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Framework for Energy Security and Resilience in the Pacific (FESRIP) 2021–2030

Volume 1: The Framework





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Map of the Pacific Islands region



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Abbreviations and acronyms

ADB	Asian Development Bank
BAU	business as usual
BPS	Blue Pacific Strategy
CARICOM	Caribbean Community
CARILEC	Caribbean Electric Utility Services Corporation
CCES	climate change and environmental sustainability
CCREEE	Caribbean Centre for Renewable Energy and Energy Efficiency
COVID-19	Coronavirus disease caused by the virus SARS-CoV-2
CROP	Council of Regional Organisations in the Pacific
DSM	demand-side management
EE	energy efficiency
EU	European Union
EV	electric vehicle
ESWG	Energy Security Working Group
EWG	Energy Working Group
FAESP	Framework for Action on Energy Security in the Pacific: 2010-2020
FATS	Framework for Action on Transport Services: 2011-2020
FESRIP	Framework for Energy Security and Resilience in the Pacific
FRDP	Framework for Resilient Development in the Pacific
FRP	Framework for Pacific Regionalism
FTE	full-time equivalent
GEM	Geoscience, Energy and Maritime Division (SPC)
GEP	Georesources and Energy Programme (GEM, SPC)
GGGI	Global Green Growth Institute
GHG	greenhouse gas(es)
GIZ	Gesellschaft für Internationale Zusammenarbeit (German aid)
IEA	International Energy Agency
IPP	independent power producer
IRENA	International Renewable Energy Agency
JICA	Japan International Development Agency
MCST	Micronesia Center for Sustainable Transport
MFAT	Ministry of Foreign Affairs & Trade (New Zealand)
MTCC-Pacific	Maritime Technology Cooperation Centre – Pacific (SPC/SPREP)
MWh	megawatt-hour
NDC	nationally determined contributions (for GHG emissions reductions)

OPERA	Office of the Pacific Energy Regulators Alliance
PACRES	Pacific Adaptation to Climate Change and Resilience Building
PACTVET	Pacific Technical and Vocational Education and Training
PASO	Pacific Aviation Safety Organisation
PBSP	Pacific Blue Shipping Partnership
PCREEE	Pacific Centre for Renewable Energy and Energy Efficiency (SPC/Tonga)
PEGSAP	Pacific Energy and Gender Network Strategic Action Plan
PIC	Pacific Island country
PICTs	Pacific Island countries and territories
PIDF	Pacific Islands Development Forum
PIFS	Pacific Islands Forum Secretariat
PPA	Pacific Power Association as well as Power Purchase Agreement
PPP	public-private partnership
PPTF	Pacific Petroleum Task Force
PRDR SE4All	Pacific Regional Data Repository for Sustainable Energy for All
PRIF	Pacific Region Infrastructure Facility
PRP	Pacific Resilience Partnership
PRSD	Pacific Roadmap for Sustainable Development
RE	renewable energy
SAF	sustainable aviation fuel
SDGs	Sustainable Development Goals
SEIAPI	Sustainable Energy Industry Association of the Pacific Islands
SPC	Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
SOE	state-owned enterprise
TIC	Technical Implementation Committee (for CROP/PRIF review)
TOR	terms of reference
TWG	Technical Working Group
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
USP	The University of the South Pacific
WB	World Bank

Chair's message

I am privileged to write this message in my capacity as the current Chair of the Pacific Energy Ministers' Meeting, and equally, as Samoa's Minister for Finance and also responsible for energy.

I would first like to acknowledge the foresight of the Pacific Energy Ministers for endorsing the development of the *Framework for Energy Security and Resilience in the Pacific (FESRIP) 2021–2030* during the 4th Energy Ministers Meeting, held in Apia, Samoa in 2019. Secondly, I wish to recognise the efforts of the members of the Council of Regional Organisations in the Pacific (CROP), namely, the Pacific Community (SPC), the Pacific Islands Forum Secretariat (PIFS), the Secretariat of the Pacific Regional Environment Program (SPREP), the University of the South Pacific (USP) and the Pacific Power Association (PPA), who have worked tirelessly in steering the development of FESRIP, replacing the *Framework for Action on Energy Security in the Pacific (FAESP) 2010–2020*. I am also grateful to the support provided by the Pacific Region Infrastructure Facility (PRIF) and the United Nations Development Programme (UNDP) in this initiative.

The Pacific Island countries and territories (PICTs) are committed to transforming their energy sector from fossil fuel-based to clean, reliable and affordable renewable resources, and have taken significant efforts to make this transformation a reality. However, despite considerable investment in renewable energy for electricity generation and efforts to improve the efficiency of energy use, petroleum still provides about 80% of the region's commercial energy. This demonstrates that energy sector challenges for CROP agencies and PICTs are considerable and the road ahead will not be easy. PICTs will require the assistance of development partners, academic institutions, the private sector and civil society organisations to address these challenges and realise this transition.

With the adverse impacts of climate change-induced natural phenomena such as cyclones, typhoons and storm surges on energy infrastructure in the Pacific Islands region, the PICTs will work collaboratively with partners to reduce damage from these events and to ensure the resilience of these critical assets. FESRIP will guide PICT regional energy development in the next decade. As envisioned by the energy ministers, this framework will be a regional vehicle for accelerated progress on the Sustainable Development Goals (SDGs), SAMOA Pathway, nationally determined contributions (NDCs) and energy roadmaps; and is supportive of the *2050 Strategy for the Blue Pacific Continent* and the Kainaki II Declaration.

As current Chair of the Pacific Energy Ministers' Meeting, I am confident that SPC, PIFS, SPREP, USP and PPA will work collaboratively with PICTs and other development partners to successfully implement FESRIP. This will provide an assurance that anticipated sustainable energy solutions will be realised in the region.

I commend this framework to you.



Hon Sili 'Epa Tuioti

Chairperson, 4th Pacific Energy Ministers Meeting; and
Samoa Minister for Finance

Foreword

Energy is key to the achievement of the 2030 Agenda for Sustainable Development and the Paris Agreement on climate change. Collectively, Pacific Island countries and territories (PICTs) are champions of the transition to renewable energy and are doing all they can to contribute to the global effort under Sustainable Development Goal (SDG) 7 to: 1) ensure universal access to affordable, reliable and modern energy services; 2) increase substantially the share of renewable energy in the global energy mix; and 3) double the global rate of improvement in energy efficiency.

PICTs are cognisant of the fact that universal access to secure, robust, sustainable and affordable electricity, transport fuel and household energy services is crucial for their sustainable development efforts and that energy supplies must be resilient to climate change and natural disasters and increasingly supplied by renewable resources, with improved energy efficiency, upgraded energy infrastructure and improved technologies. Notwithstanding the challenges of limiting global warming to 1.5°C by 2050, PICTs will continue working with partners and interest groups to realise this principal goal of the Paris Agreement. In their resolve to contribute to this goal, PICT energy ministers have reaffirmed their commitment to 100% renewable energy generation for the Pacific Islands region.

Despite their negligible contribution to global greenhouse gas emissions, PICTs will experience some of the most severe adverse impacts of climate change. The leadership role Pacific leaders have played, and are continuing to play, in raising the plight of the Pacific people and advocating for global climate action at the international stage is more critical than ever.

However, the 2020 Tracking SDG7 Progress Report reveals that far greater commitment and action is required to meet the SDG7 targets by 2030. The context in which PICTs import, produce, use and manage energy in the 2020s and beyond will be different from the previous decade. The region now faces even more serious challenges, including: 1) severe climate change impacts on energy infrastructure; 2) continued heavy dependence on petroleum fuel during a period of expected global energy market transformation and potential dislocation; 3) continued uncertainties and the negative social and economic impacts of COVID-19; and 4) the extension of affordable clean energy services to communities currently poorly served.

Consequently, PICTs have put in place and implemented relevant energy roadmaps and policies to address these challenges. It is critical for development partners to devise mechanisms that will support PICTs in achieving their respective energy transition goals. Pacific leaders prioritised energy security over the last decade through the development and implementation of the *Framework for Action on Energy Security in the Pacific (FAESP) 2010–2020*, which enabled Council of Regional Organisations in the Pacific (CROP) agencies to provide the necessary support to PICTs. This commitment has continued with energy ministers endorsing the development of the *Framework for Energy Security and Resilience in the Pacific (FESRIP) 2021–2030* to replace FAESP.

It is anticipated that FESRIP, developed by the Pacific Community (SPC) in collaboration with the Pacific Island Forum Secretariat (PIFS), the University of the South Pacific (USP), the Secretariat of the Regional Environment Programme (SPREP), the Pacific Power Association (PPA), the Pacific Regional Infrastructure Facility (PRIF) and the United Nations Development Programme (UNDP), in consultation with PICTs and other partners, will strengthen the collaboration among partners and with PICTs. Unlike its predecessor, FESRIP consists of two volumes: Volume 1 is the Framework; and Volume 2 covers the energy background and issues in the Pacific and is aligned to relevant international and

regional frameworks. With a total of 23 priority areas, FESRIP has brought to the fore current and emerging energy issues that are confronting the Pacific region and will need to be addressed in the next decade.

All these issues will require significant capacity, resources, investment and coordination to address. The five relevant agencies from CROP (SPC, PIFS, USP, SPREP and PPA) have agreed to jointly own and implement this framework. FESRIP will prove to be an invaluable and forward-looking roadmap for PICTs in tackling the energy challenges that will be confronting the region in the next decade. Further, FESRIP will provide much-needed guidance for other development partners to come on board and contribute to the energy transition of PICTs.

This framework complements similar international and regional regulatory arrangements in place such as the SDGs, the SAMOA Pathway, the *Framework for Resilient Development in the Pacific*, and the *2050 Strategy for the Blue Pacific Continent*, and together they will provide an assurance that energy security and resilience will be realised in the Pacific Islands region in the next decade.

We commend this framework to you.



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Director General
Pacific Community



Mr Kosi Latu
Director General
Secretariat of the Pacific Environment Programme



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Executive summary

The context in which PICTs import, produce, use and manage energy in the 2020s and beyond will differ from 2010 when the previous 10-year framework began. The region faces even more serious challenges, including: severe climate change impacts on energy infrastructure; continued heavy dependence on petroleum fuel during a period of expected global energy market transformation and potential dislocation; continued uncertainties and negative social and economic impacts due to COVID-19 and potentially, further pandemics; and the extension of affordable clean energy services to communities currently poorly served. The region is also experiencing a number of opportunities, including: rapid advances in renewable energy (RE) and energy storage technologies alongside declining prices; growing experience with independent power producers; progress in low-carbon transport technologies; scope for cost-effective energy efficiency (EE) improvements; potentially significant green finance; and a growing number of Pacific organisations and centres with energy initiatives. These influence priorities for an effective approach within a new post-pandemic 'normal' in delivering improved access to affordable, reliable, sustainable and secure clean energy services. This framework focuses on key changes that CROP partners – particularly SPC, PPA, SPREP, USP and PIFS – agree to implement in order to function as an effective regional partnership for action to address the sector's challenges.

The Framework for Energy Security and Resilience in the Pacific (FESRIP) 2021–2030 consists of two volumes:

Volume 1 is a concise statement of broad principles and procedures to guide the relevant CROP agencies in establishing more detailed policies, actions and goals that are appropriate for a regional approach to the development and implementation of a coordinated and collaborative CROP regional energy framework.

Volume 2 consists of a series of issues and background papers that provide more detailed context and analyses, and a broad programme of regional action to address the key issues. Additionally, six annexes provide background information, including a brief overview of the review of the 2010–2020 regional energy framework, the mandate for CROP's lead energy agency, a summary of consultations, and matters raised by reviewers.

Drafts of both volumes have been widely circulated for review within CROP agencies, by development partners and by PICT energy offices, power utilities, climate change offices, civil society, private sector organisations, and others. The result is consistent with energy ministers' decisions and is aligned with the current concepts of Pacific regionalism as agreed by Forum Leaders.

Overall, the focus of FESRIP 2021–2030 is on actions that will assist PICTs to address their own energy sector priorities, with a strong emphasis on improving energy sector robustness and resilience to adverse climate change and natural disasters and achieving the long-term goal of universal access to secure, robust, sustainable and affordable electricity, transport fuel and household energy services that are increasingly supplied by renewable resources, with improved EE, upgraded energy infrastructure and improved technologies.

| Energy sector issues and opportunities for the Pacific Islands

The proportion of financial support from development partners provided directly to Pacific Island countries (PICs) is expected to increase rather than flow through regional organisations, which creates challenges for obtaining adequate resources for effective regional actions. Despite considerable investment in RE for electricity generation and efforts to improve the efficiency of energy use, petroleum still provides about 80% of the region's commercial energy. In 2017, electricity generation was 72% petroleum-based and transport essentially 100%. PICs have very ambitious nationally determined contributions (NDCs) commitments to reduce energy-sector carbon emissions and have endorsed a range of Sustainable Development Goals (SDGs) with links to energy. "However, globally, business-as-usual projections suggest an increase in surface temperature of over 3°C by 2050, which would have devastating effects on island states, their economies and their energy infrastructure." Opportunities include greater political commitment to RE, EE and climate change mitigation through ambitious targets, and national energy policies focussing on sustainability and improved energy access. Further opportunities include recognition of energy as an enabler to the achievement of various societal goals such as the SDGs (for example, SDG7's importance for achieving the other SDGs), and reforms such as new legislation and the establishment of energy regulators, transformation of state-owned enterprises (SOEs) from fossil fuel to RE and energy service providers, improved investment prospects for those PICs with limited access to electricity, and potentially, lessons learned from COVID-19.

At least eight new Pacific centres, organisations or programmes with a strong energy component have been established since the previous framework in 2010. This proliferation could worsen issues with coordination and collaboration among them, hampering the effectiveness of this framework at a time when collaboration is vital; however, it also provides opportunities for specialisation and synergies, especially as most have direct links with one or more CROP agency.

Energy infrastructure can be expected to have a lifetime of 30 years or more if well maintained. Considering the expected serious impacts of climate change unless global emissions are rapidly and significantly reduced, this framework prioritises support to the development and management of robust climate-resilient and disaster-resilient energy infrastructure, beginning immediately.

| The evolving context of regionalism in the Pacific

The changing perspectives of regionalism in the Pacific have implications for the nature of a new regional energy framework. FESRIP 2021–2030 is broadly consistent with the following: 1) the 2014 *Framework for Pacific Regionalism* (FPR), which emphasises the sovereignty of national governments in deciding regional priorities; 2) the 2017 *Pacific Roadmap for Sustainable Development* (PRSD), with guidance for a coordinated regional response for the achievement of the 2030 Agenda and the SDGs; 3) the *Framework for Resilient Development in the Pacific* (FRDP), a voluntary 2017–2030 regional guideline for sectoral action to address climate change and disaster risk management, including a low-carbon development goal; and 4) the 2017 *Blue Pacific Strategy* and the development of a *2050 Strategy for the Blue Pacific Continent*, to be presented at the 2021 Forum.

| Institutional changes and management mechanisms for the energy framework

Energy sector challenges for CROP agencies and PICTs are considerable. FESRIP 2021–2030 provides a basis for not only real coordination among the relevant regional bodies but also promotes proactive and ongoing energy-sector collaboration among them and with regional and international agencies through a broad range of energy actions that are appropriate for cost-effective implementation in a regional approach. This does not prevent CROP agencies from advising individual PICTs on a range of national energy issues or implementing national programmes if requested to do so by the PICTs. PICT officials would like support through bilateral and regional efforts to be complementary, consistent and better coordinated.

| Energy initiatives appropriate for a regional approach

Energy actions or initiatives that can be effectively delivered to PICTs through regional assistance have been arranged in six broad categories: 1) Energy Policy, Planning and Capacity Development, 2) Energy Sector Finance and Cooperation; 3) Sustainable Electric Power Development; 4) Low-carbon Transport Energy; 5) Improved Energy Efficiency; and 6) Petroleum and Other Liquid Fuel Services.

Overview of the 2021–2030 regional energy framework

Long-term goals Universal access to secure, robust, sustainable and affordable electricity, transport fuel and household energy services that are resilient to climate change and natural disasters, and are increasingly supplied by renewable resources, with improved energy efficiency, and upgraded energy infrastructure and improved technologies.

Key parties The framework guides the regional energy sector activities of CROP agencies with significant energy sector activities: SPC (lead), SPREP (environmental aspects of energy, including climate change), PPA (power utilities) and USP (education, training and research), along with PIFS (regional policy alignment). Development partners and non-CROP regional organisations will be encouraged to align and coordinate their energy sector actions with the framework.

Priorities and sovereignty National governments are sovereign in deciding regional energy sector assistance priorities. Actions within the framework will assist PICTs to develop and implement their own key national energy sector priorities and goals as expressed in national energy policies, development policies, NDC commitments, etc.

Regional activities The framework prioritises actions that can be effectively implemented at a regional or multi-country level and which enhance energy security, reduce carbon emissions, and improve resilience in the energy sector to climate change and natural disasters. The broad energy actions or initiatives that are deemed most appropriate to be delivered to PICTs effectively through regional assistance are: 1) Energy Policy, Planning and Capacity Development; 2) Energy Sector Finance and Cooperation; 3) Sustainable Electric Power Development; 4) Low-carbon Transport Energy; 5) Improved Energy Efficiency; and 6) Petroleum and Other Liquid Fuel Services.

Time frame The framework is for 2021–2030 but addresses expected issues over a 30-year timeframe.

Review, update and evaluation There will be a formal review of the framework and its activities no later than 2025, with the framework updated if the findings so recommend. Furthermore, it will be independently evaluated in 2030.

Work planning and reporting

As activities will depend on PICT requests, evolving PICT priorities and available resources, there will be no formal detailed work plan. However, SPC (with CROP partners) will prepare and update every two years a brief outline of anticipated priorities and key work planned under FESRIP. SPC (with CROP partners) will prepare a consolidated progress report every two years.

Role of lead CROP energy agency

The 2010 SPC regional energy mandate remains unchanged unless, and until, updated by energy ministers. The key role is providing leadership for, and improving the profile of, energy as a key priority sector in the region. Responsibilities (edited for brevity) include:

- appointment of a dedicated long-term senior energy position not dependent on project funding;
- analysis of energy sector trends, issues and challenges, and identifying opportunities for strategic engagement;
- proactive energy sector social, economic and policy research and analysis;
- coordination of regional energy work plan with appropriate monitoring and evaluation;
- comprehensive, coordinated and shared data collection, analysis and dissemination;
- development and sustaining of common energy data and information system;
- being a focal point for development partner interaction and resource mobilisation; and
- establishment and facilitation of mechanisms to involve key energy stakeholders in analyses of emerging challenges and opportunities, plus oversight, decision-making and/or management of energy sector issues.

Oversight

The heads of the relevant CROP agencies (SPC, PPA, SPREP, USP, PIFS) officially endorse this framework and will provide oversight, including ensuring that the following take place:

- alignment of their energy activities with the overall regional framework;
- regular information exchanges, coordination and collaboration, including, where practical, joint development and implementation (two or more CROP agencies) of specific activities; and
- joint monitoring, evaluation and periodic reporting (every two years or as otherwise agreed) of activities undertaken within the framework.

Information sharing, coordination and collaboration

Framework implementation will be facilitated by a CROP Energy Technical Working Group (ETWG). The main functions of the CROP ETWG are information sharing, coordinating and collaborating, including joint agency implementation, where practical. It will meet at least quarterly and report to heads of CROP.

Advisory mechanism

An Energy Security Working Group (ESWG) consisting of representatives from a wide range of stakeholders has been established. Among other tasks, it will assess progress and provide advice, including priority actions. The ESWG will contribute to the Pacific Resilience Partnership (PRP) and function as a PRP Technical Working Group on low carbon development. It will meet at least annually.

1 Introduction

This framework was prepared over two phases during 2019 and 2020–2021:

The first phase was an independent review of *Towards an Energy Secure Pacific: A Framework for Action on Energy Security in the Pacific* (FAESP) 2010–2020, completed in October 2019 and published in early 2020. An earlier draft was considered by the region’s energy ministers during the 4th Pacific Regional Energy and Transport Ministers’ Meeting held in Apia, Samoa in September 2019, and finalised the following month. Ministers called for the development of a new framework to guide PICT regional energy development during the next decade. The review findings are not discussed in this volume but are briefly summarised in Volume 2.

The review can be downloaded from PRIF at:

https://www.theprif.org/sites/default/files/documents/faesp_report_final_0.pdf

or SPC at:

http://prdrse4all.spc.int/sites/default/files/faesp_report_finalnew.pdf

The second phase was the development of the new FESRIP 2021–2030, with strengthened links to existing and future Pacific Island energy sector development plans and policies. Draft versions of this framework (both Volumes 1 and 2) were available in October 2020 and they were finalised in March–April 2021. The new framework builds on the achievements and lessons learned from FAESP and its implementation plan and has benefited from extensive consultations. Although the new framework is formally limited to a 10-year duration, decisions made in 2021 will affect energy imports, management, use, costs, reliability and security well beyond 2030, and thus the framework considers energy sector issues, challenges and opportunities that will have impacts for three decades or more, the lifetime of much energy infrastructure.

2

Emerging energy sector issues and opportunities for the Pacific Islands

The context in which the PICTs will plan, import, manage, produce and use energy in the 2020s and beyond will differ significantly from that of the 2010–2020 framework period, with serious challenges facing PICT governments, power utilities, regulators, transport companies, CROP agencies, development partners and the public. Some key issues in the 2020s and beyond are summarised below with more detailed coverage, including references, in the various papers of Volume 2.

Climate change impacts. Adverse climate change impacts are an overriding issue with serious energy sector implications for the region. Notwithstanding that the global efforts are highly unlikely to limit global warming to 1.5°C by 2050, PICTs have resolved to continue working with partners and interest groups to realise this principal goal of the Paris Agreement. Energy systems are typically built to operate for 30 years or more, but some PICT energy infrastructure plans and technical decisions implicitly assume that the climate conditions of today will be similar in the future. Designing, locating and building more robust energy systems now for improved flood and storm surge resilience, and for more destructive cyclones and sea level rise is essential. Energy policy, planning and implementation need to routinely address uncertainty and the changing risks.

Inadequate data and energy security indicators. In recent years, there has been some improvement in the collection of energy data, which are generally good for the power sector (the main grid supply of national or state utilities), reasonably good for a limited number of (mostly urban) household energy surveys, poor for transport and miscellaneous fuel use, and poor for rural energy use in general, whether off-grid power or biomass for cooking. Data for energy security indicators need to be improved. The relevant CROP agencies (SPC, PPA, SPREP and USP) need, and are seeking, substantial ongoing support for data collection, analysis and sharing, which are required for effective decision making and monitoring of progress.

Petroleum dependence. PICTs remain highly dependent on imported petroleum fuels, accounting for about 80% of the region's commercial energy use in 2017, about the same as in 2000. Of the 80%, about 52% is for transport, 37% for electricity generation and 12% for miscellaneous use. Petroleum will continue to dominate commercial PICT energy use for some years, during a period of expected global volatility in the industry, possibly less secure supply, and likely wide price fluctuations. In recent years, it appears that the ability of PICTs to negotiate, implement and monitor good fuel supply contracts has declined, and coastal bulk storage facilities – often near heavily-populated areas – are increasingly vulnerable to fuel spills and damage from rising sea levels and natural disasters. PICTs need improved capacity to secure fuel at fair prices and to properly maintain fuel storage and distribution facilities.

Progress in energy technologies and their cost. In 2010, the life-time costs of RE technologies (electricity, transport and other) were often more expensive than conventional petroleum-fuelled systems. RE production and energy storage technologies are advancing rapidly, with costs steadily declining both globally and in the Pacific. There are numerous cost-effective RE opportunities for PICTs.

Renewable electricity progress. Implementation of renewable electrical energy in PICTs has been far less than required to meet national energy sector objectives, including NDC goals to reduce carbon emissions. Overall, electricity generation was 72% reliant on petroleum fuels in 2000 and this remained unchanged in 2017, ranging from 63% in Melanesia and 75% in Polynesia, to 96% in Micronesia. Despite considerable investment in RE, PICT electrical energy security overall has not appreciably improved in the past twenty or so years as petroleum-fuelled generation grew at the same rate. Improved security requires a transition away from fossil fuels, with more diversification of supply and considerably more finance in an uncertain future.

Energy efficiency progress. PICT progress in demand-side (consumer) EE has been quite limited despite some positive efforts in electrical appliance efficiency standards and regulations, lighting within buildings, and policies meant to improve EE. There are numerous cost-effective EE opportunities. Reducing reliance on petroleum requires more EE finance, new regulations such as building energy standards, and financial incentives such as for utility demand-side management.

Energy for transport. The PICT transport sector (land, marine and air) remains essentially 100% petroleum-fuelled. Globally, electric vehicle (EV) technologies and wind-marine propulsion are progressing steadily; however, in PICTs, a shift to low-carbon transport is expected to be slow and challenging for officials, the transport industry (ground, sea, and air), and power utilities. Widespread electrification of ground and marine transport requires considerably expanded generation capacity (preferably RE), widespread reliable and affordable electricity in urban and rural centres and outer islands, appropriate environmental management (for example, battery system disposal), and a network of charging facilities on the main islands and in remote locations. Cost-effective wind propulsion is an available and mature technology which can be re-integrated into maritime transport.

Gender and energy. Women account for half of the brainpower in the region; however, despite significant improvements in recent years, they remain poorly represented in the energy sector, ranking poorly globally. There are opportunities to better develop Pacific women as energy professionals, which will be implemented through the *Pacific Energy and Gender Network Strategic Action Plan (PEGSAP) 2020–2030*.

Pandemic impact. COVID-19 has delayed implementation of some planned RE and other energy systems in PICTs as energy system components are often unavailable and/or cannot be quickly shipped by suppliers to the Pacific or within the Pacific. COVID-19 has also severely damaged some Pacific economies, particularly those highly dependent on tourism, and caused considerable financial stress to some power utilities (for example, as customers cannot easily pay their bills, energy demand drops) and to Pacific national airlines. The pandemic is not expected to slow investment in RE globally in the medium to longer term. However, longer-term impacts could include a lower 'normal' level of tourism generally, government and development assistance resources diverted from energy to other sectors, and potentially further global pandemics, with serious impacts on PICT economies and the ability to finance investments, including in the energy sector (for example, expanding reliable and affordable energy services to communities that are poorly served).

Proliferation of regional energy centres. There are at least eight organisations or centres in the Pacific with significant regional or sub-regional energy-sector activities, far more than a decade ago. These are:

- 1)** the Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE) in Tonga, hosted by SPC and the Tonga government;
- 2)** the Pacific Climate Change Centre (PCCC) at SPREP in Samoa;
- 3)** the Maritime Technology Cooperation Centre Pacific (MTCC), hosted by SPC and SPREP;
- 4)** the Pacific Centre for Environment and Sustainable Development (PACE-SD), at USP in Fiji;
- 5)** the Micronesian Center for Sustainable Transport (MCST), a collaboration between the Marshall Islands and USP;
- 6)** the Office of the Pacific Energy Regulators Alliance (OPERA), to be based at SPC with initial ADB support;
- 7)** Energy Fiji Ltd's regional power utility training centre, affiliated with PPA; and
- 8)** the Regional Pacific NDC Hub based at SPC in Fiji, with 15 PICT members and five international and regional partners.

In this context, coordination of regional PICT energy efforts may become more difficult, particularly where there is competition for limited resources, although there are also opportunities for specialisation and synergies as all but one are affiliated with CROP agencies (SPC, SPREP, PPA, USP). The CROP agencies will endeavour to resolve any coordination issues and to achieve joint implementation where practical.

Overall, framework actions from 2021 to 2030 will endeavour to effectively address the above issues, consistent with a regional approach and national priorities.

3

The evolving context of regionalism in the Pacific

A regional approach to Pacific sectoral development which was considered appropriate a decade ago may not be so today. The evolving context of regionalism in the Pacific has implications for the nature of a new regional energy framework.

FPR and PRSD FPR was adopted by Forum Leaders in 2014 and emphasised the sovereignty of national governments, not regional bodies, in deciding regional priorities. The 2017 PRSD was endorsed by leaders to guide a coordinated regional response for the achievement of the 2030 Agenda and the SDGs within the context of PICT national plans and priorities, the 2004 SAMOA Pathway and FPR. Sectoral regional policies and activities such as energy are to be consistent with, and subordinate to, the overall PRSD.

FRDP FRDP 2017–2030 is a regional guideline for action at the sectoral level to address the cross-cutting issues of climate change and disaster risk management. One of the three FRDP goals, Goal 2 Low Carbon Development, aims to contribute to more resilient energy infrastructure and increase energy security, while decreasing net emissions of greenhouse gases (GHGs) through RE and increased EE. Although voluntary, it has become a useful regional coordination mechanism. Management arrangements include a PRP support unit (comprising PIFS, SPC and SPREP) and a taskforce (comprising representatives from governments, development partners, academia, civil society and the private sector). The purpose of the support unit is to “support the efficient and effective functioning of the different elements of the PRP governance arrangements” and the taskforce’s is developing resilience standards, a FRDP M&E framework, and a system of PRP affiliation for entities at the regional, national and sub-regional levels. To the extent practical, the new energy framework will work within FRDP mechanisms, specifically through the Energy Security Working Group (ESWG). Among others, for reasons of efficiency and effectiveness, the ESWG will function as a PRP Technical Working Group on low carbon development.

The Blue Pacific Strategy In 2017, Forum Leaders endorsed the ‘Blue Pacific’ identity as the core driver of collective regional action and at the 2019 Forum, the region’s leaders endorsed the development of a *2050 Strategy for the Blue Pacific Continent*, of which a draft is to be presented to leaders at the 2021 Forum. In 2019, PICT energy ministers “agreed to develop and align the regional energy framework to the *2050 Strategy for the Blue Pacific Continent*.” The Blue Pacific approach emphasises the use of existing mechanisms – aligning with and seeking to build off existing regional and international mechanisms, processes, and meetings – not developing new or sector-specific approaches.

All framework actions and mechanisms will be consistent with the evolving understanding of Pacific regionalism as decided by the leaders.

4

Considerations for an effective regional energy framework

There is not always a clear distinction between PICT frameworks, roadmaps, strategies, action plans or policies. This section clarifies the extent and limitations of the 2021–2030 energy framework, the organisations guided by the framework, and the areas it does not fully address.

4.1

Frameworks versus policies and plans

A framework is a set of principles and long-term goal(s) that form the basis for developing guidelines and provides overall direction for planning appropriate initiatives. Unlike a plan, it does not require an agreed end-point or comprehensive set of activities that have to be implemented for the goals to be achieved. This framework sets out long-term goals and the broad path to get there, including principles, processes and management arrangements.

- FESRIP 2021–2030 does not include an associated detailed energy implementation plan by CROP agencies and none is recommended. Instead, detailed work-planning, such as medium-term strategic plans and annual work plans, will be done by the individual CROP agencies based on FESRIP 2021–2030, including the Priority Energy Initiatives (refer to section 6.2).
- FESRIP 2021–2030 has been developed by and for those CROP agencies with extensive energy sector activities and will guide CROP regional (multi-country) energy sector actions, although the approach is relevant to some single-country energy assistance efforts as well.
- Activities within FESRIP 2021–2030 will depend on changing PICT requests, evolving PICT priorities, and available CROP agency resources for energy sector assistance. As mentioned above, there will be no formal detailed FESRIP implementation or work plan. However, to help guide individual CROP agencies' short-term planning and keep the PICTs informed, SPC with its CROP partners will prepare and update every two years a brief outline of anticipated priorities and key work.

4.2

Financing and staffing for FESRIP

At a time of economic crisis in the region, seriously constrained short-term budgets of CROP agencies, expected changes in the timing and amount of development finance, and changing sectoral priorities of the development community, it is not practical to estimate the financial resources likely to be available for developing and implementing the long-term regional energy support effort that is FESRIP. However, this is a ten-year endeavour and CROP partners will immediately consider ways to acquire sufficient funds over the next several years, an effort which has already begun.

Excluding administrative, finance, programme assistants and junior professional staff, and omitting transport energy, CROP agencies had about 11 full-time or full-time equivalent (FTE) professional staff dealing with energy in October 2020. The distribution was approximately as follows (varying as contracts end): SPC seven, including PCREEE; PPA two; USP one and a half; and SPREP a half. All in all, far fewer than CROP staff dealing with climate change, agriculture, fisheries, health and other key issues or sectors. This appears to be under half of the number justified for current challenges and those of the next decade. A 2008 SOPAC study, *Coordination & Implementation Mechanisms for Regional Energy and Pacific ACP EDF–10 Energy Initiatives* proposed at least 15 professional staff to handle the then smaller regional energy programme, including six new positions (energy coordinator, energy economist and financial specialist, technical specialist, EE specialist and others). The 2011 *FAESP Implementation Plan* counted at least 21 full-time positions (professional and support) employed at CROP agencies who were contributing to the implementation of the 2010–2020 energy framework, FAESP.

There are insufficient data to quantify the size of the region's energy sector as nearly all economic and social activity has an energy component. PICT petroleum fuel imports are roughly USD 2.3 billion per year (assuming USD 0.45/litre average landed cost) and investment in renewable electricity generation, excluding hydropower, requires about USD 0.5 billion annually. Fiji and the Marshall Islands co-chair the Pacific Blue Shipping Partnership (PBSP), a country-owned and driven effort with a plan to secure USD 0.5 billion in blended finance to decarbonise domestic shipping in participating Pacific countries. Even excluding significant investment in electricity transmission and distribution, non-RE power generation, biomass energy and funding to transition transport away from petroleum, PICT energy is a USD 3 billion per year sector, and likely over triple this in total. The private sector accounts for much of the region's energy sector planning and investment but CROP agencies require considerably more resources to effectively assist the PICTs in dealing with energy.

- CROP agencies will endeavour to double professional staff levels dealing with energy issues over the next several years, along with adequate support staff, as resources allow.
- Considering financial gaps, specialists in fund raising and proposal writing will be engaged as soon as practicable.

In the past, CROP agencies (most recently SPC, previously SOPAC and PIFS) provided valuable petroleum advisory services, the cost of which is only justified on a regional basis but which is difficult to finance currently through regional support. Although documentation is limited, it is estimated that PICTs have saved up to USD 10 for every dollar spent providing the service. In 2019, during the 4th Pacific Regional Energy and Transport Ministers' Meeting, the region's energy ministers "recognised the need to strengthen the regional petroleum advisory service to better serve the needs of PICTs and called on development partners to immediately assess and support the delivery of this regional petroleum advisory service."

- A concerted effort will be made to obtain financial support to engage a petroleum specialist adviser as soon as practicable.
- Depending on PICT priorities, other specialist staff will be engaged, as resources allow.

In 2019, during the 4th Pacific Regional Energy and Transport Ministers' Meeting, energy ministers considered the sustainability of the regional energy advisory service and "noted the importance of data for evidence-based policies and reporting and the new funds that are required for the Pacific Regional Data Repository (PRDR) and energy efficiency." Energy ministers also "called for concerted efforts by PICTs, development partners and the private sector to undertake studies and development of bio-energy, geothermal, ocean energies and waste resources, and to adopt new and emerging technologies, to increase the renewable energy mix solution in PICTs." Furthermore, energy ministers called for enhanced capacity building in sustainable energy and encouraged PICTs to "make use of educational pathway opportunities on sustainable energy ... including regional qualification certificates and diplomas." Finally, energy and transport ministers jointly "agreed to work towards ambitious ... targets for domestic shipping ... to reduce GHG emissions by 40% in 2030 and 100% by 2050."

Assisting PICTs to progress toward the above, and other energy objectives, requires considerable finance. It would be easier for the region to attract substantial support if there were mechanisms for co-financing with the PICTs. Some years ago, there was brief consideration of a regional energy financing mechanism through a moderate levy on all petroleum fuel imported to the region. A charge of USD 0.01/litre on retained imports (2017 volumes and costs) would raise nearly USD 50 million per year if all PICTs participated, or over USD 20m if only Forum Island countries took part. This could sustain a significant regional energy assistance effort and provide substantial funds for co-financing to raise additional resources. However, this specific approach may be impractical; in effect, the larger consumers, PNG and Fiji, would be asked to subsidise the smaller consumers. If non-Forum members participated, Guam and New Caledonia would also be subsidising the others.

- CROP FESRIP partners will vigorously explore options for a substantial increase in financial resources for implementing this framework, including possible support from PICTs to attract substantial co-financing.

4.3

The regional Pacific NDC Hub

There is a regional Pacific NDC hub office based at SPC in Fiji, currently supported by the German, New Zealand, UK and Australian governments, and implemented by GIZ, SPC, SPREP and GGGI. Energy framework actions will be coordinated with the Hub as:

- 1) it is developing NDC roadmaps, investment plans, and/or project profiles for PICs;
 - 2) the Pacific NDC commitments are, thus far, almost entirely in the electricity sector, but include, for several countries, transport energy use;
 - 3) the Hub mechanism works closely with climate change offices and thus far there seems to have been only limited coordination with energy offices and power utilities; and
 - 4) eventually, substantial climate change funding for the energy sector may be available for PICs. Mitigation actions limit or reduce GHG emissions, thereby reducing future impacts of disruptive climate change. Adaptation actions reduce vulnerability to the actual or expected consequences of climate change, thus improving resilience to those effects. Although the NDC actions are mostly limited to climate change mitigation, considerable PIC investments will be required for climate change adaptation and in many cases the necessary actions coincide or overlap.
- Energy framework actions will include technical advice to the region's NDC implementation efforts and close cooperation with the Hub.

4.4.

Dealing with transport energy

There is no CROP agency coordinating regional transport matters overall, although MCST was established as a regional marine transport resource. The *2010–2020 Framework for Action on Transport Services* (FATS) was limited to marine transport. It was intended to incorporate and expand energy aspects of a 2020–2030 marine FATS within FESRIP, but a stand-alone marine framework is not currently being developed.

Although petroleum fuels for transport constitute the single largest use of petroleum fuels in the Pacific Islands region, responsibility for transport is scattered among a large number of private sector and public entities at both regional and national levels. Accordingly, in section 6, FESRIP 2021–2030 discusses areas of transport activity which are appropriate for coordinated regional or subregional activity but, with the exception of 'Petroleum and Other Liquid Fuel Services', does not consider these in any detail, provide priorities for action, or consider staffing or financial resources needed to begin to address them.

- FESRIP 2021–2030 includes only limited coverage of transport energy issues, but this will be revised and aligned to the next FATS (or its equivalent), if and as it is developed, and linked to a proposed regional e-mobility policy and program currently led by PCREEE and supported by the United Nations Industrial Development Organisation (UNIDO).

4.5

Inclusion of the Pacific territories

The French and US Pacific, and other non-independent territories, were not included in many SPC-coordinated energy sector activities under FAESP, largely due to funding restrictions. It remains unclear how to substantively improve this.

- CROP FESRIP 2021–2030 partners will explore with territories and development partners options and opportunities to include them more fully in the regional energy programme, perhaps including the addition of a French-speaking energy expert.

4.6

Coordination with development partners

Although this framework cannot commit development partners to specific policies or actions, CROP FESRIP 2021–2030 partners will encourage the following relationship with the development community in general and the PRIF Energy Working Group (EWG) in particular.

- Development partners are encouraged to endorse the framework and align their regional and Pacific multi-country activities with it.
- The PRIF EWG, or any similar arrangements which might replace it, will be encouraged to:
 - 1) explicitly open participation to CROP agencies with energy activities; and
 - 2) regularly prepare and provide the PICTs reports with a matrix of current, planned and proposed programmes and other Pacific energy sector activities summarising the roles of specific PRIF members.

5

Management mechanisms for FESRIP

Management arrangements for an effective regional energy framework and subsequent actions must reflect changing realities and expectations, providing a basis not only for information sharing and coordination among the relevant CROP agencies, but also promoting active and ongoing energy-sector collaboration among them and with international and other regional agencies. Without collaboration, this is not a true regional framework for the CROP family. The challenges for CROP agencies and PICTs are considerable. Some management elements of the framework have been summarised in the previous section. Others are discussed below.

5.1

CROP energy sector mandates

As endorsed by energy ministers in 2009 and Forum Leaders in 2010, “the key role of the lead coordination agency for the regional energy sector [SPC] is that of providing leadership for, and improving the profile of, energy as a key priority sector in the Pacific islands region.” In 2019, energy ministers reconfirmed “the leading role of SPC in energy” and endorsed the mandate of PPA in “supporting the power utilities of the PICTs in the provision of high quality, secure, efficient and sustainable electricity services.” CROP agencies will treat FESRIP 2021–2030 as a combined CROP effort, recognising that its long-term goals will not be satisfactorily achieved with individual uncoordinated efforts.

Within the CROP mandate related to energy, “energy policy and climate change policy remain separate where environmental aspects are managed by SPREP and energy sector activities by SPC so as to ensure that the socio-economic aspects of energy were adequately addressed.” *CROP - Collaborating to Support Effective Response to Climate Change* (undated) states that “political leadership and effective resourcing are issues generally led and coordinated by PIFS; practical application of adaptation and mitigation activities across many key development sectors is led by SPC, and on some issues by SPREP ... the lead regional coordinating agency in climate change.” USP is the principal CROP agency for education, training and research but has not been explicitly recognised within mandates dealing with energy. As mandates can overlap and there are not always clear mechanisms or incentives for cooperation and coordination:

- the heads of the relevant CROP agencies (SPC, PPA, SPREP, USP, PIFS) will formally endorse FESRIP and will oversee its implementation, including development of effective implementation mechanisms and arrangements for proactive joint development and implementation, where appropriate; and
- the heads of relevant CROP agencies will review the energy mandates and if warranted, recommend to relevant ministers amendments to improve clarity and effective cooperation.

5.2

Separation of coordination and collaboration from implementation

It can be difficult for the same staff to prioritise regional information sharing, coordination, proactive collaboration, and effective reporting and monitoring if they are dependent on, and focused on, short-term project implementation and resource mobilization. The functions should, as far as practical, be separated, with an effective firewall established between them.

- Within SPC, the CROP lead agency for energy, the functions of regional information sharing, coordination, collaboration and project implementation will be separated as resources allow, ideally within a year.
- When resources permit, an SPC senior position will be created for regional energy information sharing, coordination, collaboration, monitoring, reporting and evaluation, supported by staff responsible for coordination of fund raising for regional energy initiatives.

5.3

Review, reporting, monitoring and evaluation

- FESRIP is a 10-year document with broad priorities to be formally reviewed and updated as required, but no later than after five years, and independently evaluated in 2030.
- Beginning in 2023, SPC, with its CROP partners, will produce a consolidated report on framework progress using materials produced and provided by each participating CROP agency. This will be updated every two years or prior to the energy ministers' meeting (whichever is more frequent). Where a CROP agency has separate institutes, centres or formal links to other energy initiatives (such as SPC-PCREEE, USP-PACE-SD, USP-MCST, SPC-OPERA, and SPC-Regional Pacific NDC Hub, etc.), reporting will include a brief overview of their energy-sector activities.
- As far as possible, energy security reporting will be standardised among CROP agencies, using, to the extent practical, data PICTs already collect and existing formats (for example, for SDGs 5 and 7, the SAMOA Pathway, national energy plans/roadmaps and NDC commitments and goals).
- SPC will develop and implement, with the relevant CROP agencies, a robust system to monitor, report, review and evaluate the framework and regularly make findings public. To the extent possible, monitoring, review and evaluation of progress will use the FRDP mechanisms (there may be a need for an interim arrangement).

5.4

Oversight, coordination and advisory functions

The Pacific Energy Oversight Group (PEOG) and Pacific Energy Advisory Group (PEAG) were respectively responsible for overseeing the activities of the former regional energy framework and advising on activities and improving coordination. They are being discontinued and replaced by the following:

- FESRIP oversight will be the function of the heads of the relevant CROP agencies. They will officially endorse this framework, including ensuring that the following takes place:
 - 1) alignment of their energy activities with the overall regional framework;
 - 2) regular information exchanges, coordination and collaboration, including, where practical, joint development and implementation of specific activities by two or more CROP agencies; and
 - 3) joint monitoring, periodic reporting (every two years or as otherwise agreed) and review of activities undertaken within the framework.
- A CROP Energy Technical Working Group (ETWG) whose main functions are sharing information, coordination and collaboration vis-à-vis implementation of the framework. It will meet at least quarterly.
- An Energy Security Working Group (ESWG) will be established. Among others, the functions are assessing progress and providing advice, including priority actions. In addition, for reasons of efficiency and effectiveness, ESWG will align with FRDP 2017–2030, specifically Goal 2: Low Carbon Development, with the expected outcome of “improved energy security, decreased net emissions of greenhouse gases, and enhanced resilience of energy infrastructure.” The ESWG will function as a PRP Technical Working Group on low carbon development, reporting to the heads of CROP, the PRP taskforce and ultimately through FRDP mechanisms to Forum Leaders.

6

Energy initiatives appropriate for a regional approach

6.1

Criteria for energy actions through a regional approach

A *regional* programme is limited to activities that provide practical value for priority issues of the PICTs that can be provided more effectively through a regional or multi-country approach than by direct bilateral assistance to a single country, territory or dependency, or through efforts by the country itself. A regional approach can be more cost-effective and result in better technical advice by spreading the costs of highly-specialised but intermittent services across a group of countries or by developing sets of guidelines or technical standards that can be used or easily adapted for national use, such as the PPA/SEI-API technical guidelines for RE and EE. There are no agreed criteria for distinguishing regional assistance to PICs to that better done through bilateral national-level support, thus development partners and CROP agencies have used a range of principles. The following are useful guidelines, although not always clear or fully consistent in practice.

- Advancing awareness, dialogue and action on sensitive and/or emerging development issues.
- Promoting regional public goods (for example, tertiary education or specialist capacity building).
- Generating and sharing development knowledge, experience and expertise.
- Establishing a shared norm or standard, or a common position on an issue (for example, petroleum fuel contracting or taxation).
- Synergy. For example, combined climate change (mitigation and adaptation) action with capacity development, which is more effective done regionally.
- Economies of scale. Expertise to translate policies such as legislation, regulations and financial incentives into concrete action is expensive on a country-by-country basis but affordable if spread over a few countries (for example, PRIF's recent work on new PIC building codes).
- Benefit test. The initiative should bring substantial net benefits to the region, shown, where practical, by cost-benefit analysis (including distribution of benefits across and within countries).
- Duplication test. The initiative should not be currently being done by another organisation and there should be no duplication of effort.
- Market Test. Is the market providing a service well at reasonable cost? If so, involvement by regional bodies should be minimal (probably varying with some services appropriate for a sub-set of PICTs).
- Sovereignty Test. Does a proposed regional initiative maintain sovereignty of national governments? Regional initiatives should support the management of some services by regional bodies but not policy-making.
- Subsidiarity Test. Can national (or sub-national) governments provide the service well? If so, involvement by regional bodies should be minimal.

At times, PIC governments request CROP agencies to implement national projects provided through bilateral assistance or single-country projects financed by regional or international agencies. This, and other opportunities for activities that do not clearly meet the above criteria, will continue. FESRIP must be consistent with the needs of PICTs as expressed by them. For example:

- Has the activity been officially requested by the PICT as a priority?
- Does the activity complement other regional or bilateral energy sector support to a PICT?
- Does the activity directly contribute to national energy targets or other commitments adopted by the government?
- Is the PICT willing to co-finance the activity?

6.2

Priority energy initiatives appropriate for a Pacific regional approach

There is a wide range of energy sector initiatives that can meet one, or often several, of the above regional criteria and can appropriately be provided through a coordinated or joint *regional* effort that can help improve implementation of PICT *national* energy policies and plans and help improve national energy security, reliability, sustainability, affordability and/or access. These are consistent with the new Pacific regionalism, FRDP – building a resilient Pacific – and the outcomes and decisions of energy ministers in Samoa in September 2019. There is inevitable overlap in some cases. The justification for a number of topics is discussed further in *Background Paper 6: Energy Initiatives Appropriate for a Pacific Regional Approach* in Volume 2.

The six categories and 23 areas of actions or initiatives listed below can be considered an initial menu from which PICs can pick specific activities that add value, considering local circumstances. Many of the specific activities may only be a priority for a few countries or territories.

In some cases, there is a clear CROP lead agency or co-lead identified. For many, there is ideally a group of CROP agencies providing coordinated or joint support.

- The six categories and their associated areas of activity address key issues that a number of PICTs are expected to face in the coming decade and beyond and constitute the priority areas for action through a regional approach.

The priority areas are listed below with the proposed lead or joint lead CROP agencies for each:

Priority A: Energy Policy, Planning and Capacity Development	
1. Development and implementation of robust national energy policies, plans and legislation	SPC, lead; PPA for power sector
2. Capacity development in the energy sector	USP, lead in cooperation with the other CROP agencies
3. Database development with energy resilience/security indicators	SPC and PPA, co-leads
4. Rectifying gender imbalance in the energy sector	SPC, lead
5. Non-commercial household energy	SPC, lead in cooperation with USP
Priority B: Energy Sector Finance and Cooperation	
6. Financing a regional energy framework	PIFS, with participating CROP agencies
7. Regional support to Pacific Island territories	SPC, lead
8. Cooperation in sustainable and resilient energy with other island regions	SPC, PPA and SPREP, co-leads
9. Cooperation with the private sector in energy	PPA and SPC, co-leads; PIFS

Priority C: Sustainable Electric Power Development
(PPA lead for grid-based electrification; SPC for off-grid/mini-grid)

10. Climate-resilient power generation and distribution for island grids	PPA and SPC, co-leads
11. Overcoming technical limitations to high penetrations of renewable energy	PPA, lead
12. Financial and management mechanisms for sustainability of outer island and remote rural electrification	SPC and PPA, co-leads
13. Inspection and maintenance of RE technologies	SPC, lead with PPA
14. Regional RE standards for hurricanes and natural disasters	SPC and PPA, co-leads
15. Implementation of national goals and NDC commitments for renewable electricity	SPC, SPREP and PPA, co-leads
16. Expanding and increasing the range of RE technologies	No overall lead; SPC for ocean energy
17. Independent energy regulation	SPC, initial lead

Priority D: Low-Carbon Transport Energy

18. Land transport energy use	SPC, lead
19. Marine transport energy use	SPC, USP and SPREP, co-leads
20. Air transport energy use	No specific lead

Priority E: Improved Energy Efficiency

21. Improved energy efficiency within buildings and economy wide	No specific lead
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Priority F: Petroleum and Other Liquid Fuel Services

22. Petroleum advisory services: fuel pricing, contracting, monitoring and biofuels	SPC, lead
23. Petroleum advisory services: fuel storage, distribution infrastructure and miscellaneous	SPC, lead

A)

Energy Policy, Planning and Capacity Development

1. Development and implementation of robust national energy policies, plans and legislation

(SPC, lead; PPA for power sector)

CROP agency support will be provided for PICTs to develop, review, assess and refine their policies and plans with the objective of improving robustness of the plans and their implementation. Among others, planners and plans often do not adequately consider future uncertainties or allow for the known near-future impacts of disruptive climate change, such as flooding of new facilities. PIC energy policies, particularly within the power sector, have generally been developed to meet specific forecast expectations of energy demand or a narrow range of demand scenarios. Under the high uncertainty anticipated for 2021 through 2030 and beyond, effective planning requires an assessment of the range, likelihood and type of current and upcoming risks, then choosing and implementing the option that is the most practical and robust to the most uncertainties. CROP agency assistance to PICTs for energy policies and plans and their implementation will adopt this approach, avoiding a 'predict one outcome, then act' approach. In addition, in the context of energy and climate change mitigation planning, CROP agencies will support PICTs to consider the issues of carbon pricing, fossil fuel subsidies and a just transition from fossil fuels. Another important aspect is aligning national energy policy targets with NDC targets. Among other benefits, this will assist with accessing climate financing for the implementation of NDCs and national energy policies. Furthermore, given the current COVID-19 pandemic, it is important to pay particular attention to energy use in sectors such as tourism that have been severely affected, including the various negative socio-economic impacts (jobs, gender equality, etc). Regarding the electricity sector specifically, the pandemic underlines the need to develop and implement business continuity plans and accelerate measures to strengthen commercial performance.

2. Capacity development in the energy sector (USP, lead in cooperation with the other CROP agencies)

Capacity development initiatives for energy offices, power utilities, energy regulators, the private sector and others are often project based, with a short-term focus, uncoordinated with other efforts and/or *ad hoc*. USP and SPC, in collaboration with other CROP agencies, will develop and regularly update and circulate information on energy sector capacity development initiatives underway, planned and proposed by CROP agencies, utilities (for example, Energy Fiji Ltd) and initiatives of other regional organisations or centres. It will foster coordination and cooperation within CROP agencies and with other regional and national training institutions and include relevant guidelines, training materials, certification programmes, etc. in the online Pacific Regional Data Repository for Sustainable Energy for All (PRDR SE4All) system (<http://prdrse4all.spc.int>). As required, there will be analyses of capacity needs and gaps.

Examples suggested by PICTs include research, development and training on: 1) biofuels (regional standards, laboratory testing and verification); 2) clean cooking stoves; and 3) fuel quality testing and verification.

3. Database development with energy resilience/security indicators (SPC and PPA, co-leads)

SPC will continue to develop, expand and regularly update its PRDR SE4All energy database and report repository system in close coordination with PPA and IRENA through the SIDS Lighthouses Initiative. The database will include accessible information on annual petroleum imports by value and volume for each PICT, power sector installed capacity and generation by RE and petroleum, and other information. Energy use and security indicators will be revised to better indicate changes in national security. These will use, to the extent possible, data collected for other purposes to avoid overloading the capacity of PICT energy and statistics offices. The occasional *Country Energy Security Indicator Profile* will be updated, incorporating revised energy security indicators and expanded when resources allow to include territories.

4. Rectifying gender imbalance in the energy sector (SPC, lead)

SPC is reviving the Pacific Energy and Gender Network and has prepared PEGSAP 2020–2030. The action plan takes a strategic approach and discusses four levels of intervention to increase women's engagement as entrepreneurs and professionals in the clean energy sector: 1) institutional – existing and new regional and national energy policies will address women's practical and strategic energy needs and promote women's involvement in the clean energy value chain; 2) service providers – enhancing employment opportunities for women in the clean energy workforce; 3) community – promoting women's involvement in energy-related decision making in communities and households; and 4) individuals – improving women's knowledge, skills and access to resources to voice their energy needs and engage in the clean energy value chain.

5. Non-commercial household energy (SPC, lead in cooperation with USP)

Surveys suggest that biomass can still account for 50% of cooking fuel use in some PICs, even in urban/peri-urban households, too often on badly-ventilated wood stoves, resulting in severe respiratory problems for women and children. This initiative will include an assessment of the extent of the problem in the region with recommended affordable and appropriate solutions and concrete actions to address the issue.

B) Energy Sector Finance and Cooperation

6. Financing a regional energy framework (PIFS, with participating CROP agencies)

CROP agencies, led by PIFS and in consultation with CROP partners and development agencies, will develop a strategy for short- and longer-term resource mobilisation sufficient to effectively carry out regional energy lead and collaboration roles. This will be done early in the FESRIP period.

7. Regional support to Pacific Island territories (SPC, lead)

Consultations showed especially strong support for greater inclusion of French, US and other affiliated PICTs in the framework activities beyond just workshops. Initially, there will be consultations with territories, development partners and others on the extent that this is desired by territories, the practical areas of real cooperation and potential finance. A French-speaking energy staff member at SPC may be appropriate.

8. Cooperation in sustainable and resilient energy with other island regions

(SPC, PPA and SPREP, co-leads)

Although there are cooperative arrangements between the Pacific and the Caribbean Community in energy (for example, PPA with Caribbean Electric Utility Services Corporation [CARILEC]; PCREEE with the Caribbean Centre for Renewable Energy and Energy Efficiency [CCREEE]; and SPREP with the Caribbean Community [CARICOM's] Climate Change Centre), there has been little effort to learn substantially from the experience of the Caribbean, Hawaii and others, and incorporate appropriate lessons into Pacific actions. These include regional energy standards within national building codes, hurricane standards for PV systems, mini grids with energy storage, innovative regulatory arrangements, and possibly effective utility EE efforts. Among others, within the FESRIP period, cooperation and exchange arrangements will be explored and developed between the CROP lead energy agency and the Caribbean, the US state of Hawaii, and possibly other areas (such as in the Atlantic, Indian Ocean and South China Sea).

9. Cooperation with the private sector in energy (PPA and SPC, co-leads; PIFS)

A structural shift away from petroleum fuel towards renewables will require considerably more finance than development partners can provide directly to PICs or countries can allocate from their national budgets. However, the uptake of renewables is restricted by a lack of bank and sovereign guarantees and private sector participation, among other issues. Under FESRIP, CROP agencies (particularly SPC and PPA) will work with the development community, financiers and investors, and PICs to improve the climate for private financing and strengthen national capacity to develop and implement effective power purchase agreements (PPAs) through independent power producers (IPPs), and public-private partnerships (PPPs). Also, as part of FESRIP, CROP agencies will produce and/or improve standards and guidelines (and provide training) to standardise RE and demand-side EE design and implementation, with clear regulations to improve resilience and robustness. A number of power sector actions listed below (under C) will also require improved cooperation with private sector energy organisations, as will transport energy, EE and petroleum services.

C)

Sustainable Electric Power Development

(PPA, lead for grid-based electrification; SPC for off-grid/mini-grid)

10. Climate-resilient power generation and distribution for island grids (PPA and SPC, co-leads)

Distributed electricity generation with energy storage through community mini grids can be isolated from the main grid during natural disasters or outages. In smaller islands, capital costs for distributed electricity generation with energy storage may not be significantly higher than traditional investment in central generation. Distributed systems are more resilient to climate change and other disasters and overall savings can outweigh costs considerably. Climate-ready energy infrastructure typically adds 3% to upfront costs but saves USD 4 for every dollar spent. A recent Caribbean distributed RE system with storage had a capital cost 8% higher than a centralised option, but this was offset by reduced O&M costs. Initial actions will include a review of experience elsewhere, such as Hawaii and the Caribbean, with lessons for the Pacific.

11. Overcoming technical limitations to high penetrations of renewable energy (PPA, lead)

There are technical challenges to cost-effectively integrate 50% or more of RE into grids, but considerable efforts are underway to address this. As RE penetration to the PICT grids grows, there will be studies, as needed, to determine technical solutions to increase RE to the grids, where economically attractive.

12. Financial and management mechanisms for sustainability of outer island and remote rural electrification (SPC and PPA, co-leads)

Many PICT rural electrification systems (diesel, RE and hybrid) operate poorly within a few years of construction. PICT and others' experiences with general management, O&M and financial management of remote off-grid and mini-grid electrification will be assessed, followed by practical advice to the countries on managing remote energy systems for sustainability.

13. Inspection and maintenance of RE technologies (SPC, lead with PPA)

SPC is enhancing its technical capacity for assisting PICTs to inspect, troubleshoot and maintain solar PV technology and other RE technologies. In collaboration with partners including the private sector, SPC will provide this service to PICTs to identify and remedy technical faults. Assistance will include local capacity building.

14. Regional RE standards for hurricanes and natural disasters (SPC and PPA, co-leads)

Initially, a regional standard for PV systems will be developed and adopted for withstanding category four and five cyclones/hurricanes, and earthquakes and flooding, in coordination with development partners who will be strongly encouraged to require that their investments be compliant with the standard and installers be trained and certified. This will be extended to small hydro systems, wind energy and other RE technologies.

15. Implementation of national goals and NDC commitments for renewable electricity (SPC, SPREP and PPA, co-leads)

Most PICs are very unlikely to achieve their NDC goals without much more intense efforts. CROP agencies will work closely with development partners and the SPC-based Pacific regional NDC Hub with technical advice on the practicality of reaching the current or amended goals and firm commitments.

16. Expanding and increasing the range of RE technologies (No overall lead; SPC for ocean energy)

In 2019, energy ministers called for concerted efforts to undertake studies and development of bioenergy, geo-thermal, ocean energies and waste resources, and to adopt new and emerging technologies to increase RE utilisation in PICTs. Relevant CROP agencies, in collaboration with partners, will support PICTs and the private sector in their efforts to expand and increase their range of RE development. Regional-level assistance could include analyses of issues such as sustainable approaches for biomass energy in the Pacific (for example, appropriate biomass species for specific locations), wind energy (technological developments of small systems appropriate for PICTs), geothermal (any developments of small systems), etc.

17. Independent energy regulation (SPC, initial lead)

It is prudent for all PICTs to establish, where practical and cost-effective, independent energy/ electricity regulators that provide regulatory advice and oversight for the electricity sub-sector initially and then the wider energy sector, including petroleum and liquid fuels. During the 2019 Energy Ministers' Meeting, SPC and ADB were directed to establish the Office of the Pacific Energy Regulators Alliance (OPERA) and formulate a sustainable financing mechanism for OPERA.

D) Low-Carbon Transport Energy

18. Land transport energy use (SPC, lead)

Globally, there are indications that heavy road transport, shipping and aviation can technically, and perhaps economically, reach net-zero emissions by 2050, with significant opportunities to improve EE by 35-40% in the transport sectors without radical changes in technology. For EVs, obstacles in the Pacific include high vehicle costs, the need for significant expansion of electricity generation, and its reliability and affordability in both urban areas and more remote communities. There should be an assessment of EV viability, issues and opportunities, initially focusing on public transport, with subsequent EV development, where economically attractive. In addition, actions should include assistance in assessing biofuelled vehicles and cycling, which is common in low-lying island states.

19. Marine transport energy use (SPC, USP and SPREP, co-leads)

There was considerable discussion of marine sector EE during the 2019 Transport and Energy Ministers' Meeting. Transport ministers agreed "to work towards the ambitious [Pacific Blue Shipping] Partnership's targets for domestic shipping in the Pacific Island countries to reduce GHG emissions by 40% in 2030 and 100% by 2050." Wind propulsion retrofits and new-builds could achieve the bulk of marine GHG reductions. CROP agencies will work closely with MCST and MTCC to develop a joint or coordinated strategy to work toward these objectives.

20. Air transport energy use (no specific lead)

In the short-to-medium term, regional airlines could include sustainable aviation fuels (SAF) which can substantially reduce carbon emissions; however, clean fuel alternatives can be up to six times more expensive than kerosene-based fuels and would require subsidies or external finance, at least in the short term. In the longer term, hydrogen may be an alternative to petroleum-based aviation fuel. There may be a role for CROP agencies to work with aviation authorities and the Pacific Aviation Safety Office (PASO) in Vanuatu, which oversees aviation safety and security in the Pacific Islands.

E) **Improved Energy Efficiency**

21. Improved energy efficiency within buildings and economy wide (no specific lead)

There are substantial opportunities for cost-effective improvements in demand-side (consumer) EE, where buildings alone account for about 50% of electricity use within PICTs. Much of this is for lighting, but globally, energy demand for air conditioning is expected by the International Energy Agency (IEA) to triple by 2050. Demand is unlikely to grow this rapidly in most PICTs, where air-conditioning use is relatively less, but effective policies and technical choices can substantially limit energy demand growth for lighting and cooling. In 2015, an ADB project in five PICs calculated that by 2030, potential EE savings in residences and commercial buildings would be about 8% with a modest effort and 30% with more aggressive actions. CROP agencies will help establish baseline data (via surveys, for example), develop standards and regional training for building energy audits, work with others on minimum energy performance standards in new and renovated commercial and government buildings, and investigate the practicality of incentives for demand-side management (DSM) efforts by power utilities, perhaps in cooperation with OPERA.

There are also opportunities for improved end-use efficiency in transport, water and sewerage systems, agriculture and manufacturing. PPA has long had a programme of improving supply-side EE within the power utilities, and this will continue.

F) **Petroleum and Other Liquid Fuel Services**

22. Petroleum advisory services: fuel pricing, contracting, monitoring and biofuels (SPC, lead)

In 2017 (the most recent data available when this was written) the region consumed about 107,400 US barrels of petroleum fuel per day, increasing on average by 2% annually since 2000. During consultations with PIC governments in 2020, there was 100% support among those who responded for the re-instatement of SPC's petroleum advisory services, the only regional programme that provided such services to the PICs. Savings to countries can exceed ten times the cost of advice, but the service is uneconomic if not done at a regional level. SPC will aggressively seek finance for advisory services to assist PICTs negotiate, implement and monitor petroleum fuel contracts, and again produce a regional quarterly fuel price report.

This service will include support for the Pacific Petroleum Task Force (PPTF), which was established at the directive of energy ministers and provides advisory services as requested by individual PICs, including legal and financial advice, and analyses of biofuels and other local alternatives to imported petroleum fuels.

23. Petroleum advisory services: fuel storage, distribution infrastructure and miscellaneous (SPC, lead)

Many PICT bulk fuel storage facilities and pipelines are in low-lying areas, often in heavily populated areas or near businesses such as markets, and are at increasing risk of flooding and storm damage with consequent pollution of land and water. Most are owned and operated by private companies, which are responsible for safe operations and maintenance. However, many are reportedly poorly maintained. As resources permit, CROP agencies will work with donors and the industry to independently assess the safety of fuel storage and distribution facilities, and require the improvements necessary to meet international standards, considering expected changes in coastal flooding. Where requested by PIC governments, there will be assistance to help develop or improve legislation, with clear rules and regulations for facility owners and operators to implement for safety, maintenance and security of supply in their facilities. Facilities must be built and maintained to be able to meet the current and future needs of the country, particularly security of supply, and they must comply with applicable local environmental, safety and other rules and regulations as well as meet all appropriate international standards. Related services requested by some countries are likely to include studies of fuel standards.



The Pacific Region Infrastructure Facility (PRIF) is a multi-partner coordination and technical assistance facility for improved infrastructure in the Pacific region. The PRIF development partners are the Asian Development Bank (ADB), Australian Department of Foreign Affairs and Trade (DFAT), European Union (EU), European Investment Bank (EIB), Japan International Cooperation Agency (JICA), New Zealand Ministry for Foreign Affairs and Trade (MFAT), United States Department of State (USA) and the World Bank Group.

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