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SEIAPI Sustainable Energy

Newsletter of the Sustainable Energy Industry Association of the Pacific Islands **ISSUE 2 • JUNE 2023**

SEIAPI HOLDS AGM

Article by Sandip Kumar

On May 18, an Annual General Meeting was convened virtually via ZOOM, chaired by Mr. Geoff Stapleton, the Executive Officer of SEIAPI. The AGM was notified of the stepping down of Ms. Belinda Strid as the President. Mr. Gavin Pereira has been unanimously elected as the Chair of the SEIAPI Executive Committee. The previous position of President has been renamed as Chairperson in line with the terminology of other organizations. Mr. Pereira has years of professional and technical experience on regional energy matters and is the Director of Superfly Ltd, a Solomon Islands based solar energy company. Energy specialist and prominent Pacific consultant, Mr. Peter Johnston has been elected as the Vice Chair. Bruce Clay, successful entrepreneur, and former General Manager of Clay Energy was elected as the Treasurer with GSES Pacific Technical Officer, Mr. Sandip Ravi Kumar elected as the Secretary of SEIAPI. The Ordinary members elected include Dr Atul Raturi (USP), Clayton Eigenmann (Eigena), Apisake Soakai (Energy consultant), Navin Shandil (Solar Hub Fiji) and Pawan Kumar Bajpai (Narhari Electrical).

A few highlights from the AGM include updates on 2022/2023 activities, finances, and objectives/plans for the current year. The Secretariat's report noted that there are 16 Industry members from Fiji, Vanuatu and Solomon Islands. Additionally, there are 7 Associate members including companies from New Zealand, Australia, Spain and Fiji. 2023 saw inclusion of two new Manufacturer category members, namely Selectronic Australia and Victron Energy. Interestingly, due to a longstanding Pacific Power Association/SEIAPI MOU, all 22 PPA electric power utilities are automatic members of SEIAPI.

The AGM also provided a platform to discuss some insights on the way forward and how to get SEIAPI widely promoted so that more private entities be reached, and the public kept informed of SEIAPI activities.

Mr. Pereira expressed appreciation of the contribution and initiatives of the SEIAPI Executive Officer, Mr. Geoff Stapleton and hopes to work closely with him and the new Executive Committee to achieve SEIAPI goals and to better define and realize SEIAPI's objectives. Collectively, the new Committee thanked Mr. Geoff Stapleton for drafting the proposal and securing funding for the Sustainable Energy Training Centre which is to be built at USP Pacific TAFE campus in Suva, Fiji.

SEIAPI UPDATES PRIF – PMC

Article by Sandip Kumar

The Pacific Region Infrastructure Facility – Project Management Committee (PRIF-PMC) usually meets in Sydney. In June 2023, the PMC quarterly meeting was held in Fiji for the first time.

PRIF partners are the Asian Development Bank, Australian Department of Foreign Affairs and Trade, European Union, European Investment Bank, Japan International Cooperation Agency, New Zealand Ministry for Foreign Affairs and Trade, United States Department of State and the World Bank Group. PRIF helps Pacific Island Countries (PICs) meet Infrastructure challenges, including energy provision, through studies and finance to improve the quality and coverage of infrastructure.

The PMC Suva meeting considered and subsequently endorse the design parameters for a new phase of PRIF support proposed to start in January 2024. The Committee also considered and endorsed changes to the PRIF Charter.

PRIF partners also participated in the Resilient Infrastructure and the 2050 Strategy for the Blue Pacific Continent Dialogue held at the Pacific Islands Forum office. The dialogue included Forum Secretariat members, regional organizations, and civil society and underscored the importance of climate-resilient infrastructure for realizing the 2050 Strategy goals.

Following site visits to Fiji infrastructure, the PRIF-PMC met with USP and SEIAPI. USP was represented by the USP Pacific TAFE Executive Director, Ms. Susan Sela and Associate Professor in Physics, Dr Atul Raturi. SEIAPI was represented by the Executive Officer Mr. Geoff Stapleton (virtually) and Secretary Mr. Sandip Kumar.

USP and SEIAPI updated the PMC on current and planned training that require training support. Mr. Stapleton discussed the funding to be provided by a donor for the proposed Sustainable Energy Training Centre and the efforts to make it sustainable. He noted the extensive solar photovoltaic training resources that are freely available through a GIZ/PPA license agreement with PIC training centers and the need for equipment and Training of Trainer modules to provide training to each country. He raised other issues such as enforcing / adopting standards / guidelines for products and installations and the need for donors and governments to require compliance with these standards/guidelines in tender documents and installations. Accreditation needs to be strengthened and collaboration between donor programs needs to be improved.

The PRIF-PMC appreciated the work that SEIAPI is undertaking and SEIAPI will keep the donors informed of its activities.

PRIF-PMC, SEIAPI and USP reps present at the meeting

SUNERGISE SHINES WITH 'SOLAR-FIRST' DESIGN FOR ECO-FRIENDLY PLANT RETAILER

Article By: Clay Energy

In a groundbreaking collaboration between Sunergise, Cheshire Architects, and New Zealand's eco-friendly retailer, Kings Plant Barn, a visionary project has come to fruition. With a shared belief in the boundless potential of solar energy, these innovative companies embarked on a mission to seamlessly integrate solar power into the very fabric of Kings Plant Barn. Gone are the days when solar panels were seen as mere afterthoughts or add-ons. This project sought to place solar power at the forefront of the design, transforming the building into an energy-efficient masterwork adorned with sleek, black solar panels.

Kings Plant Barn's aspiration was clear: to fully incorporate solar panels into their new building. Sunergise worked hand in hand with Cheshire Architects during the design phase, ensuring that the solar exoskeleton they created not only adhered to building and electrical code requirements but also exuded visual appeal. The result is a bespoke implementation that merges seamlessly with the building's design, boasting a sleek profile that is a first of its kind. Panels were strategically placed to enhance the aesthetic appeal while maintaining a harmonious balance between energy production and design considerations. Even door and window widths were based on individual panel measurements, showcasing the meticulous attention to detail and a commitment to a flawless integration.

Today, the exterior of the Kings Plant Barn Stonefields store stands as a beacon in its urban environment, adorned with an array of solar panels, harnessing the sun's energy to power the building's daytime needs.

The remarkable success of this solar implementation was further recognized at the prestigious Sustainable Energy Association of New Zealand (SEANZ) Awards. It stands as a testament to the fact that solar power can transcend its traditional role and become an integral part of a building's design, symbolizing a major milestone for the solar industry in New Zealand. It shattered the notion that solar energy is an afterthought, proving that it can take center stage as a key feature of sustainable architecture.

During the award ceremony, Lachlan McPherson, co-founder of Sunergise, expressed his gratitude for the shared vision among Kings Plant Barn, Cheshire Architects, and the Sunergise

team. He emphasized the exceptional craftsmanship displayed in the installation, showcasing a new milestone for the solar industry in New Zealand, and applauded the moment sustainable solar solutions are integrated not only for their utility but also for their aesthetic appeal.

Sunergise overcame numerous obstacles during the design and installation phases to ensure a flawless execution. Careful optimization of the roof purlin spacing, and thoughtful placement of wall nogs accommodated the solar arrays. Wind-shear forces were reduced or eliminated in red zones with triple rail, wind-skirts and utilizing the vertical panels as a parapet. Weight load considerations were seamlessly integrated into the building's structural design. The install and engineering team's unwavering attention to detail and commitment to excellence shone through every step of the process.

The success of the Kings Plant Barn solar exoskeleton project would not have been possible without the shared vision and collaboration of Cheshire Architects and Kings Plant Barn. Their commitment to embracing the power of solar energy has set a remarkable example, paving the way for a greener future.

This exceptional building now stands as a beacon of inspiration, encouraging the integration of renewable energy sources into our built environment. With each project that places solar power at the forefront of design, we draw closer to a future powered by clean, and abundant solar energy.

"This Article was provided by Clay Energy and has not been edited, assessed or endorsed by SEIAPI. It describes a very innovative prize- winning PV project in which a SEIAPI member played a key role."

Did you know?

As of summer 2022, China, the European Union, the US, Vietnam and Japan were the biggest producers of solar energy in the world.

China currently leads the list as the top producer of solar energy, which is promising considering it boasts the largest population and carbon footprint globally. Within the European Union, Germany, the Netherlands, and Spain stand out as key markets with a significant investment in solar energy

SOLAR HALL OF FAME

On May 3rd at the Australian Smart Energy Council (SEC) annual conference in Sydney, Geoff Stapleton executive officer of SEIAPI was inducted into the Solar Hall of Fame.

The Australian Solar council, now the Smart Energy council started the **Solar Hall of Fame** in 2012 to acknowledge those who have been involved with the solar industry for many decades. It acknowledges their passion, guidance and support that has helped the industry grow and mature onto one of the most advanced in the world.

Asked about being inducted into the Solar Hall of fame, Geoff responded:

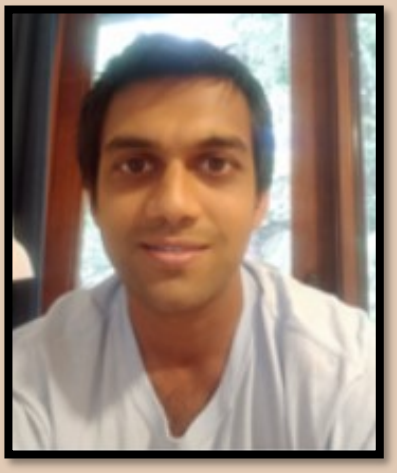
It is a great honor to be inducted into the Solar Hall of Fame. Thank you to SEC and the selection committee. I have had a very long relationship with SEC and its predecessors, Australian Solar Energy Society (AUSES) and the Australian New Zealand Solar Energy society (ANZSES). I presented my UNSW undergraduate thesis, on "solar water pumping" as a poster at the 1981 conference at Macquarie University. I then joined ANZSES in 1982 and have been an individual member of the various organizations ever since. Part of me also feels guilty in being acknowledged with this induction because as far as I am concerned, I have been lucky to have spent over 35 years in an industry that I love. My involvement with the various parts of the industry has been to help grow an industry that would allow me to make a living doing what I love. So again, thank you to SEC and the committee."

This is the second acknowledgement Geoff has received in the last 12 months. Last July at the Clean Energy Council (CEC) Summit in Sydney Geoff won **The Outstanding Contribution to Industry Award.** In presenting the award the CEC stated: "*Geoff Stapleton is one of the pioneers of the Australian rooftop solar industry. After first becoming involved in the sector in the late 1980s, Geoff has been pivotal in the ongoing development and refinement of standards, safety practices and training for the solar industry. He also played a key role in the foundation of the installer accreditation scheme that continues to ensure robust installation practice and training to this day.*"

Geoff was not at that dinner to receive his award; his company GSES was hosting 6 six people from PNG Power Ltd during that week and training them on inspection of grid connect solar systems. At the time that award was announced at the conference formal dinner he was at a dinner hosted by the International Finance Corporation (IFC), the private sector arm of the World Bank Group, for the PNG visitors.

Mr. Geoff Stapleton with the hall of fame award

SEIAPI EXECUTIVE COMMITTEE MEMBERS 2023-2024

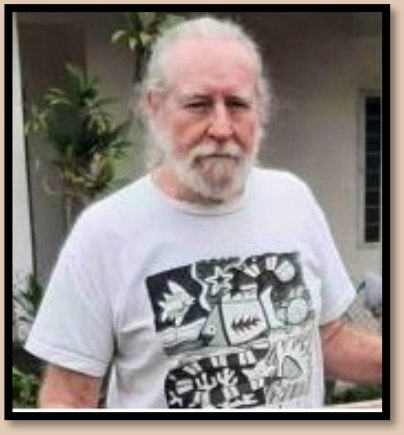


MR GAVIN PEREIRA
CHAIR – SEIAPI

Gavin's interest in off-grid solar kicked off during 2004 as a 20-year-old, when he took Geoff Stapleton's course in Stand Alone PV system design as part of UNSW's PV Engineering degree program.

After graduating in 2007, Gavin was a far-too-early entrant in the carbon market, before burning out in 2010 and following his girlfriend (now wife) to Solomon Islands. Whilst she took up a AusAID volunteer stint, Gavin started Superfly Limited, with the aim to provide a quality focussed solar solution to the energy access problems faced (80% of the country lacks access to electricity).

Superfly has evolved since then to establishing a dedicated solar shopfront in 2017 and now taking on major 3 phase BESS and hybrid projects for the Government and her major donors. It is Gavin's aim to promote excellence in the Solar industry in Solomon Islands through promoting SEIAPI and through utilising Superfly's installations as an example of industry best practice.



MR. PETER JOHNSTON
VICE CHAIR – SEIAPI

Peter Johnston is a Fiji citizen with a bachelor's degree in degrees in aeronautical engineering (Ohio State Univ) and master's degrees in technology policy (Sussex) and environmental management (London). He has been involved in sustainable energy and environmental issues in the Pacific islands– and to a lesser extent Southeast Asia–since the late 1970s. He was Fiji's first Director of Energy in 1981, managed a UNDP-funded Pacific regional energy programme in the 1980s, was chief technical adviser for a national environmental advisory programme in Cambodia in the 1990s, and has been a consultant with ADB, DFAT, MFAT the EU, GIZ, GGGI, PRIF, SPC, SPREP, the World Bank and other regional and international organisations. He is a former board member of the Fiji Electricity Authority (now EFL) and was lead consultant for ADB/PRIF and the Pacific Community for an external review of the 2010-2020 Pacific regional energy framework and for its 2021-2030 update. He is semi-retired but continues to work on renewable energy and energy efficiency issues.

MR. SANDIP R KUMAR
SECRETARY –SEIAPI

Sandip hails from Ba. He currently holds the position of Pacific Technical Officer at Global Sustainable Energy Solutions (GSES Australia) since 2018 based in the PPA office in Suva, Fiji. He also provides technical support to SEIAPI. He possesses more than ten years of professional experience largely in the training and energy sector. Prior to joining GSES, he held the position of Lecturer – Electrical/Renewable Energy at Fiji National University for more than 8 years. Earlier in his career, Sandip held the positions of Project Estimator/Engineer for electrical companies in Fiji. He is also a Licensed Electrician. He holds a Master of Science degree from the University of the South Pacific. His thesis was based on 'Higher renewable energy penetration analysis of grid connected PV systems in Tarawa, Kiribati and their implications on grid stability', which was done in collaboration with IRENA and PPA. Sandip also engages in part-time consultancies in the energy sector and has delivered on the projects for GGGI, UNDP, PRIF, SEIAPI and PPA.

MR. BRUCE CLAY
TREASURER- SEIAPI

Bruce is the founder and former General Manager of Clay Energy, a member of the Sunergise group. Based in Suva, Fiji and established in 1998 Clay Energy has grown into one of the region's leading renewable energy EPC companies with experience in delivering power solutions from small SHS to large hybrid and utility grid connected systems throughout the Pacific."

MRS. APISAKE SOAKAI
COMMITTEE MEMBER – SEIAPI

Mrs Apisake Soakai is currently a freelance consultant engaged in energy development projects to address energy access, increase energy independence, improve energy efficiency, gender and climate considerations through policy design and performance assessment. She has worked in the Pacific region for three decades initially in the public service in Tonga, Utility sector in Nauru, and regional energy development initiatives funded by IRENA, PRIF, EU, UNIDO and other development partners.
She is a graduate with a master's degree in business administration from Middlesex University, London.

MR. PAWAN KUMAR BAJPAI
COMMITTEE MEMBER – SEIAPI

Pawan holds MBA **& PGDCA** in **Energy Management**, **Post-Graduate Diploma** in **General Management**, **B.Tech** in **Electrical Engineering** from India. He has 11 Years of experience in the industry with multiple roles and have successfully delivered up-to 7MW Size of Solar System with major expertise in Technical (Electrical, Procurement and Commissioning), Marketing & Sales, product integration, Service and Project Management. Currently working for Narhari Electrical Co Pte Ltd as Solar Energy Consultant since 2016. Institution Member Ships – Chartered Engineer & Member of -The Institution of Engineers India, Technical Member of The Institution of Engineers – Fiji.

MR. NAVIN SHANDIL
COMMITTEE MEMBER – SEIAPI

Navin Shandil joined Solar Hub Fiji in October 2022 and serves as Operations and Sales manager at Solar Hub Fiji. He has extensive specialized experience with large and small company's solar projects, Business development, installation, operation, and sales function. Currently he is leading the team in developing innovative business models that can accelerate sustainable energy access in Fiji with the goal to contribute to achieving that all Fijians have access to reliable Electrical Power supply through our renewable energy system and to achieve net zero emissions. He aims to create an environment of equal access to basic energy needs that can improve the social economic wellbeing of the Fiji citizen. He is a USP Graduate (Project Management) and also gained his qualification from FIT in Electrical Engineering.

MR. ATUL RATURI
COMMITTEE MEMBER – SEIAPI

Atul has worked in India, Kenya and the Pacific. He is engaged in teaching and researching in materials/devices/policies for solar energy development. He is also an adjunct AP at SPREE, UNSW. He has been a consultant to SEFP (WB), IUCN, ADB and UNEP among others. Atul is a member of Pacific Energy Advisory Committee and IEEE Senior Member. He has contributed to Fiji's Low Emissions Development Strategy (LEDS) Report, National Communications to UNFCCC and REN21 Global Status Reports. He is a strong supporter of energy for productive use and is a member of the UNDESA Expert Group on Energy's Interlinkages with Other SDGs.

MR. CLAYTON EIGENMANN
COMMITTEE MEMBER – SEIAPI

"Clayton is a dynamic executive with extensive multinational experience in renewable energy and infrastructure. Renowned for his reliability and enthusiastic professionalism, he has successfully led diverse teams in delivering high-profile energy solutions across the Americas, Caribbean, and the Oceania Region. Clayton's unwavering passion for sustainable development drives his entire career, supported by ISO/IEC 17024 accreditation as a renewable energy expert. With a remarkable track record, he proudly highlights the safe execution of over 1GW of renewable energy systems across various countries, cultures, and projects. Leveraging his expertise in EPC project delivery, operations, and business turnarounds, He has recently launched his consultancy, Eigena, focusing on driving sustainable energy and infrastructure developments, businesses, and initiatives."

MR. GEOFF STAPLETON
EXECUTIVE OFFICER - SEIAPI

Geoff specialized in solar (PV) energy in the final year of his electrical engineering degree in 1981and then went on to obtain his electrician's license. He joined BP Solar Australia in 1987. In 1989 he started his own company on the south coast of NSW where he designed, installed and maintained off grid power systems. In 1998 he was one of the co-founders of Global Sustainable Energy Solutions Pty Ltd (GSES) and currently the Director of International Training.

Geoff has played an active role on committees within the various Australian solar/sustainable energy industry associations since 1991; a Member of Standards Australia Working Groups since the mid 1990's and for 10 years was a member and later Chair of the Renewable and Sustainable Technical Advisory committee that oversaw the ongoing management of renewable energy training units in Australia. Geoff has been an accredited designer and installer since 1994.

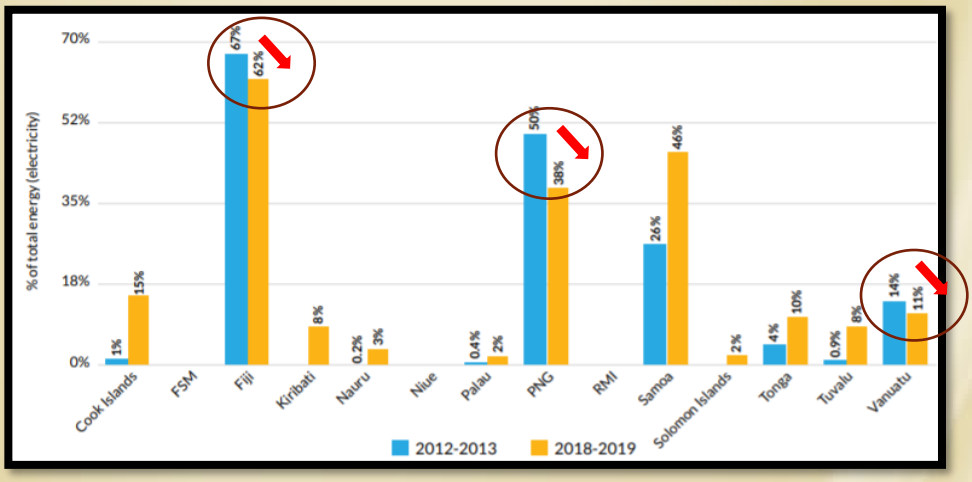
CHALLENGES WITH HIGH PENETRATION OF VARIABLE RENEWABLE ENERGY IN PACIFIC ISLAND COUNTRY UTILITY GRIDS

Janendra Prasad[1], Associate Professor Anna Bruce[2], Professor Iain Macgill[3], University of New South Wales

(This paper was presented at the 29th PPA Conference 2022 in Brisbane, Australia - 21-24 November 2022)

Pacific Island Countries and Territories (PICTs) have set ambitious goals to reduce carbon emissions and as a region have pushed hard for the climate change agenda on the global scene. However, renewable electricity uptake in the PICTs has been far less than required to meet national energy sector objectives despite significant efforts and investments over the past two decades, and countries still rely heavily on fossil fuels, which comprise up to one-third of the value of total imports.

There are many technical challenges associated with integration of high penetration variable renewable energy (VRE) into electricity grids, and there are significant knowledge gaps and a lack of coordinated efforts to support PICT utilities to address these issues. Currently, there are also very few published studies that look at the issues, challenges, and opportunities for grid integration of VRE specifically in this region.



The PRIF's 2021 Performance Indicators report shows that there has been no significant improvement between 2012-13 and 2018-19 on SDG Target 7.2 (RE as a percentage of total energy (electricity)) for some of the higher energy using countries such as Fiji, PNG and Vanuatu, as depicted in Figure 1, despite considerable investments in RE over the same period in these countries.

Figure 1. RE as a percentage of total energy (Electricity), Source: PRIF, 2021

The move towards achieving higher RE targets for the power sector and net zero goals will result in more renewable generation technologies connecting to these networks and integration will become more challenging as PICTs scale up VRE. Fluctuating load demand, limited flexibility of conventional power plants, generation capacity issues, and the need to implement more complex systems in order to operate, control, monitor, and manage the variability of VRE will pose challenges for power system operators in the PICT utilities. It is imperative for utilities to assess the operational and stability characteristics of the existing networks and understand the capability of their grid to accommodate renewable, intermittent generation. They will need to identify operational limitations and optimal range of power generation mix between existing and new generation to prevent adverse impacts and explore strategic reinforcements and other methods of increasing VRE penetration such as grid scale BESS for grid firming, peak shifting and spinning reserve capability. Without better long-term capacity expansion planning and

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[3] Professor Ian MacGill - School of Electrical Engineering and Telecommunications *www.eet.unsw.edu.au*, Collaboration on Energy and Environmental Markets *www.ceem.unsw.edu.au*, ARC Training Centre for the Global Hydrogen Economy *www.globh2e.org.au*, UNSW.

subsequently, adequate intervention strategies, it may be difficult to achieve the RE targets set by these countries and may be further exacerbated due to cross sector energy integration such as electrification of land transport, in future.

IRENA's Transforming Energy Scenario for the global scene shows the share of renewable in the power sector would need to increase from 25% in 2017 to 86% by 2050. Of the 85% renewable energy, the dominant technologies are Wind at 36% and Solar PV making up 22%.

Conventional power plants in PICTs include diesel and heavy fuel oil (HFO). Dispatchable renewable energy plants that can contribute to meeting PICTs targets include hydropower and biomass. VRE power generation includes solar PV, onshore and offshore wind.

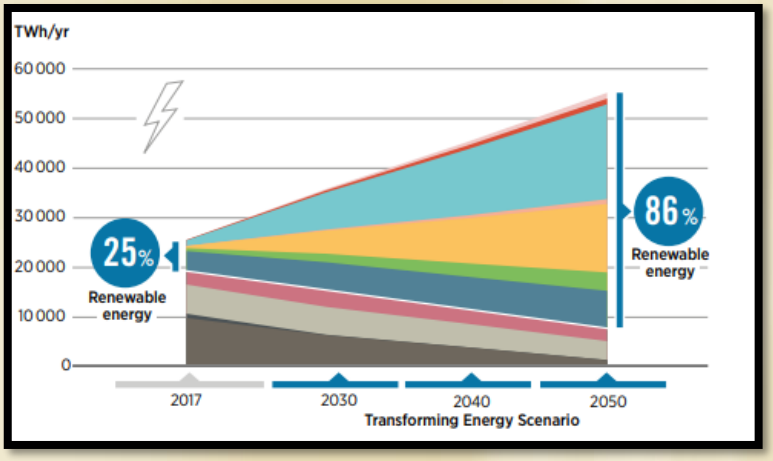
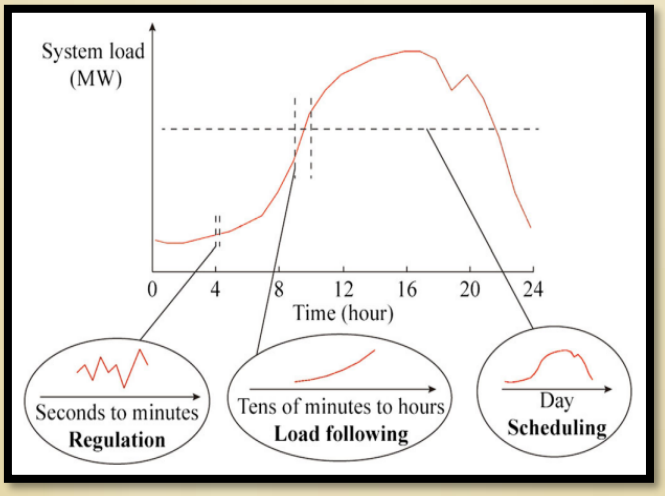


Figure 2. RE Composition in Future (2050), Source: IRENA, 2020

Operating a grid with VRE will be different from one based primarily on conventional power plants due to its variable nature and uncertainty in supply, since the generation depends on the sun shining or the wind blowing. Therefore, VRE is not available on demand ('dispatchable') and remains challenging to predict, despite increasingly accurate weather forecasting tools. Additionally, the generators are typically smaller in scale, often geographically isolated from load centers and distributed broadly across the electricity grid.



Contemporary power systems face uncertainties coming from multiple sources, forecast errors of load, wind and solar generation in addition to existing generation deviation and outage of generators, and unscheduled loss of transmission and distributions lines. With increasing amounts of wind and solar generation being integrated into the systems, if not managed appropriately, increasing variability and uncertainty can increase challenges for system balancing including maintaining reliability through scheduling and load following, regulation of system frequency and maintaining stability over seconds – minutes in the event of sudden loss of a large generator or line.

Figure 3. Balancing across different timeframes, Source: IRENA

Many of the PICT utility grids are small, islanded networks with very little inertia and support to maintain system stability and frequency. The generation that is connected to these networks may often lack appropriate controls to manage the system during disturbances which may also impact the overall stability of these grids. It is also not uncommon for the generation plant to run on its own OEM control system rather than be integrated into a centralized SCADA system. New VRE sources that are not integrated into a central SCADA system via appropriate communication using fiber or radio links, may not have the same level of visibility and controllability as the conventional power plant.

The characteristics of VRE generation present new challenges in different areas of grid operation and planning across different timescales:

Voltage Stability	Frequency Stability	Network Adequacy	Resource Adequacy
The voltage waveform and phase angle have to be maintained at all locations in the electricity system following disturbances.	The system frequency must be maintained within acceptable limits by instantly balancing supply and demand.	Adequate grid capacity is needed to transport electricity from generators to load centres.	Having sufficient portfolio of energy sources to match electricity demand with supply is essential for

			reliable operation of the power system

Timeframes in which system operators and designers need to act to meet these requirements.

Several strategies are available to address each of the timescale challenges. For instance, over planning timeframes, optimizing the siting of VRE sources considering the available capacity of the network as well as the best location from a generation yield perspective network will address the adequacy challenge. Furthermore, network adequacy can be improved by increasing the grid capacity of the transmission and distribution network, using storage options such as battery energy storage system (BESS), incentivizing local balance to match supply and demand locally; and reducing network congestion by curtailing generation from VRE in periods of high generation and low demand. Grid flexibility is defined as the capability of the electrical power system to cope with the variability and uncertainty of the renewable energy generation sources introduced at different (very short to long term) time scales. A power system is considered flexible if it satisfies several operational criteria such as meeting peak loads, maintaining the balance of supply and demand and avoiding curtailment, capability to ramp up and down and mitigate possible events to reliably supply customer demand, across all time scales.

Grid integration studies use available power system data to build and populate power system models for specific utility grids, validate the dynamic characteristics of existing generators, identify grid stability and reliability issues for different VRE penetration levels and various demand scenarios. Grid Integration and evaluation of SCADA and EMS systems has been completed for some of the PICT utility grids including FSM, Marshall Islands, Samoa, Tonga and Tuvalu under a World Bank funded project. These countries have also adopted a Grid Connection Code for Renewable Power Plants and Battery Storage Plants. The grid code stipulates the minimum connection requirements to maintain voltages and the frequency range of the island grids and how renewable energy generators could respond to grid disturbances and provide grid support capabilities. However, to operationalize the outcome of such studies will require interpretation of the recommendations into local context, careful planning, financial investments, and technology intervention which may not have been materialized due to lack of expertise and capacity constraints.

Energy models are useful mathematical tools based on the system approach and the best model should be determined based on the problem that decision makers endeavor to solve. Multiple considerations are used to frame the various power system modelling approaches. Figure 4 provides a summary of the distinguishing characteristics of modelling approaches. Energy planning and modelling needs to consider multi scales aspects (temporal and geographical), as well as the economic, technical, environmental, and social criteria.

Type	Time frame and resolution	Size	Network detail	Energy system integration	Example tools[1]
Short-term stability studies	Very short, high resolution	Local to multi-regional	Detailed transmission / distribution	No	PSS®E, OpenDSS
Unit-commitment and economic dispatch (UC-ED)	Medium length (months to years) and resolution (e.g. hour)	Regional to multi-regional	Typically low to medium detail	Possible	PLEXOS®, OSeMOSYS, TIMES, Balmorel
Capacity expansion and planning	Long (years to decades)	Regional to multi-regional	Medium to high detail	Possible	PLEXOS®, GE MAPS, OSeMOSYS, TIMES, Balmorel, OptGen, ReEDS
Household demand modelling	Short-medium (days to months)	Very small (e.g. single household or mini/microgrid)	None to moderate	Possible, e.g. household electricity and gas	

Figure 4. Summary of characteristics of modelling approaches Source: Hungerford, 2019

The Fifth Pacific Regional Energy and Transport Ministers' Meeting (PRETMM) with the theme of Accelerating Decarbonization in the Blue Pacific, was held in Port Vila, Vanuatu in May 2023. The meeting was attended by energy ministers, meads of energy departments, delegates from PICTs and representatives of regional and non-governmental organizations, development partners and private sectors. The meeting noted that while deployment of VRE presents important opportunities for PICTs, grid integration of VRE is technically complex and there is a lack of capacity and expertise in the region. The meeting also noted that there are currently only limited regional efforts to support the development of, and data and capacity to use, forward-

looking planning frameworks and tools, including Capacity Expansion Modelling (CEM) software, by PICT utilities and other regional stakeholders. Therefore, the Energy Officials called for development and use enhanced and tailored energy planning frameworks and capacity expansion tools for net zero outcomes, with a focus on future demand assessments, universal energy access, transitioning fossil fuel dependent sectors, meeting renewable targets, electrifying road transport/household/commercial uses and securing island grids with high variable renewable penetrations.

UNSW, in partnership with various CROP agencies and other development partners is currently leading a regional study to incorporate a broad set of experiences and perspectives from multiple energy sector stakeholders to enable detailed analysis of the barriers, challenges, and technical issues in the uptake of RE and integration of VRE into the PICT electricity grids. This study will identify current approaches to planning and modelling for capacity expansion in the region and the need for the development of improved planning frameworks and CEM tools to support regional net zero energy transition through higher penetrations of VRE in PICT utility grids. It is anticipated that the study outputs will benefit the region, enabling the PICTs to undertake future demand assessments, better techno-economic assessment, scenario modelling and strategic planning for increasing renewable penetrations towards achieving their 100% renewable energy goals.

Transition from fossil fuels to diversified RE sources will require multifaceted approach and concerted efforts from all stakeholders in the energy sector. Intervention strategies will need to include capacity building and long-term capacity expansion planning for better investment decisions to determine how energy policy can be achieved at least-cost, while maintaining energy security, resilience, and reliability in achieving the ambitious renewable energy goals and target in the Pacific Island region.

SEIAPI
Sustainable Energy

For more updates, please visit http://www.seiapi.com or email on info@seiapi.com/secretariat@seiapi.com for any queries and comments.

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