EU PacTVET

European Union Pacific Technical and Vocational Education and Training on Sustainable Energy and Climate Change Adaptation Project

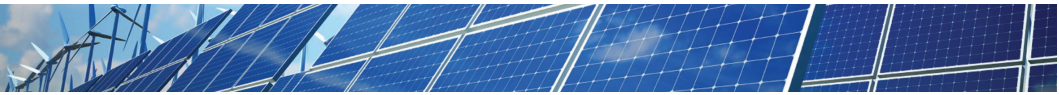
Pacific Community
Communauté du Pacifique

EUROPEAN UNION

USP
THE UNIVERSITY OF THE SOUTH PACIFIC

Regional Certificates in Sustainable Energy (SE)

Qualifications



Regional Certificate 1 in Sustainable Energy (SE)

The Certificate 1 in Sustainable Energy is a generic qualification aimed at those who seek entry to work in the Energy/Sustainable Energy sector working with Renewable Energy (RE) sources and Renewable Energy Technologies (RETs).

	Compulsory Unit Standards
Level 1 credits	32
Level 2 credits	8
Level 3 credits	-
Level 4 credits	-
Minimum totals	**40**

Credit Value:

One credit is equivalent to ten notional learning hours. Notional learning hours include: direct contact time with teachers and trainers (directed learning), time spent in studying, doing assignments, and undertaking practical tasks (self-directed/work related), time spent in assessment.

Sustainable Energy

The Pacific Island states are particularly vulnerable to the adverse effects of climate change. They are also countries that are leading the world in reducing their fossil fuel consumption and shifting to renewable energy sources of electricity generation. The increasing demand, usage and costs associated with fossil fuels to power the transportation and energy sectors of Pacific Island nations has led to an energy transformation in the region. Investment in clean and affordable energy, with a focus on renewable energy, energy efficiency and conservation is leading diversity in technologies, sources of energy and mitigating the envrionmental effects of using fossil fuels.

Around the Pacific Island region, the price of fuel and electricity tariffs rank amongst the highest in the world and there are significant inefficiencies in electricity generation and fuel consumption in the transport sector. While there are promising renewable energy opportunities, about 7 million people out of the region's 10 million still do not have access to electricity. Against this backdrop, Pacific island countries are prioritising a shift to renewable electricity sources and increased access for all communities. In some cases, whole atolls are now 100 percent renewable, many more people have access to clean and reliable power, the amount of diesel imported for electiricty generation has been reduced and some Pacific countries can now better manage the impacts of climate change. As a result of the shift and ongoing changes there is a need for training in a wide range of skills associated with sustainable energy.

The purpose of the certificate level qualifications in Sustainable Energy is to use the formal technical vocational education and training (TVET) sector to facilitate building national and regional capacity to: raise the level of awareness and knowledge on alternative renewable energy sources and renewable energy technologies (RETs), develop technical skills and

knowledge to support processes for installation, operation and maintenance of RETs, and undertake planning, development, monitoring and assessment and management of sustainable energy projects to promote energy efficiency which will mitigate loss and damages from the effects of climate change. These qualifications contribute to developing a Pacific Community whose people are educated and healthy and manage their energy resources in a sustainable way.

Certificates 1 and 2 in Sustainable Energy are generic qualifications which include general learning on on-grid and off-grid power systems, renewable and non-renewable energy sources, energy efficiency and renewable energy technologies (RETs). Certificates 3 and 4 in Sustainable Energy foster specialisation in the field of Renewable Energy and offers four strands: Micro-Hydro, Solar, Hybrid Wind systems, and Biomass. Certificate 3 also offers an elective in Energy Efficiency whilst Certificate 4 offers an additional elective in Energy Management.

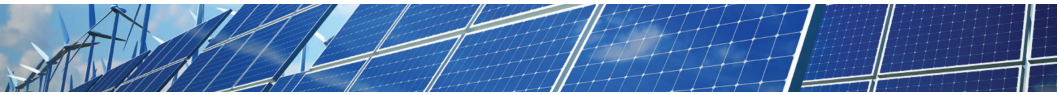
All outcomes for this Certificate 1 are compulsory covering the following key job roles:

- **Using tools, equipment and materials**: applied safely in the workplace and relating to generic tools and equipment used for on-grid and off-grid renewable energy sources (wind, micro-hydro, solar, biomass) renewable energy technology and energy efficiency such as fuel generators, battery charge controllers, hand and power tools, PV Solar pan els, wind turbines.
- **Identifying appropriate renewable energy sources and renewable energy technolo gies, measuring energy efficiency and participating in the implementation of sus tainable energy projects:** determine standalone and hybrid power systems suitable for local communities, government imperatives and development partner objectives; report on suitable alternative energy sources/technologies and identify risk and vulnerability fac tors, conduct and monitor tasks to implement SE projects.
- **Communicating with stakeholders:** to identify problems, use appropriate technology to convey information effectively, use appropriate cultural protocols to facilitate discussions and resolve conflicts if needed.

Flexibility and Recognition of Prior Learning:
This qualification can be achieved in different settings including the community, workplace and educational institutions. Learners can achieve competence in ways most suited to their educational, work or cultural needs and aspirations.

Recognition of prior learning (RPL) acknowledges the skills and knowledge gained from workplace, community experiences or informal training which includes courses or study previously undertaken. Assessment for RPL must be undertaken by a qualified assessor

Entry level/pre-requisites
There are no prerequisites for this qualification. It is expected that entrants to this qualification would have completed at least three years of secondary school education or have at least one year of work experience in a field related to Sustainable Energy.



Credit Transfer Arrangements

The Pacific Qualification Framework allows for credit recognition and transfer from other regional or national qualifications through a process of mutual recognition. Credit transfer is a process whereby credits already achieved for one qualification are recognized towards a new qualification. If a learner has obtained competency in the Certificate 1 in Sustainable Energy (within the past 3 years) they will receive a credit for unit standards which have been successfully completed

Pathways

On completion of the Certificate 1 in Sustainable Energy graduates can progress to further learning in Sustainable Energy or other industry areas which provide the opportunity to gain higher level technical skills and knowledge and contribute to the workforce.

Graduate Profile

A graduate of a level 1 certificate is able to: demonstrate basic general knowledge, apply basic skills required to carry out simple tasks, apply basic solutions to simple problems, apply literacy and numeracy skills for participation in everyday life, work in a highly structured context, demonstrate some responsibility for own learning, interact with others.

On completion of a Certificate 1 in Sustainable Energy graduates will have broad basic knowledge and skills to engage as competent community members and employees. A graduate would be competent to undertake roles such as: gathering relevant information and data for monitoring and reporting of projects, providing general information, communications and services to communities, government and development partners, and developing community awareness on matters related to renewable and non-renewable energy sources, renewable energy technologies, energy efficiency and energy management.

- Create community awareness on matters of sustainable energy.
- Assist energy officers and community members to collect field data on energy matters.
- Assist the community in determining appropriate energy sources and technologies
- Assist the conduct of energy efficiency assessments using a combination of quantitative and qualitative research tools and technologies.
- Communicate effectively with community stakeholders using appropriate protocols
- Apply and promote Traditional Knowledge in Sustainable Energy interventions

Requirements: A Certificate 1 in Sustainable Energy comprises 8 compulsory Unit Standards

Unit codes. First digit represents certificate level; second digit represents strand with Generic units as zero (0), Energy Management (1); Energy Efficiency (2) RE specialisations (3) -Solar; Hybrid Wind Systems; Biomass; Micro Hydro. Third and fourth digits is the simple numbering of units.

4 Generic Skills Units (CG):. *The learning and assessment activities in these unit standards will be applied in relation to Renewable Energy and Renewable Energy Technologies.*

ID	Unit Title	PQF Level	PQF Credit
CG1002	Apply workplace health and safety procedures	1	3
CG2001	Participate in a team towards an objective	2	4
CG2002	Collect, present and apply workplace information	2	4
CG1001	Apply appropriate workplace communication skills	1	6

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4 Core Skills Units (SE)

ID	Unit Title	PQF Level	PQF Credit
SE1002	Describe and explain energy sources	1	5
SE1001	Select basic tools, equipment and materials used in Renewable Energy Technology (RET) and Energy Efficiency (EE)	1	6
SE1003	Promoting Sustainable Energy Practices in the Pacific Island Communities	1	8
SE1004	Perform workplace calculations for the energy sector	1	4

Regional Registration Information

Provider Arrangements

Accredited providers/assessors need to apply to the regional accrediting agency (EQAP) to deliver this qualification. In addition, if the Pacific country hosting delivery has national quality and/or registration requirements the provider must comply with the national application processes.

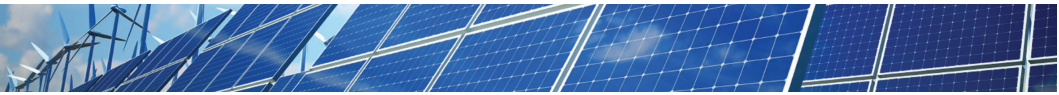
Version

This is the first version of the Certificate 1 in Sustainable Energy. This qualification and the unit standards were provisionally endorsed on 19 May 2016 by the Pacific Regional Sustainable Energy Industry Standards Advisory Committee (ISAC) in Nadi, Fiji. Final endorsement was obtained in September 2016 through the web-based communication 'Basecamp'.

Certification & Quality Assurance

This qualification will be awarded by the regional accrediting agency on behalf of the Pacific Regional Industry Sector Advisory Committee (Sustainable Energy Industry Association of the Pacific Islands/SEIAPI). It may also be awarded by a Pacific island national accrediting agency and/or an accredited training organisation.

Workplace assessors assessing against regional unit standards must comply with the Pacific regional (PQAF) and relevant national quality assurance standards.



Review

Regional qualifications exist to meet the needs of learners and the broader Pacific community and economy. All qualifications need to be reviewed periodically to ensure they remain useful, relevant and fit for purpose.

An initial round of review for the certificate levels 1 to 4 regional qualifications in Sustainable Energy will focus on ensuring relevance and appropriateness in a regional and national context. The initial review will be undertaken **within two years** of granting of regional accreditation. Regional qualifications in Sustainable Energy will thereafter be reviewed every **three years** to ensure they remain aligned with changing Pacific regional and national priorities. Any person or organization may contribute to the review of this qualification by sending feedback to the Pacific regional quality assurance agency EQAP, or a national education quality agency.

This table indicates the date of accreditation to be noted in the review process.

Accrediting Agency	Version	Review Date
Education Quality Assessment Programme (The Pacific Community)	1	September 2018

Qualification Developer

This qualification was developed by the Pacific Regional Sustainable Energy Industry Standards Advisory Committee (ISAC) for the Sustainable Energy Industry Association of the Pacific Islands (SEIAPI) to EQAP.

Pacific Regional Qualifications Unit

Educational Quality and Assessment Programme (EQAP)
Address: Level 5, Vanua House, Victoria Parade, Suva.
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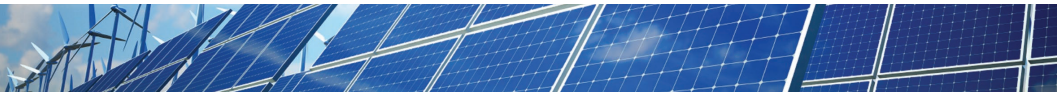
Email: EQAP@spc.int

Regional Certificate 2 in Sustainable Energy (SE)



Regional Certificate 2 in Sustainable Energy (SE)

The Certificate 2 in Sustainable Energy is a generic qualification aimed at those who are working or seek entry to work in the Energy/Sustainable Energy sector working with Renewable Energy (RE) sources and Renewable Energy Technologies (RETs).

	Compulsory Unit Standards
Level 1 credits	
Level 2 credits	36
Level 3 credits	4
Level 4 credits	-
Minimum totals	**40**

Credit Value:

One credit is equivalent to ten notional learning hours. Notional learning hours include: direct contact time with teachers and trainers (directed learning), time spent in studying, doing assignments, and undertaking practical tasks (self-directed/work related), time spent in assessment.

Sustainable Energy

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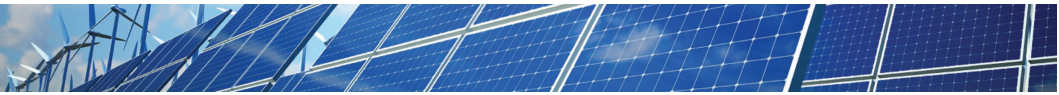
All outcomes for this Certificate 2 are compulsory covering the following key job roles:
Using tools, equipment and materials: applied safely in the workplace and relating to generic tools and equipment used for on-grid and off-grid renewable energy sources (wind, micro-hydro, solar, biomass) renewable energy technology and energy efficiency such as fuel generators, battery charge controllers, hand and power tools, PV Solar panels, wind turbines.
Identifying appropriate renewable energy sources and renewable energy technologies, measuring energy efficiency and participating in the implementation of sustainable energy projects: determine standalone and hybrid power systems suitable for local communities, government imperatives/INDCs and development partner objectives; report on suitable alternative energy sources/technologies and identify risk and vulnerability factors, conduct and monitor tasks to implement SE projects.
Communicating with stakeholders: to identify problems, use appropriate technology to convey information effectively, use appropriate culutral protocols for Pacific Island contexts, to facilitate discussion and resolve conflicts if needed.

Flexibility and Recognition of Prior Learning:
This qualification can be achieved in different settings including the community, workplace and education institutions. Learners can achieve competence in ways most suited to their educational, work or cultural needs and aspirations.

Recognition of prior learning (RPL) acknowledges the skills and knowledge gained from workplace, community experiences or informal training which includes courses or study previously undertaken. Assessment for RPL must be undertaken by a qualified assessor

Entry level/pre-requisites
Entry to the Certificate 2 level qualification requires **either completion of the Certificate 1 in Sustainable Energy or equivalent work/volunteer experience.** The equivalent experience requires evidence of relevant activities undertaken in work and/or community environments within the past 12 months



Credit Transfer Arrangements

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Pathways

On completion of the Certificate 2 in Sustainable Energy graduates can progress to further learning in Sustainable Energy (Certificates 3 and 4) or other industry areas which provide the opportunity to gain higher level technical skills and knowledge and contribute to the workforce.

Graduate Profile

A graduate of a level 2 certificate is able to: demonstrate basic factual and/or operational knowledge of a field of work or study related to energy/sustainable energy, apply known solutions to familiar problems, apply standard processes relevant to the field of work or study, apply literacy and numeracy skills relevant to the role in the field of work or study, work under general supervision, demonstrate some responsibility for own learning and performance, collaborate with others.

On completion of a Certificate 2 in Sustainable Energy graduates will have broad basic knowledge and skills to engage as competent community members and employees. A graduate would be competent to undertake roles such as: gathering relevant information and data for monitoring and reporting of projects, providing general information, communications and services to communities, government and development partners, and developing community awareness on matters related to renewable and non-renewable energy sources, renewable energy technologies, energy efficiency and energy management.

- Create community awareness on matters of sustainable energy.
- Assist energy officers and community members to collect field data on energy matters.
- Assist the community in determining appropriate energy sources and technologies
- Assist the conduct of energy efficiency assessments using a combination of quantitative and qualitative research tools and technologies.
- Communicate effectively with community stakeholders using appropriate protocols
- Apply and promote Traditional Knowledge in Sustainable Energy interventions

Requirements: A Certificate 2 in Sustainable Energy comprises 7 compulsory Unit Standards

Unit codes. First digit represents certificate level; second digit represents strand with Generic units as zero (0), Energy Management (1); Energy Efficiency (2) RE specialisations (3) -Solar; Hybrid Wind Systems; Biomass; Micro Hydro. Third and fourth digits is the simple numbering of units.

3 Generic Skills Units:. *The learning and assessment activities in these unit standards will be applied in relation to Renewable Energy and Renewable Energy Technology.*

ID	*Unit Title*	*PQF Level*	*PQF Credit*
CG2001	Participate in a work team towards an objective	2	4
CG2002	Collect, present and apply workplace information	2	4
CG2003	Identify and use appropriate Cultural Protocols for	2	6
	communities for Pacific Island Countries		

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4 Core Skills Units

ID	*Unit Title*	*PQF Level*	*PQF Credit*
SE2002	Describe and explain basic Renewable Energy	2	7
	Technologies (RETs) and energy saving practices		
SE2003	Provide basic sustainable energy solutions for energy	2	7
	reduction in residential, commercial and industrial premises		
SE2001	Apply tools, equipment, materials relevant to tasks in RETs and Energy Efficiency Practices	2	8
SE3203	Promote and contribute to energy efficiency	3	4

Regional Registration Information

Provider Arrangements

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Version

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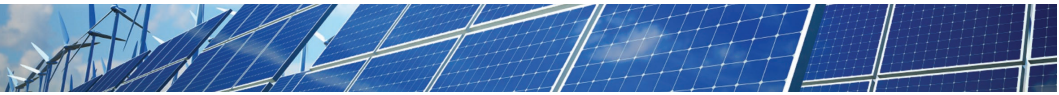

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Review

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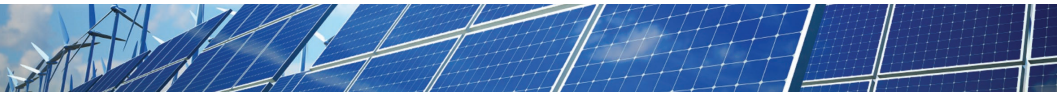
Regional Certificate 3 in Sustainable Energy (SE)



Regional Certificate 3 in Sustainable Energy (SE)

The Certificate 3 in Sustainable Energy is aimed at those who may already be working in a field related to Energy/Sustainable Energy or those with relevant work experience who wish to pursue a career in Sustainable Energy. Learners at this level must elect to study in one of the following fields: Energy Efficiency, Solar, Biomass, Hybrid Wind, Micro Hydro Power.

	RE strands: B, MHP, S, HW	Energy Efficiency
Level 1 credits		
Level 2 credits		
Level 3 credits	44	40
Level 4 credits	-	
Minimum totals	**45**	**40**

Credit Value:

One credit is equivalent to ten notional learning hours. Notional learning hours include: direct contact time with teachers and trainers (directed learning), time spent in studying, doing assignments, and undertaking practical tasks (self-directed/work related), time spent in assessment.

Sustainable Energy

The Pacific Island states are particularly vulnerable to the adverse effects of climate change. They are also countries that are leading the world in reducing their fossil fuel consumption and shifting to renewable energy sources of electricity generation. The increasing demand, usage and costs associated with fossil fuels to power the transportation and energy sectors of Pacific Island nations has led to an energy transformation in the region. Investment in clean and affordable energy, with a focus on renewable energy, energy efficiency and conservation is leading diversity in technologies, sources of energy and mitigating the envrionmental effect of using fossil fuels.

Around the Pacific Island region, the price of fuel and electricity tariffs rank amongst the highest in the world and there are significant inefficiencies in electricity generation and fuel consumption in the transport sector. While there are promising renewable energy opportunities, about 7 million people out of the region's 10 million still do not have access to electricity. Against this backdrop, Pacific Island countries are prioritising a shift to renewable electricity sources and increased access for all communities. In some cases, whole atolls are now 100 percent renewable, many more people have access to clean and reliable power, the amount of diesel imported for electiricty generation has been reduced and some Pacific countries can now better manage the impacts of climate change. As a result of the shift and ongoing changes there is a need for training in a wide range of skills associated with sustainable energy, in particular renewable energy technologies.

The purpose of the certificate level qualifications in Sustainable Energy is to use the formal technical vocational education and training (TVET) sector to facilitate building national and regional capacity to: raise the level of awareness and knowledge on alternative renewable energy sources and renewable energy technologies (RETs), develop technical skills and

knowledge to support processes for installation, operation and maintenance of RETs, and undertake planning, development, monitoring and assessment and management of sustainable energy projects to promote energy efficiency which will mitigate loss and damages from the effects of climate change. These qualifications contribute to developing a Pacific Community whose people are educated and healthy and manage their energy resources in a sustainable way.

Certificates 1 and 2 in Sustainable Energy are generic qualifications which include general learning on on-grid and off-grid power systems, renewable and non-renewable energy sources, energy efficiency and renewable energy technologies (RETs). Certificates 3 and 4 in Sustainable Energy foster specialisation in fields of Renewable Energy and offers four strands: Micro Hydro Power, Solar, Hybrid Wind, Biomass. Certificate 3 also offers an elective in Energy Efficiency which provides a pathway to a strand of Energy Management at level 4.

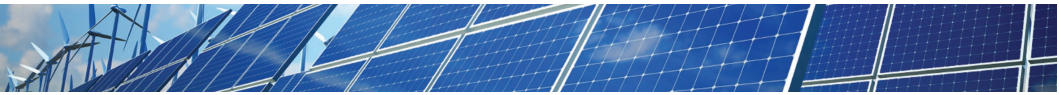
All outcomes for this Certificate 3 are compulsory covering the following key job roles:

- **Workplace Health and Safety knowledge:** includes identifying and reporting workplace hazards,
- **Using tools, equipment and materials**: applied safely in the workplace and relating to generic tools and equipment used for on-grid and off-grid renewable energy sources (wind, micro-hydro, solar, biomass) renewable energy technology and energy efficiency such as fuel generators, battery charge controllers, hand and power tools, PV Solar panels, wind turbines.
- **Identifying appropriate renewable energy sources and renewable energy technologies, measuring energy efficiency and participating in the implementation of sustainable energy projects:** determine standalone and hybrid power systems suitable for local communities, government imperatives/INDCs and development partner objectives; report on suitable alternative energy sources/technologies and identify risk and vulnerability factors, conduct and monitor tasks to implement SE projects.
- **Communicating with stakeholders:** to identify problems, use appropriate technology to convey information effectively, use appropriate culutral protocols for Pacific Island contexts, to facilitate discussion and resolve conflicts if needed.

Flexibility and Recognition of Prior Learning:

This qualification can be achieved in different settings including the community, workplace and education institutions. Learners can achieve competence in ways most suited to their educational, work or cultural needs and aspirations.

Recognition of prior learning (RPL) acknowledges the skills and knowledge gained from workplace, community experiences or informal training which includes courses or study previously undertaken. Assessment for RPL must be undertaken by a qualified assessor



Entry level/pre-requisites

Entry to the Certificate 3 level qualification requires **either completion of the Certificate 2 in Sustainable Energy or equivalent work/volunteer experience.** The equivalent experience requires evidence of relevant activities undertaken in work and/or community environments within the past 12 months

Credit Transfer Arrangements

The Pacific Qualification Framework allows for credit recognition and transfer from other regional or national qualifications through a process of mutual recognition. Credit transfer is a process whereby credits already achieved for one qualification are recognized towards a new qualification. If a learner has obtained competency in the Certificate 2 in Sustainable Energy (within the past 3 years) they will receive credit for unit standards which have been successfully completed.

Pathways

On completion of the Certificate 3 in Sustainable Energy graduates can progress to further learning in Sustainable Energy (Certificate 4) or other areas of learning which provide the opportunity to gain higher level technical skills and knowledge and contribute to the workforce.

Graduate Profile

A graduate of a level 3 certificate is able to: demonstrate some operational and theoretical knowledge in a field of work related to energy/sustainable energy, select from and apply known solutions to familiar problems, apply a range of standard processes relevant to the field of work or study, apply a range of communication skills including appropriate cultural protocols relevant to the role in the field of work or study, apply literacy and numeracy skills relevant to the role in the field of work or study, work under limited supervision, demonstrate major responsibility for own learning and performance, adapt own behavior when interacting with others, contribute to team performance.

Certificate 3 in Sustainable Energy graduates will have broad basic knowledge and skills to engage as competent community members and employees. A graduate would be competent to undertake roles such as: contributing to project development proposals and reporting, gathering relevant information and data for monitoring and reporting purposes, providing general communications and services to communities, government and development partners, and developing community awareness on matters related to renewable and non-renewable energy sources, renewable energy technologies, energy efficiency and energy management.

- Create community awareness on matters of sustainable energy.
- Assist energy officers and community members to collect field data on energy matters.
- Assist the community in determining appropriate energy sources and technologies
- Assist the conduct of energy efficiency assessments using a combination of quantitative and qualitative research tools and technologies.
- Communicate effectively with community stakeholders using appropriate protocols
- Apply and promote Traditional Knowledge in Sustainable Energy interventions

- Implement work plans and work effectively in teams
- Collect and analyse both quantitative and qualitative data and prepare field reports on renewable energy sources, RETs and energy efficiency.

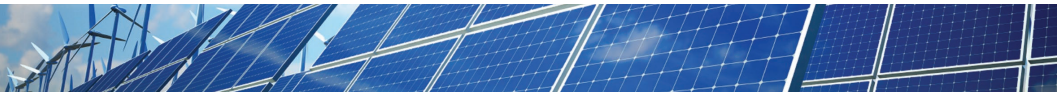
ELECTIVE FIELDS: Certificate 3 in Sustainable Energy Strands
A learner must elect to study any ONE of the following five strands: Energy Efficiency, Biomass, Hybrid Wind, Micro Hydro Power, Solar

ENERGY EFFICIENCY
The learner will gain an understanding of the need to increase and improve Energy Efficiency to meet the renewable energy and energy efficiency targets of Pacific Island countries as part of regional and global agreements and to ensure access to affordable, reliable, sustainable and modern energy for all. Learners will also gain skills and knowledge in energy efficient systems and energy conservation practices that reduce the energy intensity of local economies thereby enhancing energy security, making energy services more affordable to end-users, and reducing Greenhouse Gas (GHG) emissions.

Holders of this qualification will be able to:
- *Disseminate information and improve public awareness on energy use, and energy efficiency practices mainstreamed in local and regional government frameworks, policies and procedures.*
- *Establish energy use baselines in the end-user residential sector defined by energy performance of common household electrical appliances as per the Minimum Energy Performance Standards. a*
- *Contribute to renewable energy/sustainable energy projects in the Pacific region and apply methods and tools to determine safe, reliable, affordable and efficient electricity generation and consumption.*
- *Provide information to local communities and stakeholders (development partners, government agencies, NGO's) on benefits and impacts of energy efficient systems*
- *Contribute to strengthening sustainable energy practices through the use of energy efficient systems applied to non-renewable and renewable energy sources and technologies.*

BIOMASS
The learner will gain an understanding of how biomass energy can be divided into traditional biomass and modern bioenergy and how it is used in the pacific region. In particular the learner will understand the benefits and environmental impacts of using biomass for energy sources. An understanding will also be gained on how modern bioenergy, is used mostly for the generation of electricity or transportation. In particular, all Pacific island countries have the technical potential to develop coconut oil for biofuel and coconut sap for ethanol because much of the land, even on atolls and raised coral islands, is covered with coconut trees.

Holders of this qualification will be able to:
- *Conduct a regional/local assessment and apply methods and tools for biomass projects as they relate to the Pacific region.*



- *Identify with local communities information on determining the viability of traditional biomass and bioenergy applications in the local area.*
- *Provide information to local communities and stakeholders (development partners, government agencies, NGO's) on benefits, and economic and environmental impact of biomass energy use for a particular location such as: health implications, use of waste byproducts from other industries, environmental sustainability..*
- *Provide technical skills to support the operations and maintenance of biomass power components such as cookstoves, biogas digesters, gasification units, production of coconut oil biodiesel and coconut sap bioethanol.*
- *Contribute to strengthening sustainable energy practices through the use of appropriate renewable energy sources and technologies.*

HYBRID WIND POWER

The learner will gain an understanding of how wind turbines are viable alternatives for power generation either independently or in hybrid power systems. In particular the learner will explore the most common generation sources for a hybrid power system in the Pacific region: photovoltaic and wind turbines with a diesel generator as backup.

Holders of this qualification will be able to:

- *Conduct a resource assessment and apply methods and tools for siting hybrid wind energy projects as they relate to the Pacific region.*
- *Identify with local communities information on determining the viability of hybrid-wind energy production for local areas.*
- *Provide information to local communities and stakeholders (development partners, government agencies, NGO's) on benefits and environmental impact of hybrid wind power systems for a particular location.*
- *Provide technical skills to support the operations and maintenance of hybrid wind components such as combustion engine, generators, battery storage and power conditioning equipment.*
- *Contribute to strengthening sustainable energy practices through the use of appropriate renewable energy sources and technologies which include hybrid, grid connected, and standalone power systems.*

MICRO HYDROPOWER

The learner will gain an understanding of micro-hydropower systems that typically produce power in the range of 5kW to 100kW of power, can provide power to isolated villages and/or are sometimes connected to electric power networks. An understanding of micro-hydro systems includes civil works involved in the catchment area, including weir and turbine technology and it's capacity to complement other electrical power systems in particular solar photovoltaic.

Holders of this qualification will be able to:

- *Explain the suitability of micro-hydropower systems for people living in rural communities in Pacific Island countries with ready access to rivers and streams.*
- *Conduct a hydro-power resource assessment and apply methods and tools for siting*

micro-hydropower projects as they relate to the Pacific region.

- *Identify with local communities information on determining the viability of micro-hydro-power energy production for local areas.*
- *Provide information to local communities and stakeholders (development partners, government agencies, NGO's) on non-power benefits of hydro-power such as water supply flood control and irrigation.*
- *Provide information to local communities and stakeholders on potential environmental impacts of micro-hydro power such as alteration of landscapes through the formation of catchment area and weir effects on water quality and quantity, interruption of migratory patterns for fish, and possible disruptions to traditional sacred sites.*
- *Provide technical skills and knowledge to local technicians to support the operations and maintenance of hydro-power components at a local micro-hydro plant such as inspection, cleaning and maintenance of valves and turbines.*
- *Contribute to strengthening sustainable energy practices through the use of appropriate renewable energy sources and technologies which include hybrid, grid connected, and standalone power systems.*

SOLAR

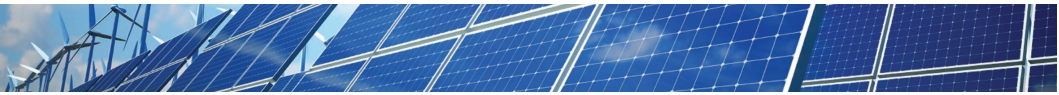
The learner will gain an understanding of how the qualities of solar design afford it great utility in the Pacific region for the following reasons: location with optimal access to the sun's rays, solar systems are relatively affordable and applicable to both homes and villages, within solar technologies, passive solar design is the ultimate in renewable energy for buildings, and can be coupled with solar panels to achieve maximum sustainability.

Holders of this qualification will be able to:

- *Conduct a resource assessment and apply methods and design tools for siting standalone, grid connected and hybrid solar energy projects as they relate to the Pacific region.*
- *Identify with local communities information on determining the viability of solar energy production for local areas.*
- *Provide information to local communities and stakeholders (development partners, government agencies, NGO's) on benefits and environmental impact of solar power systems for a particular location*
- *Provide technical skills to support the operations and maintenance of hybrid wind components such as solar panels, charge controllers, power inverter, batteries*
- *Contribute to strengthening sustainable energy practices through the use of appropriate renewable energy sources and technologies which include hybrid, grid connected, and standalone power systems.*

Requirements: Certificate 3 in Sustainable Energy

Unit codes. First digit represents certificate level; second digit represents strand with Generic units as zero (0), Energy Management (1); Energy Efficiency (2) RE specialisations (3) -Solar; Hybrid Wind Systems; Biomass; Micro Hydro. Third and fourth digits is the simple numbering of units.



All strands in the Certificate 3 in Sustainable Energy comprise:

3 Generic Skills Units:. *The learning and assessment activities in these unit standards will be applied in the elected field of Energy Efficiency; Biomass, Hybrid Wind, Micro hydro power, Solar*

ID	*Unit Title*	*PQF Level*	*PQF Credit*
CG3001	Provide quotations for installation or service jobs	3	4
CG3002	Carry out simple project activities in SE	3	6
CG3003	Comply with scheduled and preventative maintenance program processes	3	5

A Certificate 3 in Energy Efficiency comprises 7 mandatory units including the 3 generic units (listed above) and 4 core skills units:

4 Core Skills Units: Energy Efficiency

ID	*Unit Title*	*PQF Level*	*PQF Credit*
SE3201	Evaluation, recommendation and selection of EE products	3	7
SE3202	Evaluation energy saving measures in energy utilizing systems	3	7
SE3203	Promote and contribute to energy efficiency	3	4
SE3204	Assessment for improving energy efficiency in energy consumption systems	3	7

A Certificate 3 in Renewable Energy: Biomass (B), Hybrid Wind (HW), Micro Hydro Power (MHP), Solar (S) comprises 9 mandatory units including the 3 generic units (listed above) and 6 core skills units:

6 Core Skills Units: Renewable Energy (B, HW, MHP, S)

ID	*Unit Title*	*PQF Level*	*PQF Credit*
SE3301	Apply tools, equipment & materials in complex tasks in RE & EE for operations and maintenance	3	6
SE3302	Apply basic concepts in RE for energy generation and consumption	3	6
SE3303	Use drawings, diagrams, schedules, standards, codes and specifications	3	4
SE3304	Diagnose and rectify faults in renewable energy control systems	3	4
SE3305	Maintain and repair facilities associated with remote area essential service operations	3	4
SE3306	Assist in the installation, operation and maintenance of systems for RET & EE	3	6

Regional Registration Information

Provider Arrangements

Accredited providers/assessors need to apply to the regional accrediting agency (EQAP) to deliver this qualification. In addition, if the Pacific country hosting delivery has national quality and/or registration requirements the provider must comply with the national application processes.

Version

This is the first version of the Certificate 3 in Sustainable Energy. This qualification and the unit standards were provisionally endorsed on 19 May 2016 by the Pacific Regional Sustainable Energy Industry Standards Advisory Committee (ISAC) in Nadi, Fiji. Final endorsement was obtained in October 2016 through the web-based communication 'Basecamp'.

Certification & Quality Assurance

This qualification will be awarded by the regional accrediting agency on behalf of the Pacific Regional Industry Sector Advisory Committee (Sustainable Energy Industry Association of the Pacific Islands/SEIAPI). It may also be awarded by a Pacific Island national accrediting agency and/or an accredited training organisation.

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Review

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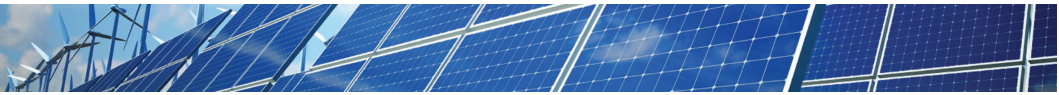
Accrediting Agency	Version	Review Date
Education Quality Assessment Programme (The Pacific Community)	1	September 2018



Qualification Developer

This qualification was developed by the Pacific Regional Sustainable Energy Industry Standards Advisory Committee (ISAC) for the Sustainable Energy Industry Association of the Pacific Islands (SEIAPI).

Pacific Regional Qualifications Unit

Educational Quality and Assessment Programme (EQAP)
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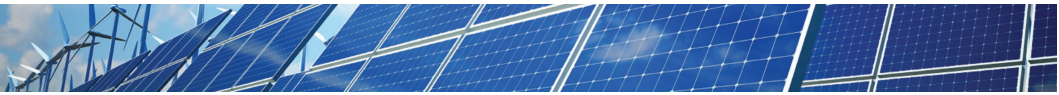
Regional Certificate 4 in Sustainable Energy (SE)



Regional Certificate 4 in Sustainable Energy (SE)

The Certificate 4 in Sustainable Energy is aimed at those who may already be working in a field related to Energy/Sustainable Energy or those with relevant work experience who wish to pursue a career in Sustainable Energy. Learners at this level must elect to study in one of the following fields: ***Energy Management, Biomass, Hybrid Wind, Micro Hydro Power, Solar.***

	RE strands: B, MHP, S, HW	Energy Management
Level 1 credits		
Level 2 credits		
Level 3 credits		
Level 4 credits	40	40
Minimum totals	**40**	**40**

Credit Value:

One credit is equivalent to ten notional learning hours. Notional learning hours include: direct contact time with teachers and trainers (directed learning), time spent in studying, doing assignments, and undertaking practical tasks (self-directed/work related), time spent in assessment.

Sustainable Energy

The Pacific Island states are particularly vulnerable to the adverse effects of climate change. They are also countries that are leading the world in reducing their fossil fuel consumption and shifting to renewable energy sources of electricity generation. The increasing demand, usage and costs associated with fossil fuels to power the transportation and energy sectors of Pacific Island nations has led to an energy transformation in the region. Investment in clean and affordable energy, with a focus on renewable energy, energy efficiency and conservation is leading diversity in technologies, sources of energy and mitigating the envrionmental effect of using fossil fuels.

Around the Pacific Island region, the price of fuel and electricity tariffs rank amongst the highest in the world and there are significant inefficiencies in electricity generation and fuel consumption in the transport sector. While there are promising renewable energy opportunities, about 7 million people out of the region's 10 million still do not have access to electricity. Against this backdrop, Pacific Island countries are prioritising a shift to renewable electricity sources and increased access for all communities. In some cases, whole atolls are now 100 percent renewable, many more people have access to clean and reliable power, the amount of diesel imported for electiricty generation has been reduced and some Pacific countries can now better manage the impacts of climate change. As a result of the shift and ongoing changes there is a need for training in a wide range of skills associated with sustainable energy, in particular renewable energy technologies.

The purpose of the certificate level qualifications in Sustainable Energy is to use the formal technical vocational education and training (TVET) sector to facilitate building national and regional capacity to: raise the level of awareness and knowledge on alternative renewable

energy sources and renewable energy technologies (RETs), develop technical skills and knowledge to support processes for installation, operation and maintenance of RETs, and undertake planning, development, monitoring and assessment and management of sustainable energy projects to promote energy efficiency which will mitigate loss and damages from the effects of climate change. These qualifications contribute to developing a Pacific Community whose people are educated and healthy and manage their energy resources in a sustainable way.

Certificates 1 and 2 in Sustainable Energy are generic qualifications which include general learning on on-grid and off-grid power systems, renewable and non-renewable energy sources, energy efficiency and renewable energy technologies (RETs). Certificates 3 and 4 in Sustainable Energy foster specialisation in the field of Renewable Energy and offers four strands: Micro Hydro Power, Solar, Hybrid Wind, Biomass. Certificate 3 also offers an elective in Energy Efficiency which provides a pathway to a strand of Energy Management at level 4.

Compulsory outcomes for this Certificate 4 cover the following key job roles:

- **Workplace Health and Safety knowledge:** includes identifying and reporting workplace hazards,
- **Using tools, equipment and materials**: applied safely in the workplace and relating to generic tools and equipment used for on-grid and off-grid renewable energy sources (wind, micro-hydro, solar, biomass) renewable energy technology and energy efficiency such as fuel generators, battery charge controllers, hand and power tools, PV Solar panels, wind turbines.
- **Identifying appropriate renewable energy sources and renewable energy technologies, measuring energy efficiency and participating in the implementation of sustainable energy projects:** determine standalone and hybrid power systems suitable for local communities, government imperatives/INDCs and development partner objectives; report on suitable alternative energy sources/technologies and identify risk and vulnerability factors, conduct and monitor tasks to implement SE projects.
- **Communicating with stakeholders:** to identify problems, use appropriate technology to convey information effectively, use appropriate culutral protocols for Pacific Island contexts, to facilitate discussion and resolve conflicts if needed.

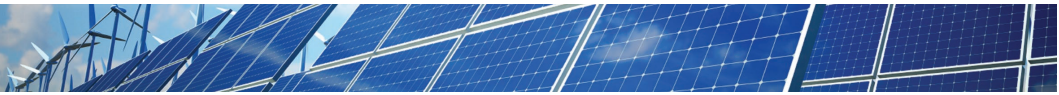
Flexibility and Recognition of Prior Learning:

This qualification can be achieved in different settings including the community, workplace and education institutions. Learners can achieve competence in ways most suited to their educational, work or cultural needs and aspirations.

Recognition of prior learning (RPL) acknowledges the skills and knowledge gained from workplace, community experiences or informal training which includes courses or study previously undertaken. Assessment for RPL must be undertaken by a qualified assessor

Entry level/pre-requisites

Entry to the Certificate 4 level qualification requires **either completion of the Certificate 3**



in Sustainable Energy or equivalent work/volunteer experience. The equivalent experience requires evidence of relevant activities undertaken in work and/or community environments within the past 12 months

Credit Transfer Arrangements

The Pacific Qualification Framework allows for credit recognition and transfer from other regional or national qualifications through a process of mutual recognition. Credit transfer is a process whereby credits already achieved for one qualification are recognized towards a new qualification. If a learner has obtained competency in the Certificate 3 in Sustainable Energy (within the past 3 years) they will receive credit for unit standards which have been successfully completed.

Pathways

On completion of the Certificate 4 in Sustainable Energy graduates can progress to further learning in Sustainable Energy or other industry areas which provide the opportunity to gain higher level technical skills and knowledge and contribute to the workforce.

Graduate Profile

A graduate of a level 4 certificate is able to: demonstrate broad operational and theoretical knowledge in a field of work related to energy/sustainable energy, select and apply solutions to familiar problems and sometimes unfamiliar problems, select and apply a range of standard and non-standard processes relevant to the field of work or study, apply a range of communication skills including appropriate cultural protocols relevant to the role in the field of work or study, demonstrated the self-management of learning and performance under broad guidance, demonstrate some responsibility for the performance of others.

Certificate 4 in Sustainable Energy graduates will have broad basic knowledge and skills to engage as competent community members and employees. A graduate would be competent to undertake roles such as: contributing to project design, development and reporting, gathering relevant information and data for monitoring and reporting purposes, providing general communications and services to communities, government and development partners, and developing community awareness on matters related to renewable and non-renewable energy sources, renewable energy technologies, energy efficiency and energy management.

- Create community awareness on matters of sustainable energy.
- Assist energy officers and community members to collect field data on energy matters.
- Assist the community in determining appropriate energy sources and technologies
- Assist the conduct of energy efficiency assessments using a combination of quantitative and qualitative research tools and technologies.
- Communicate effectively with community stakeholders using appropriate protocols
- Apply and promote Traditional Knowledge in Sustainable Energy interventions
- Implement work plans and work effectively in teams
- Collect and analyse both quantitative and qualitative data and prepare field reports on renewable energy sources, RETs and energy efficiency.

ELECTIVE FIELDS: Certificate 4 in Sustainable Energy Strands

A learner must elect to study any ONE of the following five strands: Energy Management, Biomass, Hybrid Wind, Micro Hydropower, Solar

ENERGY MANAGEMENT

The learner will gain an understanding of energy management practices that develop optimal use of energy savings through improved operations, maintenance and management practices. These include the development of management strategies, programmes and plans, implementation of techniques, technologies and tools, measurement, verification and control. The learner will also understand and demonstrate different types energy audits to determine ways to reduce energy consumption.

Holders of this qualification will be able to:

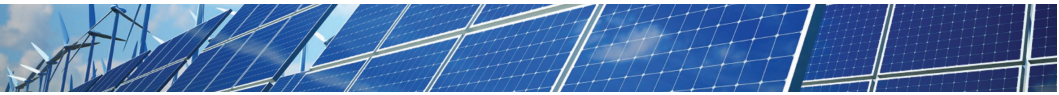
- *Disseminate information and improve public awareness on energy use, and energy efficiency practices mainstreamed in local and regional government frameworks, policies and procedures..*
- *Contribute to renewable energy/sustainable energy projects in the Pacific region and ` apply methods and tools to determine safe, affordable, relevant and efficient electricity generation and consumption.*
- *Provide information to local communities and stakeholders (development partners, government agencies, NGO's) on benefits and impacts of employing energy efficient systems and conservation measures.*
- *Determine and conduct an appropriate energy audit to establish: energy consumption in the organization/location (including residential, commercial and industrial premises), estimate the scope for saving, identify immediate improvements/savings, set a 'reference point', and identify areas for more detailed measurement.*
- *Provide information to stakeholders on understanding energy costs, need for energy audits, types of energy audits, bench marking, energy performance, matching energy use to requirements, maximizing system efficiencies, optimizing the input energy requirements, fuel and energy substitutions, energy audit instruments.*
- *Undertake financial analysis (cost-benefit approach) of proposed and recommended energy performance improvement actions.*

BIOMASS

The learner will gain an understanding of how biomass energy can be divided into traditional biomass and modern bioenergy and how it is used in the pacific region. In particular the learner will understand the benefits and environmental impacts of using biomass for energy sources. An understanding will also be gained on how modern bioenergy, is used mostly for the generation of electricity or transportation. In particular, all Pacific island countries have the technical potential to develop coconut oil for biofuel and coconut sap for ethanol because much of the land, even on atolls and raised coral islands, is covered with coconut trees.

Holders of this qualification will be able to:

- *Conduct a regional/local assessment and apply methods and tools for biomass projects as they relate to the Pacific region.*



- *Identify with local communities information on determining the viability of traditional biomass and bioenergy applications in the local area.*
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Holders of this qualification will be able to:

- *Conduct a resource assessment and apply methods and tools for siting hybrid wind energy projects as they relate to the Pacific region.*
- *Identify with local communities information on determining the viability of hybrid-wind energy production for local areas.*
- *Provide information to local communities and stakeholders (development partners, government agencies, NGO's) on benefits and environmental impact of hybrid wind power systems for a particular location.*
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The learner will gain an understanding of micro-hydropower systems that typically produce power in the range of 5kW to 100kW of power, can provide power to isolated villages and/or are sometimes connected to electric power networks. An understanding of micro-hydro systems includes civil works involved in the catchment area, including weir and turbine technology and it's capacity to complement other electrical power systems in particular solar photovoltaic.

Holders of this qualification will be able to:

- *Explain the suitability of micro-hydropower systems for people living in rural communities in Pacific Island countries with ready access to rivers and streams.*
- *Conduct a hydro-power resource assessment and apply methods and tools for siting*

micro-hydropower projects as they relate to the Pacific region.

- *Identify with local communities information on determining the viability of micro-hydro-power energy production for local areas.*
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Holders of this qualification will be able to:

- *Conduct a resource assessment and apply methods and design tools for siting standalone, grid connected and hybrid solar energy projects as they relate to the Pacific region.*
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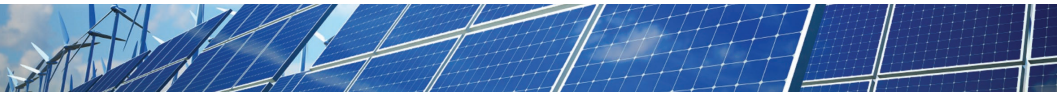
Requirements: Certificate 4 in Sustainable Energy

Unit codes. First digit represents certificate level; second digit represents strand with Generic units as zero (0), Energy Management (1); Energy Efficiency (2) RE specialisations (3) -Solar; Hybrid Wind Systems; Biomass; Micro Hydro. Third and fourth digits is the simple numbering of units.



A Certificate 4 in Sustainable Energy (Energy Management) comprises 7 mandatory units:

3 Generic Skills Units

ID	*Unit Title*	*PQF Level*	*PQF Credit*
CG4102	Coordinate effective workplace communications	4	6
CG4103	Administer and support projects in Sustainable Energy	4	7
CG4002	Contribute to WHS Hazard Identification and Risk Assessment for work sites	4	5

PLUS

4 Core Skills Units

ID	*Unit Title*	*PQF Level*	*PQF Credit*
SE4102	Supervise and coordinate energy sector work activities	4	5
SE4105	Planning and managing in the Energy sector	4	5
SE4103	Describe and use logical framework analysis and cost-benefit analysis to appraise Energy projects	4	6
SE4104	Conduct a sustainable energy audit	4	6

A Certificate 4 in Sustainable Energy: Biomass (B), Hybrid Wind (HW), Micro Hydro Power (MHP), Solar (S) comprises 7 mandatory units:

2 Generic Skills Units

ID	*Unit Title*	*PQF Level*	*PQF Credit*
CG4001	Source and purchase material/parts for installation or service jobs	4	4
CG4002	Contribute to WHS Hazard Identification and Risk Assessment for work sites	4	5

PLUS

5 Core Skills Units: Renewable Energy (B, HW, MHP, S)

ID	*Unit Title*	*PQF Level*	*PQF Credit*
SE4301	Apply tools, equipment & materials in complex tasks in RE & EE for planning, design and installation	4	7
SE4302	Assist tradespersons to determine energy efficiency and practices to conserve energy	4	6
SE4303	Install, operate and maintain systems in RET & EE	4	8
SE4304	Coordinate maintenance of renewable energy apparatus and systems	4	5
SE4102	Supervise and coordinate energy sector work activities	4	5

Regional Registration Information

Provider Arrangements

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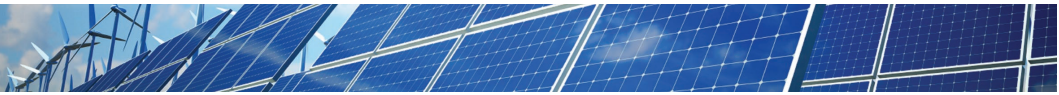

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Pacific Regional Qualifications Unit

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Pacific Sustainable Energy Industry Standards Advisory Committee (ISAC) for Sustainable Energy Industry Association of the Pacific Islands (SEIAPI)

Contact:
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Sarah Hemstock: sarahh@spc.int