry levels skills, the new qualifications can have an Entry Requirement set by industry. It is proposed that this be:

- An Apprenticeship or relevant employment and successful completion of:
  - relevant VET qualification for e.g. Certificate II in Pre-Vocation, or
  - successful completion of a Literacy and Numeracy Readiness Assessment

A pre-vocation or pre-apprenticeship course is basically a full time program delivered over a 6 month period at an RTO which includes literacy and numeracy, job seeking skills, basic hand skills and refrigeration and electrical fundamentals. It requires significant State, Federal and/or industry funding to operate which is near impossible to achieve for one group in one RTO, let alone the funding required for it to be conducted across the country in sufficient locations and numbers.

However, pre-apprenticeships work successfully for electricians and plumbers and this should be investigated. Part of the problem is also the low number of applicants for RAC apprenticeships due to the lack of general awareness of refrigeration and air conditioning by high school students and career advisors.

These are both industry wide issues that need to be taken up by all of the relevant associations in a coordinated way. E-Oz will raise them with PRIME to see if they can be one if its projects as they align to its Focus Areas.

7.2 Increased emphasis on completion of preparatory training and education, particularly in the area of literacy and numeracy.

E-Oz Response:
Unfortunately some employers hire individuals as an apprentice without any reference to their academic record or literacy and numeracy ability even though it has been proven that apprentices who have appropriate literacy and numeracy skills before they start the Certificate III qualification, have a higher learning ability and completion rate.

Greater knowledge and acceptance of this by employers would greatly improve the apprenticeship completion rate. To assist, the new qualifications can have an Entry Requirement set by industry, as outlined previously.

This Entry Requirement could then be publicised by the RTOs, employer associations, unions and ARC to the employers so that they are aware of them and the Readiness Assessment tools they can use to assess the literacy and numeracy ability of their apprentice applicants.

7.3 Year 1 and 2 focuses on core competency unit to be undertaken by all apprentices.

E-Oz Response:
Agreed, this is included in the proposed qualifications

7.4 Year 3 focuses on elective units, focusing on the theoretical application of the apprentices chosen area of specialisation.

E-Oz Response:
The achievement of competency requires the assessment of sufficient evidence of the apprentice's knowledge, skills and work performance. Therefore, the specialisations chosen by the apprentice are generally those in which they already work in or those the RTO can provide an adequate simulated environment. That is, an apprentice can learn the theory of icemaker machines, but they cannot achieve the competency unless they can provide evidence they have actually carried out some relevant work on them. Also, some units are more complex than others due to the required level of knowledge or skills, or the complexity of the systems or equipment. Therefore, these units are at a higher AQF level and should be part of a higher level qualification.

7.5 Year 4 involves practical on-the-job training focused on the technologies and applications relevant to the apprentice's chosen area of specialisation.

E-Oz Response:
Agreed, as explained in the previous point.