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SEIAPI Sustainable Energy

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USP Pacific TAFE Sustainable Energy Training Centre

Article By: Geoff Stapleton

In July 2022, GSES signed a partnership agreement with *The University of the South Pacific (USP) Pacific TAFE*. Under this agreement USP Pacific TAFE has commenced offering the following three **online** courses:

1. *Grid Connected PV Systems - Design and Install*
2. *Stand Alone Power Systems (Off-Grid) - Design and Install*
3. *Battery Storage Systems for Grid Connected PV System - Design and Install*

Refer to https://www.training.ac.fj/info/solar/ for more information.

The courses are similar to those GSES conduct in Australia and will allow those who successfully complete the course to be eligible to apply for their PPA/SEIAPI design accreditation (https://www.seiapi.com/seiapi-ppa-accreditation.) Mr. Sandip Kumar will be the initial Tutor for the USP Pacific TAFE solar courses.

This partnership arrangement is the initial stage of a larger project establishing a new Sustainable Energy Training Centre at the USP Pacific TAFE Suva campus. SEIAPI is in discussions to secure funding for the centre. Also, SEIAPI is working with Fiji based companies and other stakeholders in planning the best method to conduct the practical session for these courses before the new training centre is established.

SEIAPI is working with other Pacific Island Countries (PICs) to identify potential trainers and training centres that can provide the practical components of the courses in-country or to conduct them face to face. SEIAPI will work with the trainers/training centres to identify funding sources to provide the systems and testing equipment needed to support the practical training. Though the USP training centre has started with the above online courses to meet the current needs of private industry and some of the PPA power utilities, SEIAPI will be working with industry and other stakeholders to identify other courses to support the growth of the industry. Courses identified to date include:

1. *Operation and maintenance of both grid connect and off grid PV systems.*
2. *Utility scale storage systems.*
3. *Inspection of systems.*
4. *Awareness course for various stakeholders.*

These courses will be developed and launched in the next 12 months.

Geoff Stapleton (right) with GSES staff Sandip Kumar (left) during his recent Fiji visit.

SEIAPI's Objectives for the next 6 to 12 months

The Executive Officer, Geoff Stapleton and the SEIAPI Executive Committee have been developing a set of objectives for SEIAPI for the next 6 to 12 months. Geoff will use these as his focus for the next few months.

The objectives are:

- Support the establishment of the Sustainable Energy Training Centre at USP Pacific TAFE and identify how to establish either face to face courses or blended (online and practical) training within other countries.

- Develop the new courses that have already been identified. Also initiate discussions with industry and stakeholders to identify what other training courses are a priority. This will include identifying the countries that do not have qualified electricians and hence basic electrical training courses may be required.
- Raise the profile of SEIAPI within the PICTs and work with the various in-country and regional stakeholders to develop a workplan on the specific needs in each country and territory to increase the usage of sustainable energy systems and services and determine how SEIAPI can support this.
- Work with the relevant in-country government departments, power utilities and where relevant donors to have the technical guidelines endorsed. The aim of the endorsements is to require that all solar systems (particularly those being funded through specific donor projects) are designed and installed in accordance with the technical guidelines.
- Work with PICT governments to either have:
    - them recognise the accreditation program with the outcome that they require all designers and installers of the systems to be accredited through the PPA/SEIAPI scheme; or
    - the relevant in-country regulator develops a "solar technicians license".
- Raise awareness to the relevant government departments/agencies of the international standards (IEC or UL) for individual PV system components. Also, to work with them to have these standards mandatory so that only components/equipment that have been tested and approved in accordance with the relevant standards are installed in the PV systems for the PICTs (and other RE technologies).
- Work with the relevant in-country government education agency to adopt the training unit standards developed under SEIDP within the individual countries' training frameworks.
- Liaise with members to determine the support they would like from SEIAPI in terms of capacity building and in maintaining a sustainable RE industry.

Executive Officer Travel Sept – Dec 2022

In working towards achieving the above objectives, Geoff Stapleton has scheduled trips to:

- Fiji - September
- Solomon Islands - October
- Tonga - November
- Brisbane for the 29th Pacific Power Association conference in November.
- Samoa - December
- Cook Islands - December

SEIAPI EXECUTIVE OFFICER MEETS THE SOLAR INDUSTRY IN FIJI

Article By: Sandip Kumar

During his recent Fiji visit, the newly appointed SEIAPI Executive Officer, Mr Geoff Stapleton, met with the local solar industry to reach out to the solar companies based in Fiji and to create awareness of SEIAPI's achievements and objectives. This was held on 15th September, 2022 at ''Mana Coffee'' in Suva from 4pm to 6pm. The industry meeting was attended by 13 participants with 2 others joining via Zoom. The participants represented Clay Energy, CBS Power Solutions, Solar Fiji, Vision Energy, Dawn Renewables, Omega Electric, Powerlite, Sunray Electrical and Anare Solar Energy.

Geoff Stapleton making a presentation to the Fiji based solar companies.

SEIAPI Executive Committee members, Bruce Clay and Peter Johnston also attended this industry meeting. In his presentation, Geoff Stapleton provided an overview of SEIAPI, its objectives and the work that SEIAPI has been doing over the years for the benefit of the sustainable energy industry in the Pacific Island countries. He emphasized that the focus of SEIAPI is to support its members, particularly in building the capacity of the nascent private-sector sustainable energy industry throughout the Pacific.

He stated, "SEIAPI's certification/accreditation program was launched in May 2012, and it was relaunched in 2014 as the Pacific Power Association (PPA)/SEIAPI certification/accreditation program". "However, the voluntary scheme still has only a few accredited technicians because of the lack of suitable and ongoing training in the Pacific, partly due to the low profile of the scheme", he added.

SEIAPI has been on the forefront in developing industry guidelines and training competency standards on RE/EE in collaboration with PPA through SEIDP funded by the World Bank.

In 2019, GIZ purchased a once off license agreement for the resource material for four of GSES face to face training courses. Agreements have been signed with Solomon Islands National University and College of Micronesia, Pohnpei to date.

Geoff also highlighted GSES signing a partnership agreement with USP Pacific TAFE in July 2022. As discussed above, USP is already offering online PV courses.

Participants during the Industry meeting

The importance of adopting technical guidelines, product/component standards, and accreditation, and providing practical training within the Pacific was emphasized.

Upon conclusion, he gave the floor to the local industry to raise issues that are impeding sustainable energy industry growth. Increasing access to quality components and getting them at affordable prices were discussed, along with other matters.

SEIAPI plans more discussions with industry in other Pacific countries in the coming months.

Superfly Limited Completes Construction Works on 33kW Solar hybrid System for Aruligo Freshwater Hatchery

Article By: Gavin Pereira

Superfly Limited in Solomon Islands have completed construction and testing of their 33kW solar-hybrid system for the Solomon Islands Government Freshwater Hatchery facility. The hatchery facility is located at Aruligo, which is situated 40 kilometers beyond the national grid to the West of Honiara in Solomon Islands.

Superfly's involvement in the hatchery project commenced in late 2021 after Superfly were awarded the tender from the Solomon Islands Government central tender board. The winning bid comprised a solar system with 33kW ground mounted PV array integrating AC and DC bus PV into the Victron 3 phase system charging a 89kWh Pylontech lithium battery bank, as well as integrating an auto-start diesel genset. All done by Solomon Islanders with very little remote support. The hybrid system was pre-commissioned in July and it is monitored every day via Victron remote monitoring app. You can check out the performance on the VRM app: https://vrm.victronenergy.com/installation/198893/share/73c3bc7c (Password is Aruligo123)

The system will be tested and fully commissioned by Solomon Power in October; upon which time it will be granted an IPP license.

The high cost of diesel, including the cost of transporting it meant that a solar-hybrid system is the least cost power solution to ensure sustainable power delivery at the soon-to-be-completed freshwater hatchery facility for the Solomon Islands Government Ministry of Fisheries and Marine Resources. The hatchery will improve food security, help reduce pressure on existing in-shore fisheries, and help rural people, particularly youth, participate in the productive sector.

We are happy for the chance to show that local companies can perform these solar hybrid installations if we are given the chance to bid on them. This is also why we go to the Nth degree by making our cloud-data on these sites sharable as irrefutable proof of our ability to keep these systems running for the test of time.

a) PV array at the site

(b) pre-commissioning training for the Fisheries staff by Superfly Engineer

Rabi Ice Plant-Designed & Installed by Solar Fiji

Article By: Solar Fiji

Rabi Island is situated off the north-east coast of Vanua Levu, Fiji's second-largest island and consists of five villages. The people of Rabi and surrounding communities are dependent on farming and fishing for a living. Nuku Village hosts an Ice Plant in order for fishermen to properly store their produce for an extended period either for consumption or to be sold to market.

This island, unfortunately, is off-grid and is dependent on imported diesel to meet its energy needs, including electricity production. The objective of the proposed project was to design and install a hybrid solar system to power the Ice Plant, decentralizing power generation that not only reduces carbon emissions, but also cuts the high cost of transportation required for diesel, creating power independence and a sustainable local industry.

This is in alignment to the global target to reduce carbon emissions as part of Governments ultimate goal in achieving a green and blue economy. This is a Pilot project for the Fijian Ministry of Fisheries which aims to benefit 794 households living on the island and more than 500 households living in surrounding islands and communities.

This project also aims to play a critical role in 'jump-starting' the adoption of solar hybrid technology in the island and surrounding area and in setting the stage for broad scale-replication. In this way, the project is designed to transform an energy sector that is 100% dependent on imported fuel into one where solar energy and other RET's provide a significant percentage of energy production going forward.

The design, supply, storage, transportation and installation of the 24kVA 3 Phase Solar System for Rabi Ice Plant project was executed by Solar Fiji in accordance to the tender requirements laid by MOF.

The objective of the project was to design and install a hybrid solar system to power the Ice Plant during the day, decentralizing power generation that not only reduces carbon emissions, but also cuts the high cost of transportation required for diesel.

There were a few major components which contributed towards achieving the project objective. These were:

1. The use of premium quality solar products backed by robust warranties.
2. Experienced team who have had good exposure in designing and installing Victron Energy Hybrid Solar Systems.
3. System overview monitoring through Victron Energy VRM Portal https://vrm.victronenergy.com/world/

Funaota Stand-Alone Solar Home (SASH) Systems to save 14kg of Carbon Dioxide Annually

Article By: Mafalu Lotolua (Tuvalu Electricity Corporation)

The Tuvalu Electricity Corporation (TEC) has been on a mission to show the world that although Tuvalu's emission is very negligible, while the rising tides situation is threatening to take our homes, TEC still hopes to lead by example and show the world that Tuvalu is doing its best to further reduce greenhouse (GHG) emissions by promoting renewable energy and energy efficiency (RE/EE) technology applications.

Recently, Tuvalu has commissioned its Stand-Alone Solar Home System (SASH) project, a project that aims to reduce the reliance on fossil fuel for electricity generation of Funaota islet, thus reducing greenhouse gases (GHG) emission. Funaota, an islet of Nukufetau was dedicated by the Nukufetau Falekaupule (Council) to help develop business ventures on the islet.

The project is providing 24/7 electricity using an enhanced storage battery system to three households which includes: (i) the dormitory to house the workers and also provide power supply to the Manager's residence; (ii) coconut oil processing plant that house processing machineries; and (iii) the piggery to provide electricity to operate electrical equipment for the piggery. The project also provides Very High Frequency (VHF) radio for a communication link between the islands of Savave and Funaota.

According to TEC, the SASH project would save about 14 kilograms of carbon dioxide yearly from the 7kW systems installed at Funaota Islet.

At the commissioning of the project, TEC and the Nukufetau Kaupule signed a one-year Memorandum of Understanding (MoU) to ensure that both parties understand their roles in the safe keeping of the project. The MoU will expire on 18 July, 2022. After the expiration date, the project will be handed over to the Nukufetau Kaupule for operation and maintenance. TEC will continue to standby to offer their service when needed.

At the commissioning ceremony of the SASH project, the Pule Kaupule (Island Leader) emphasized the importance of Action. "Tuvalu is truly grateful to all the donors for the support to ensure Tuvalu achieves its RE and EE goal nationally and globally".

The project has been made possible through the India-UN Development Partnership Fund – Commonwealth Window, which has provided financial assistance of USD214,000 to the Government of Tuvalu. The UNDP/GEF-funded FASNETT Project as a village RE/EE demonstration technology also supported the project's energy storage and communication systems. The support from India-UN Development Fund and the partial support from GEF funded FASNETT Project was made possible by the excellent support provided by UNDP Pacific Office, Suva, Fiji.

For more information please contact:
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SEIAPI is a supporting organization of the above conference. **It will be held at the Universitat de les Illes Balears in Palma de mallorca, Spain, from April 26-28, 2023.**

As in the previous conferences, the main objective of this event is to provide an opportunity for an **exchange between practitioners** from the industry, academia, and development institutions working in the field of decentralized energy access and local development. The conference will cover hands-on technical, social, and environmental considerations, and business and management aspects with the aim of sharing experiences, learning from each other, and networking.

The conference will provide an overview on the status in different solar technology areas and provide a space for exchange between participants, presenting their results from scientific research and experiences from the field.

The **Call for Abstracts is now open!** Please send your contributions until October 30th!

For further information please visit the conference's website: www.energy-access-conferences.com.

UPCOMING CONFERENCE

- **29th PACIFIC POWER ASSOCIATION CONFERENCE WILL BE HELD FROM 21st – 24th November at Brisbane Convention & Exhibition Centre (Brisbane, Australia). Please visit PPA website for more information. (https://www.ppa.org.fj/)**

Email your comments/suggestions on secretariat@seiapi.com or eo@seiapi.com or admin@seiapi.com

Technical Article

WHAT CAUSES SOLAR FIRES AND HOW TO PREVENT THEM?

(Courtesy of Global Sustainable Energy Solutions (GSES, Australia))

Fire damaged array. Solar fires are headaches for the owner and the installer.

PV system fires are rare but can cause a lot of damage to a building and its contents. While it is rare for panels to catch fire on their own, poor workmanship combined with negligence can cause issues that eventually lead to electrical fires on the roof or at the inverter.

In recent months, GSES has attended multiple sites to conduct investigative fire inspections on commercial solar systems. The findings from the visits concluded that the fire was likely caused by water ingress or loose connections at rooftop isolators. Fortunately, in all instances, major damage was averted due to favourable conditions and the quick responses of personnel onsite and emergency services

As solar fires are a major risk to the reputation of the Australian solar industry as well as an obvious risk to safety and property; it is important to understand the causes of PV system failures and how to prevent them.

Our engineers and inspectors have inspected over 10,000 grid-connected solar PV systems in the past ten years. During this time, we have concluded that there are three main causes of fires:

Cause 1 – Water ingress into DC isolators.

Figure – partial immersion of the isolator and corrosion evident with watermark and presence of green - copper conductor corroded, and brown- iron screw corroded

DC isolators, especially the DC isolators located at the roof (rooftop isolators), are a known common cause of fires in PV systems. Historically, rooftop isolators have been a requirement in Australia to allow fire safety services and other workers to disconnect the system at the array – i.e. while on the roof. However, with rooftop isolators being more exposed to the elements, they are more prone to damage and deterioration. They are also less visible, resulting in issues occurring at the rooftop isolator often being missed until it is too late. While recent regulatory changes now allow alternatives to rooftop isolators, there will still be millions of rooftop isolators already installed.[1]
Without proper installation methods to maintain the ingress protection (IP) of the isolator enclosures, water can get in and accumulate inside the isolator enclosure, causing corrosion of the terminals and, in the case of inundated isolators, damage internal components of the isolator too.

When the isolator carries current in this state, higher resistance at points where corrosions has occurred, causing a hot joint which can eventually lead to fire.

Cause 2 – Cable terminations

Terminals and other connections need to be properly tightened for the current to flow through properly. When the torque settings are not followed or connections are loose, hot joints can be created. The heat can melt the plastic around the cables and start a fire.

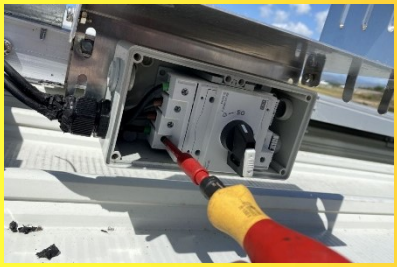

Figure - Torque being checked at a terminal. Always make sure you have tightened all your connections to the manufacturer's specification.

Cause 3 – Damage to module

Solar modules are tested to withstand various conditions. However, damage to the module can cause internal cracks that are not easily visible. Microcracks can lead to hotspots in the cell, which then may lead to fires.

Cracks and microcracks in the cell can be caused by:

a. Smashed module (golf ball, cricket ball, hail)
b. Earthing lugs installed against backsheet causing abrasion

Figure - earth lug installed hard against the underside of the module]

c. People walking on modules/improper transport.

For detailed article and information on prevention, please refer to the following link: https://www.gses.com.au/what-causes-solar-pv-fires-and-how-to-prevent-them/