Renewable Energy Trends in the Pacific - Barriers to RE Uptake, Technical Capacity Constraints, Grid Readiness for VRE, NDC/SDG's: A sectoral review

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Collaboration on Energy and Environmental Markets

Project Consortia

Pacific Community
Communauté du Pacifique

Australian Government
Department of Climate Change, Energy, the Environment and Water

Department of Energy

PPA
Pacific Power Association

USP
The University of the South Pacific

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Pacific Community
Communauté du Pacifique

FIFTH PACIFIC REGIONAL ENERGY AND TRANSPORT MINISTERS' MEETING

Warwick Hotel, Port Vila, Vanuatu, 08 – 12 May 2023

"Accelerating decarbonisation in the Blue Pacific".

EFATE OUTCOME STATEMENT

Port Vila, Vanuatu, 11-12 May 2023

29. **Call on** PICTs, SPC, PCREEE, PPA and other partners to develop 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, hydrogen energy sources, meeting 100% renewable targets, electrifying road transport/household/commercial uses, securing island grids with high variable renewable penetrations, expanding distributed microgrids, jurisdictional planning and expanding solar home systems for remote communities.

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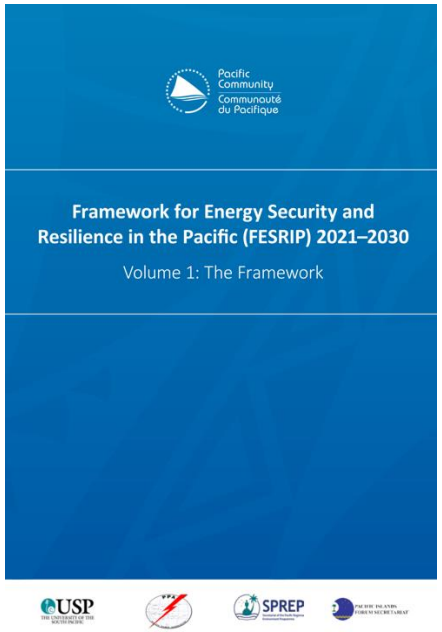
Background & Motivation



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.

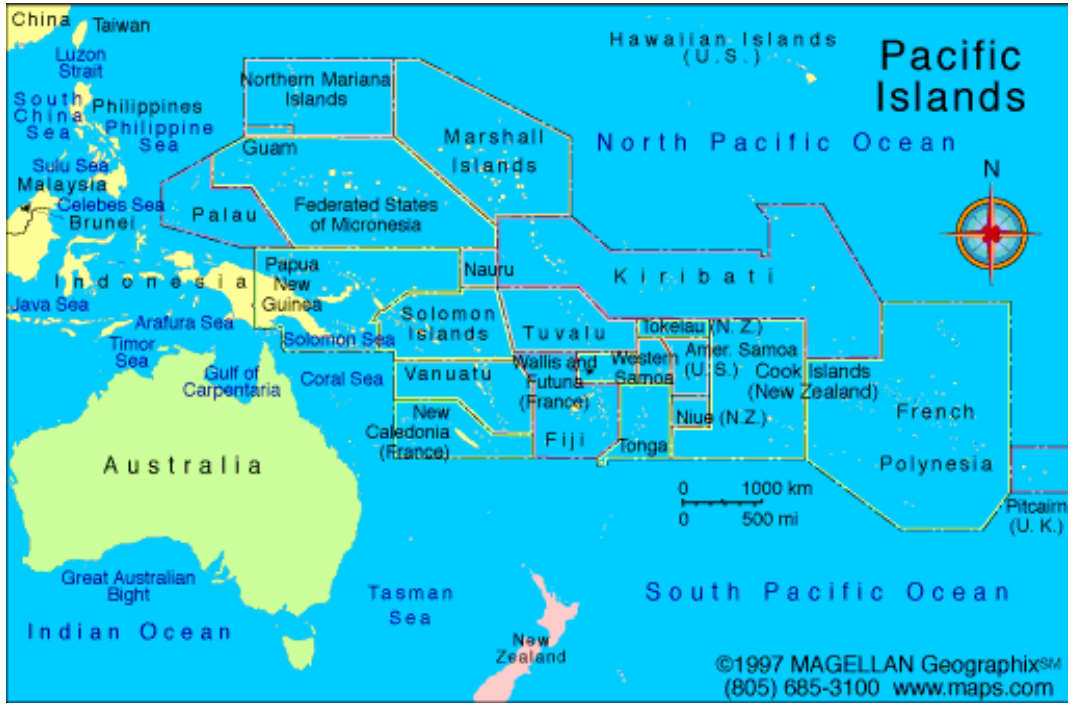
- FESRIP 2021–2030 does not include an associated detailed energy implementation plan by CROP agencies and none is recommended. Instead, detailed work-planning, such as medium-term strategic plans and annual work plans, will be done by the individual CROP agencies based on FESRIP 2021–2030, including the Priority Energy Initiatives (refer to section 6.2).

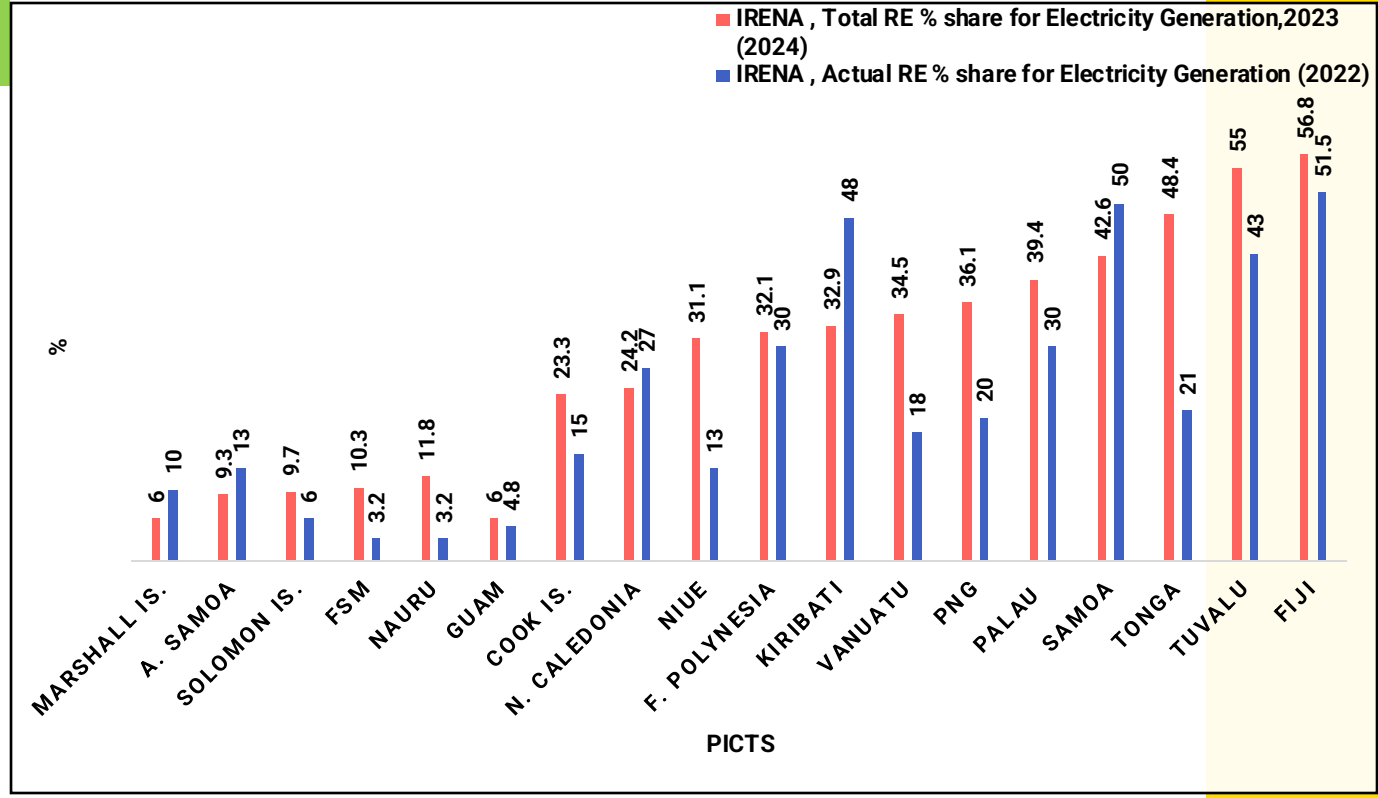
Priority A: Energy Policy, Planning and Capacity Development	
1. Development and implementation of robust national energy policies, plans and legislation	SPC, lead; PPA for power sector
2. Capacity development in the energy sector	USP, lead in cooperation with the other CROP agencies
3. Database development 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

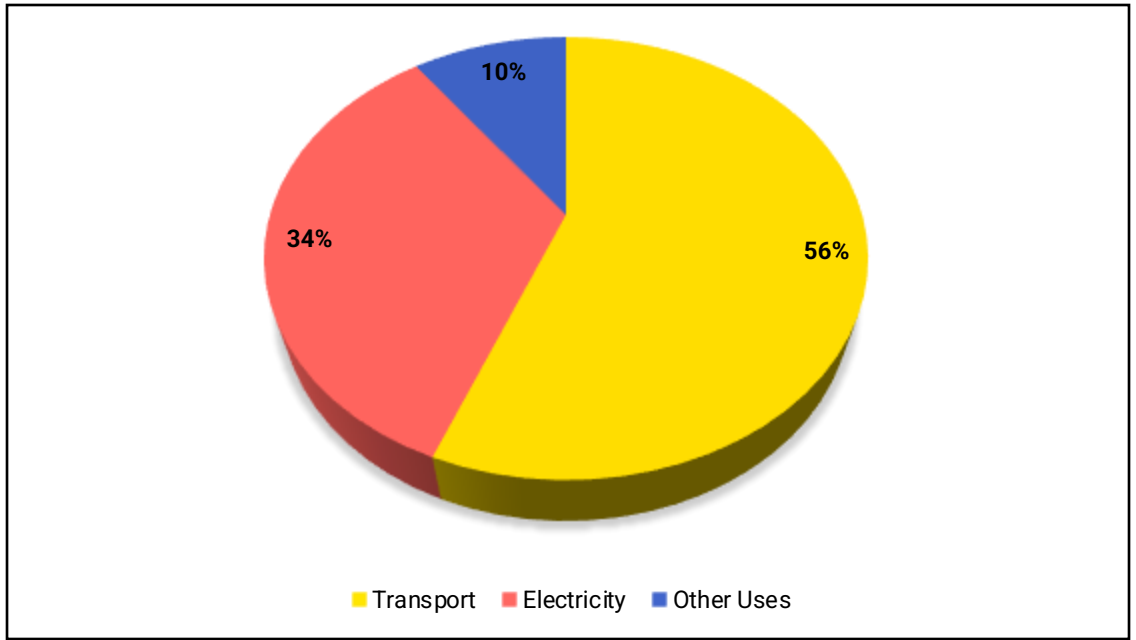
Development and implementation of robust national energy policies, plans and legislation
(SPC, lead; PPA for power sector)

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

Pacific Islands Region- Sector Context

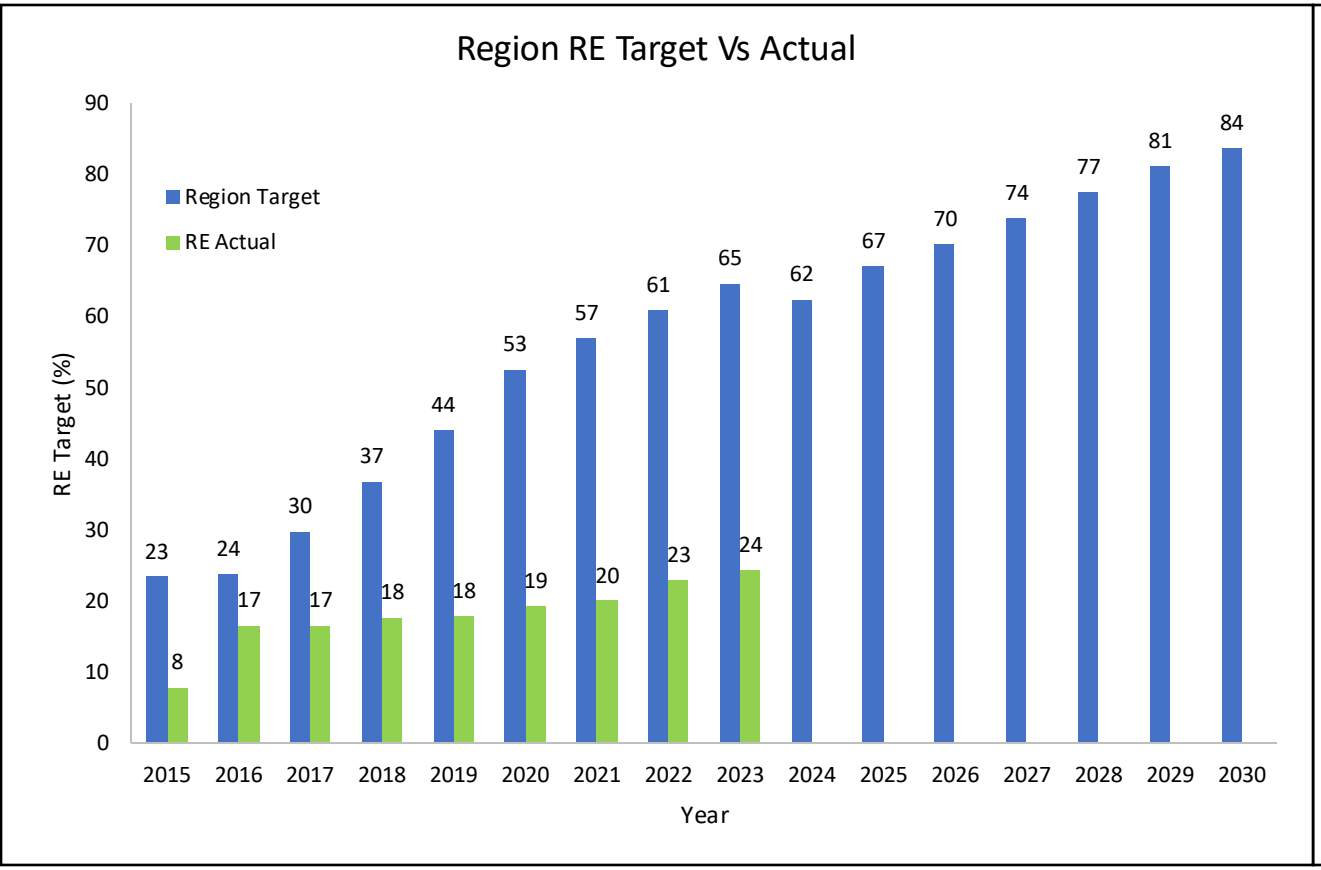


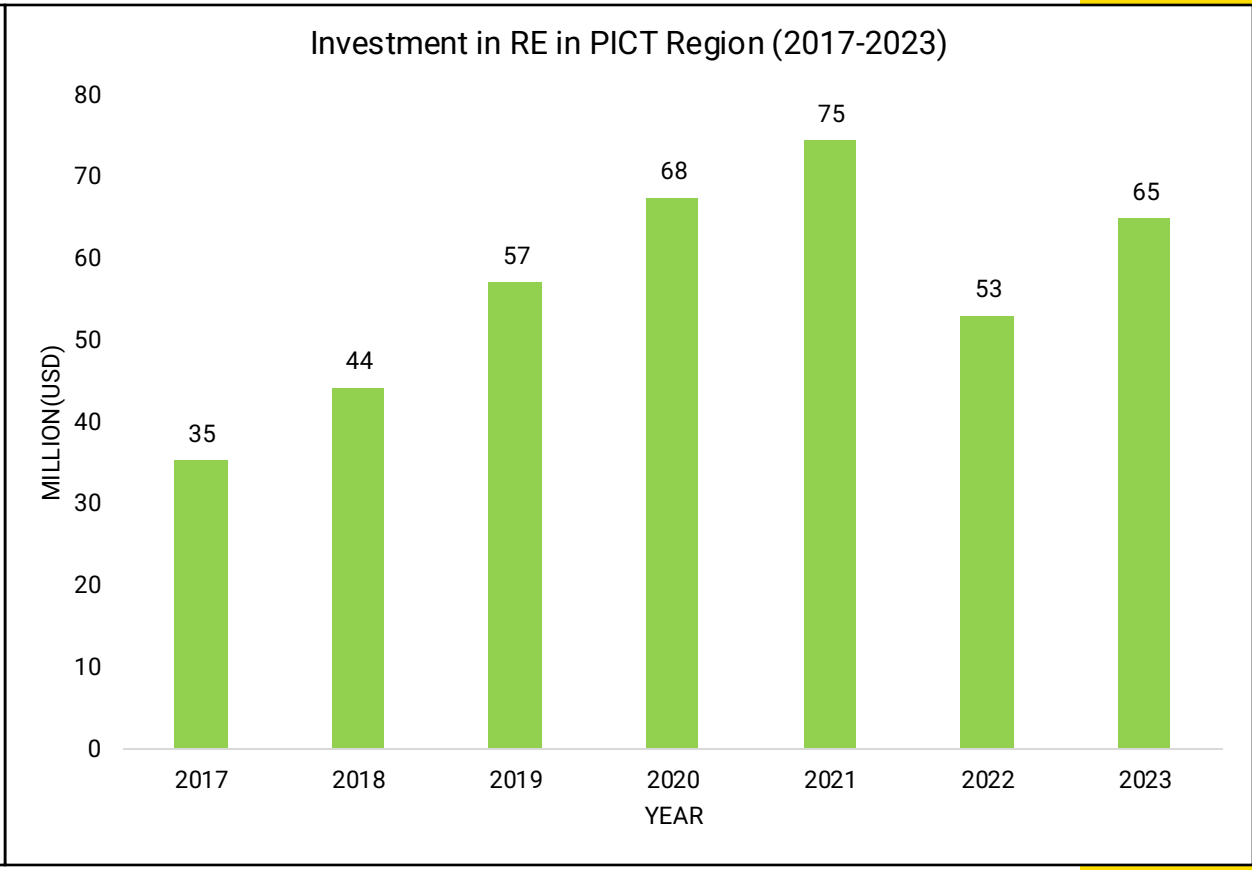




Renewable Energy Trends- Pacific Islands

SDG Target 7.2: RE as a Percentage of Total Energy (Electricity)





- **Pacific Islands countries have set quite aggressive targets to reduce their carbon emissions.**
- **Heavy reliance on fossil fuels, which make up to one-third of their total import costs.**
- **RE uptake in the Pacific Island Countries and Territories (PICTs) has been far less than required to meet their national energy sector objectives.**
- **Considerable investments in RE in Pacific Islands over the past two decades**

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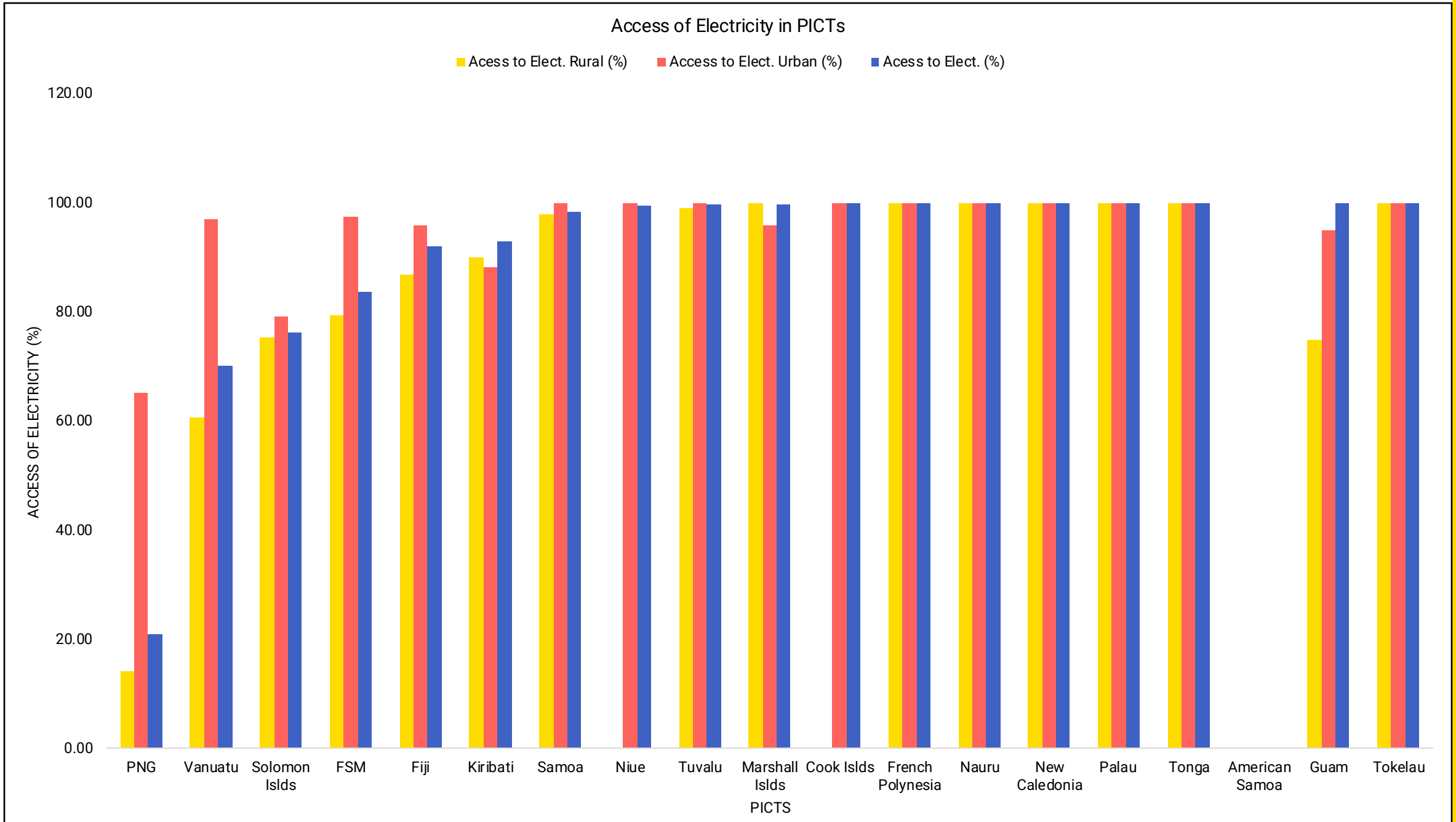
Country/Territory	Geography	Population (2023)	Installed Capacity (MW)	Peak Demand (MW)	Annual Electricity (MWh)	Access to Elect. Rural (%)	Access to Elect. Urban (%)	Access To Electricity (%)	% RE in final Energy Consumption
Papua New Guinea	Over 600 Islands	10,142,619	1139	232.00	1145000	14.03	65.18	20.92	54
Vanuatu	80 Islands, 65 Inhabited	326,740	32	14.20	79000	60.73	97.01	70.04	26
Solomon Islands	1000 Islands, 350 Inhabited	724,273	40	17.80	98421	75.38	79.22	76.35	49
FSM	607 Islands	114,164	22	6.15		79.44	97.59	83.62	2
Fiji	320 Islands, 106 Inhabited	929,766	289	171.57	1081461	86.77	96.00	92.10	32
Kiribati	32 Widely Scattered Atolls	131,232	8	4.90	5000	90.07	88.27	93.00	43
Samoa	10 Islands	222,382	71	25.00	11630	97.93	100.00	98.30	38
Niue	Single Island	1,935	2	0.65	NA	N. A	100.00	99.53	23
Tuvalu	9 Atolls	11,312	3	1.40	2000	99.10	100.00	99.68	7
Marshall Islands	34 Islands	41,569	32	8.90	2000	100.00	96.01	99.75	12
Cook Islands	14 Islands	17,072	15	N. A	7000	N. A	100.00	100.00	13
French Polynesia	121 Islands	306,279	186	N. A	148000	100.00	100.00	100.00	8
Nauru	Single Island	12,668	15	5.00	5000	100.00	100.00	100.00	1
New Caledonia	140 Islands	269,220	517		654000	100.00	100.00	100.00	6
Palau	596 Islands, 12 Inhabited	18,055	28	12.80	742700	100.00	100.00	100.00	1
Tonga	176 Islands, 36 Inhabited	106,858	25	10.40	77200	100.00	100.00	100.00	2
American Samoa	5 Islands, 2 Atolls	44,273	45	N. A	N. A	N. A	N. A	N. A	1
Guam	Single Island	173,981	445.3	257	1743000	75	95	100	4
Tokelau	3 Atolls	1,912	N. A	N. A	100	100	100	100	N. A

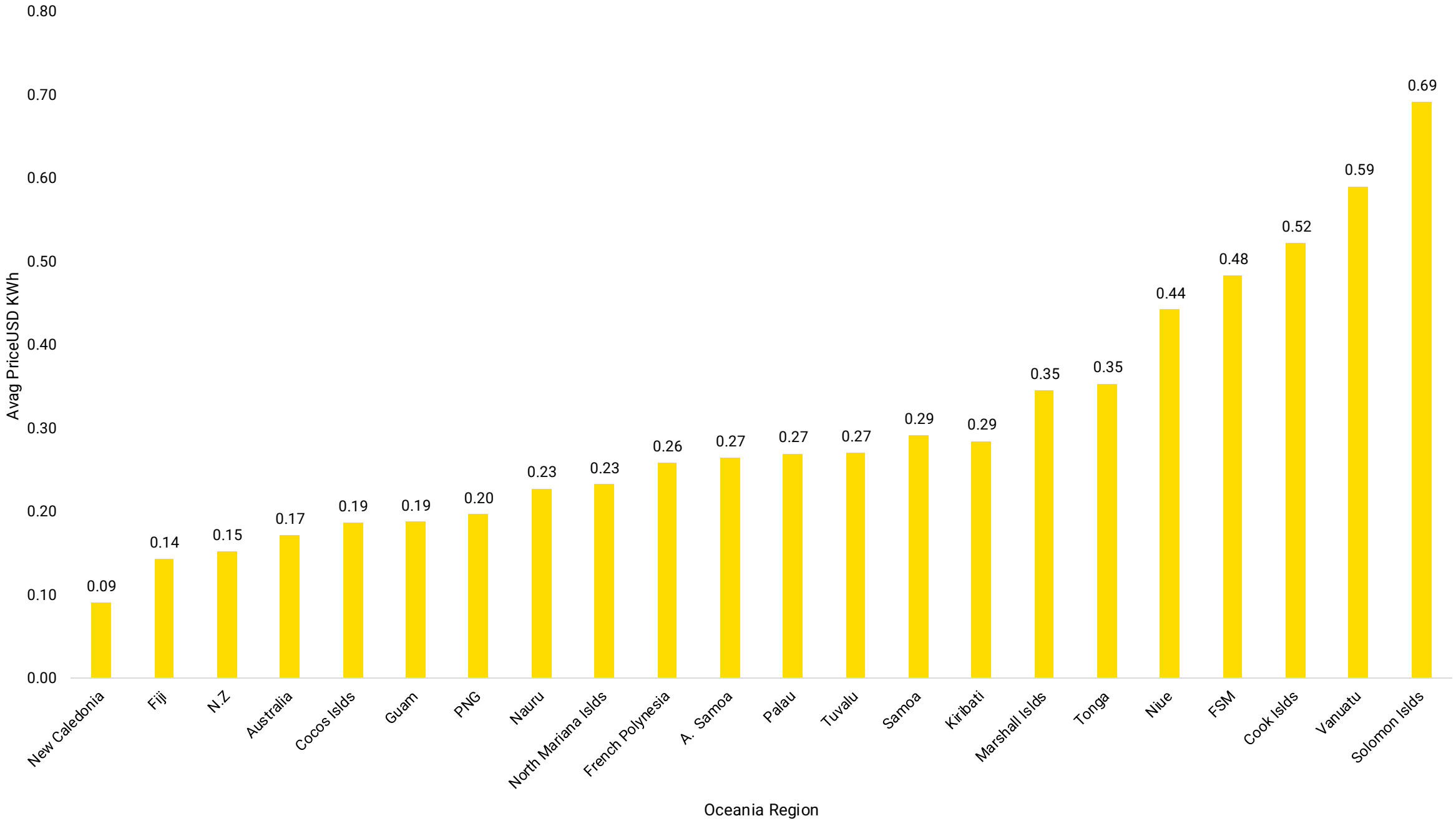
SDG 7.1.1 Population Access to Electricity in PICTS in 2021 (SDG7 Tracker, 2023)



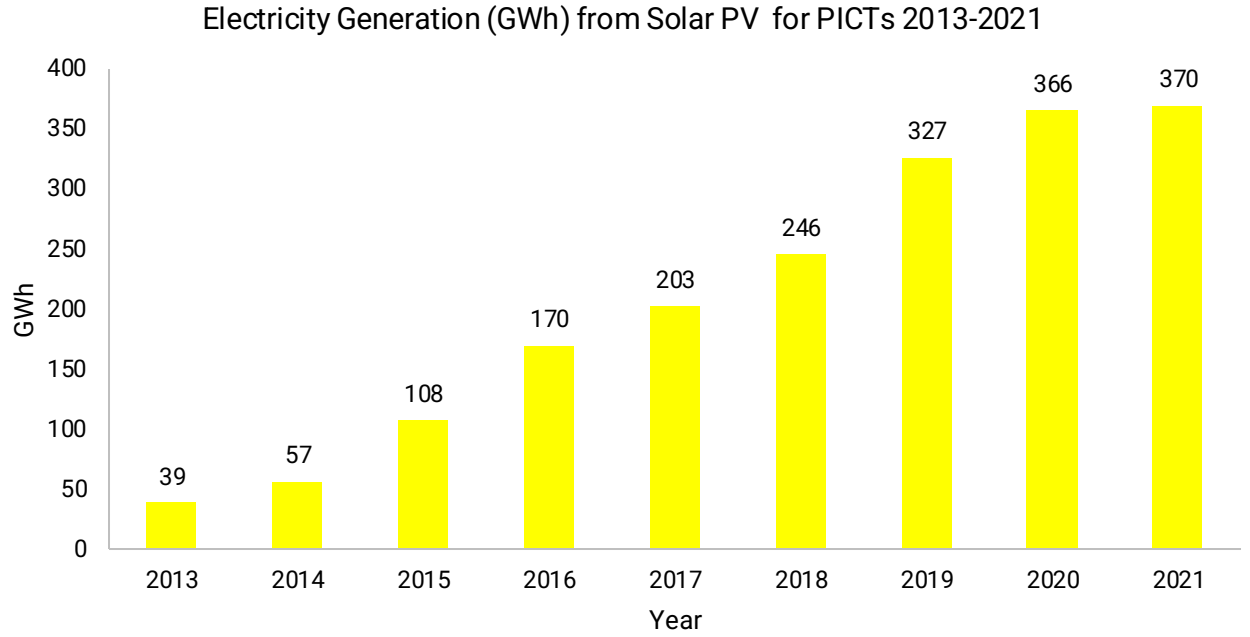
PICTs Nationally Determined Targets (NDC) Targets

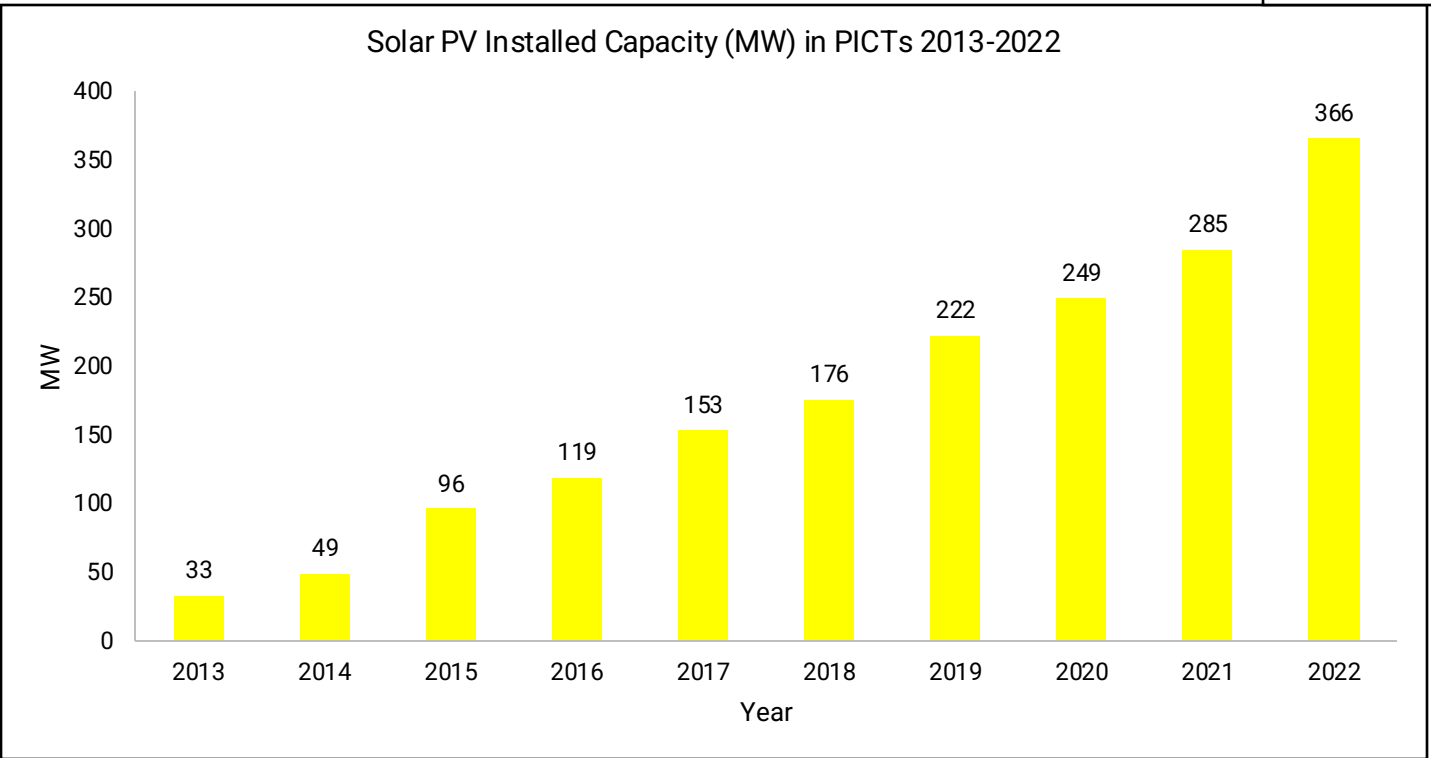
PICT	NDC Targets
Cook Islands	Reduce emissions from electricity generation by a further 43%, totaling an 81% emissions reduction by 2030 (relative to 2006)- conditional
Fiji	30% reduction in GHG emissions (20% from RE in electricity conditional). 10 % Energy Efficiency
FSM	35 % reduction in GHG (conditional). 28% reduction by 2025 - baseline 2006
Kiribati	Reduce emissions by 35,880tCO2e annually by 2025 and by 38,420tCO2e annually by 2030 (conditional)
Marshall Islands	Reduce GHG emissions to at least 32% below 2010 levels by 2025 and further to at least 45% below 2010 levels by 2030. (conditional)
Nauru	100% RE on grid by 2050 (61% conditional)
Niue	80% RE in electricity generation by 2025- 69% conditional
Palau	45% renewable energy, 35% energy efficiency by 2025, 22% energy sector emissions reductions below 2005 levels by 2025- 95% conditional
PNG	78% of electricity from renewable energy sources by 2030 - 100% conditional
Samoa	100% Electricity from Renewables by 2025 (conditional) (26% reduction by 2030 overall)
Solomon Islands	27% reduction in GHG emissions by 2025 and 45% reduction in GHG emissions by 2030 (conditional)
Tonga	13% reduction in GHG emission by 2030 compared to 2006 through a transition to 70% RE electricity as well as energy efficiency measures (100% conditional)
Tuvalu	100% RE electricity by 2030
Vanuatu	100% renewable energy in the electricity sector by 2030 (conditional)

Electricity Tariff Rates in PICTs



Solar PV in PICTs





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Vanuatu- Sector Context

80 Islands, 65 Inhabited

Population: 326,740

Installed Capacity: 32MW

Peak Demand: 14.2 MW

Annual Electricity: 79 GWh

Access to Electricity:

Rural: 60.73%; Urban: 97.01%; Total-70.04%

RE (Electricity) Composition: 26%

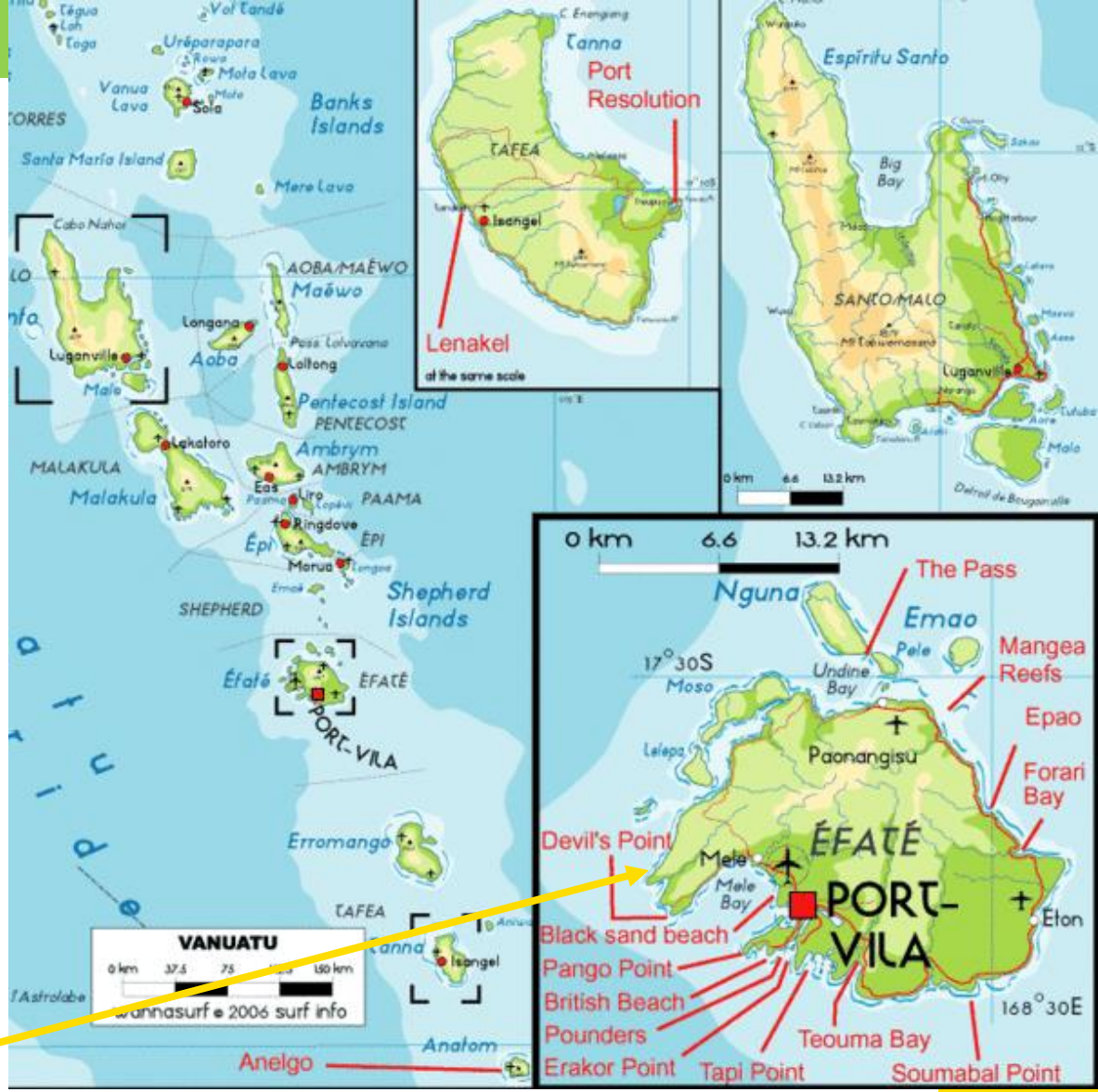
Efate Grid

Customers: 16 000

Peak Electricity Demand: 12.5 MW

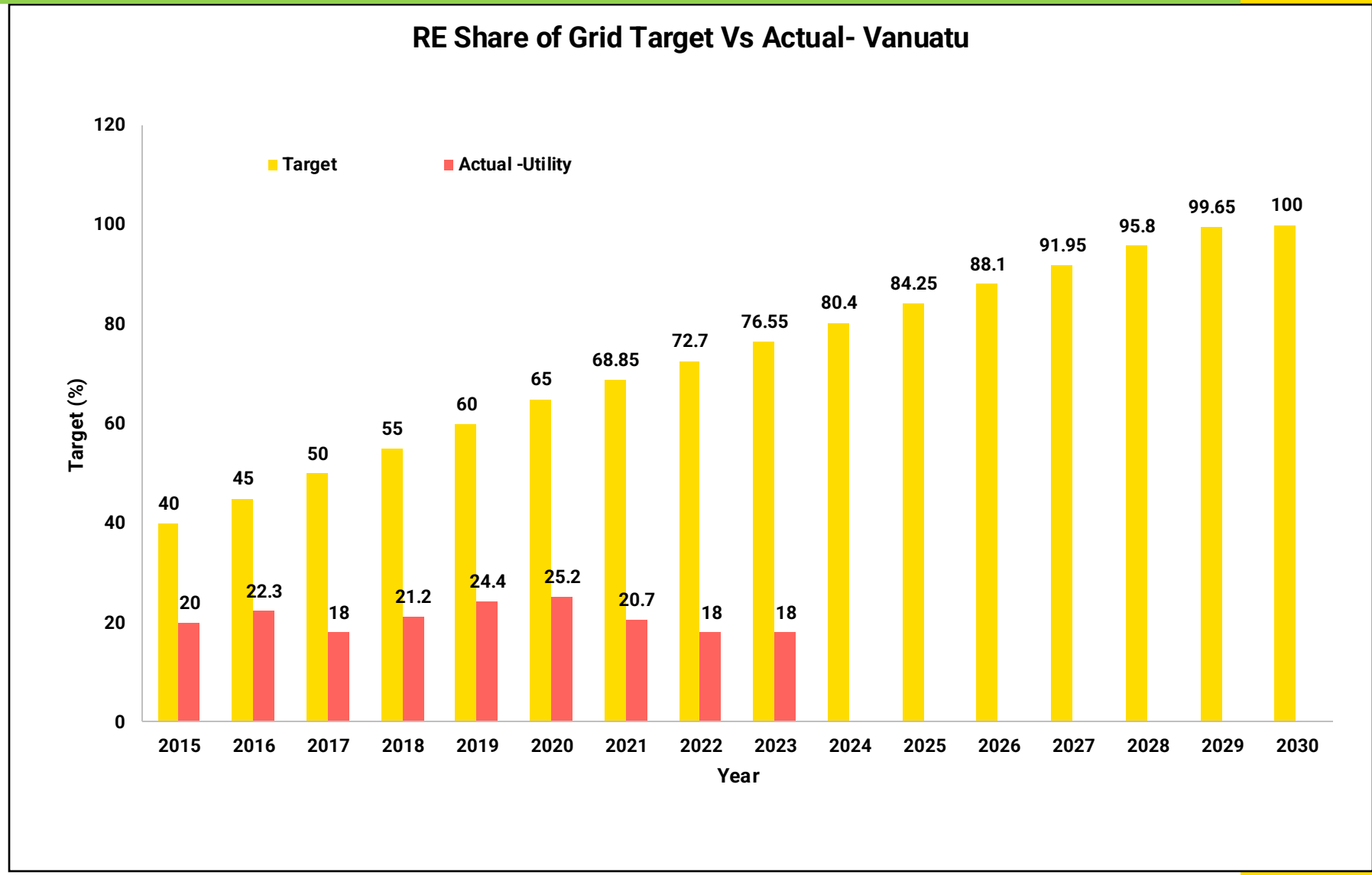
Annual Generation: 66 GWh

Tariff: 68Vt/kWh (USD $0.56/kWh)

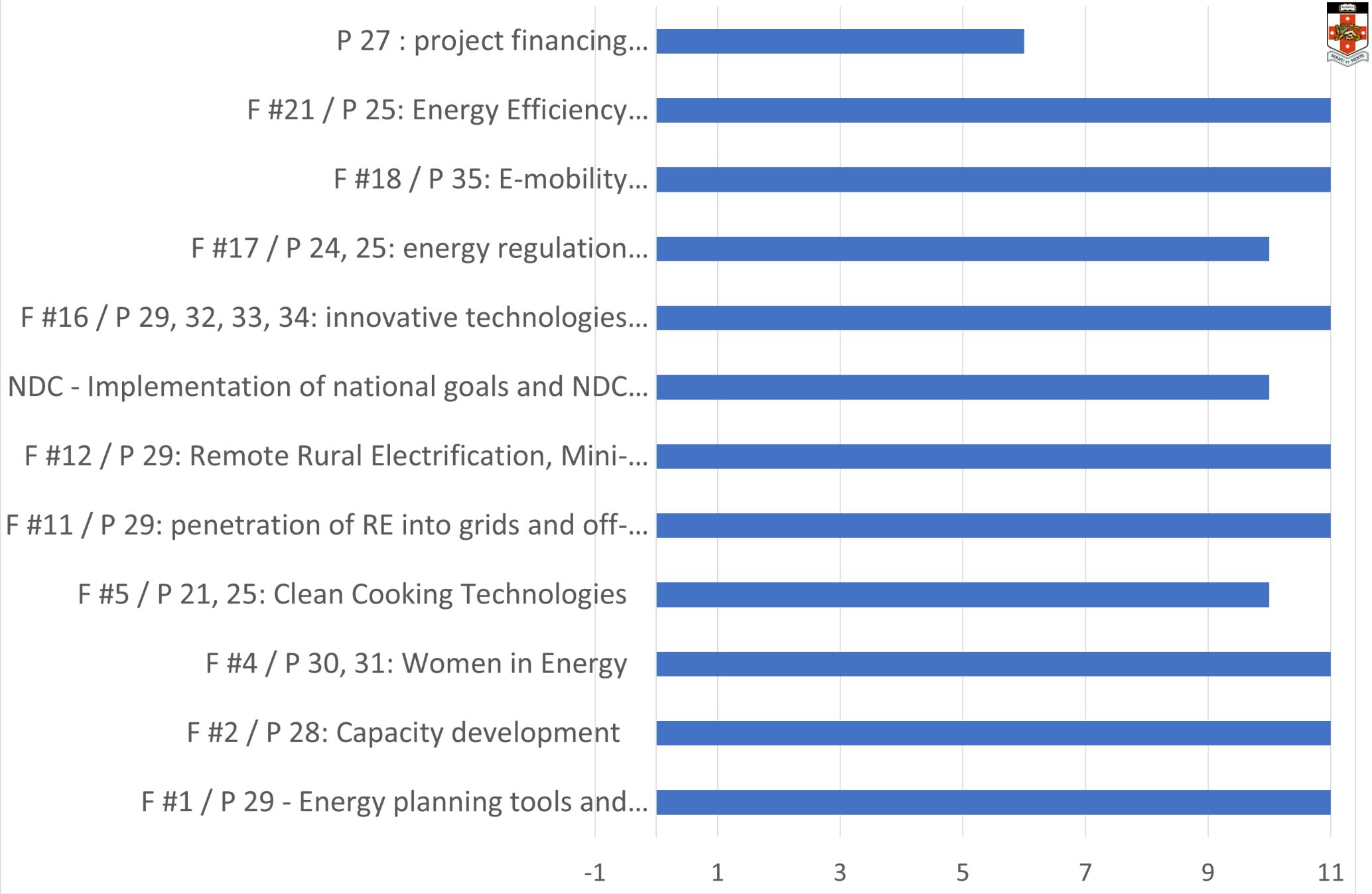


Renewable Energy Trend- Vanuatu

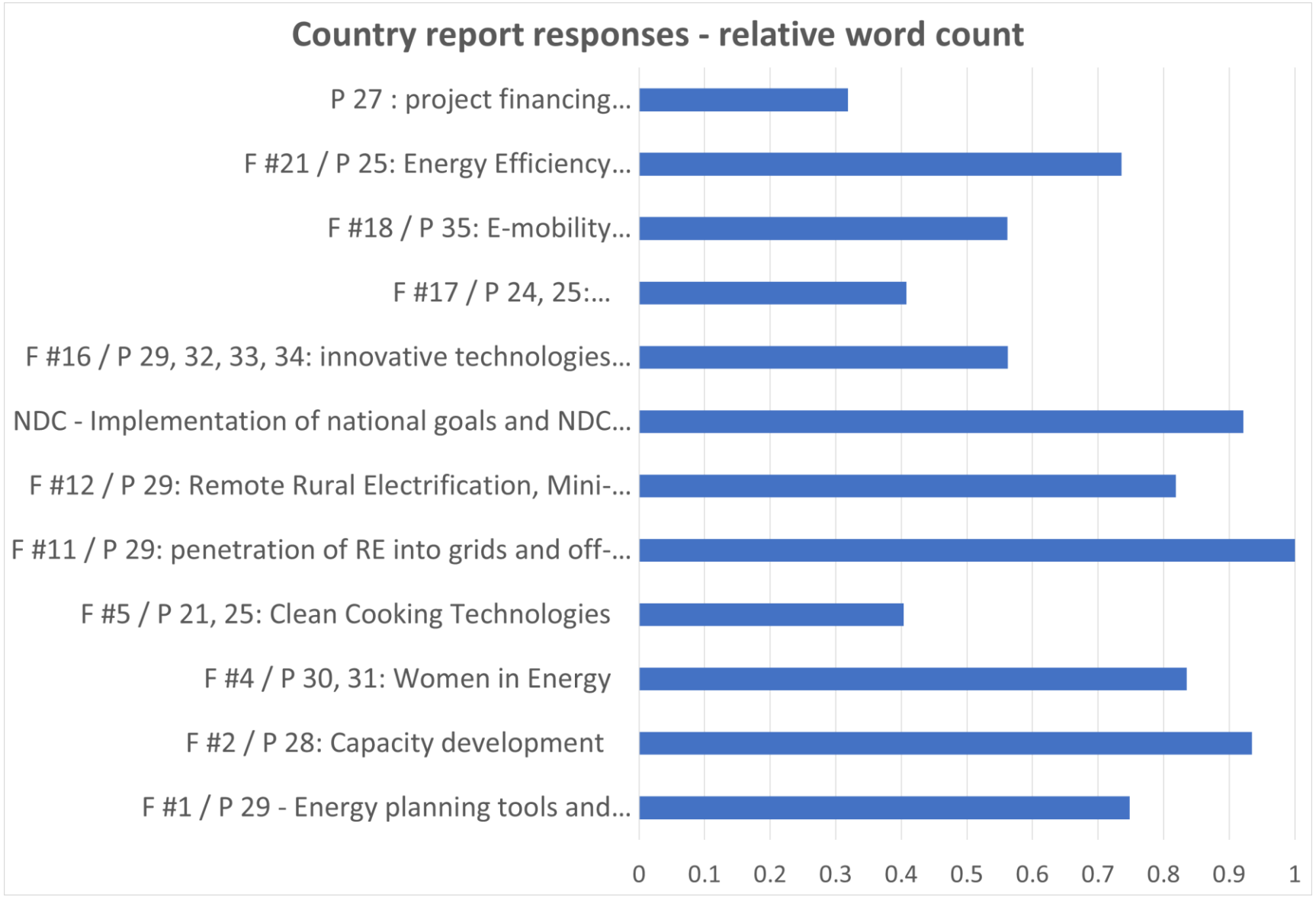
- Slight increase in RE share from 2018 to 2020
- Downward trend since 2020, 18.3%.
- Hydro share has increased slightly.
- Challenges with wind-turbines are reaching end of life, no plans for replacement.
- Solar PV increasing but many small sized project without significant impact.



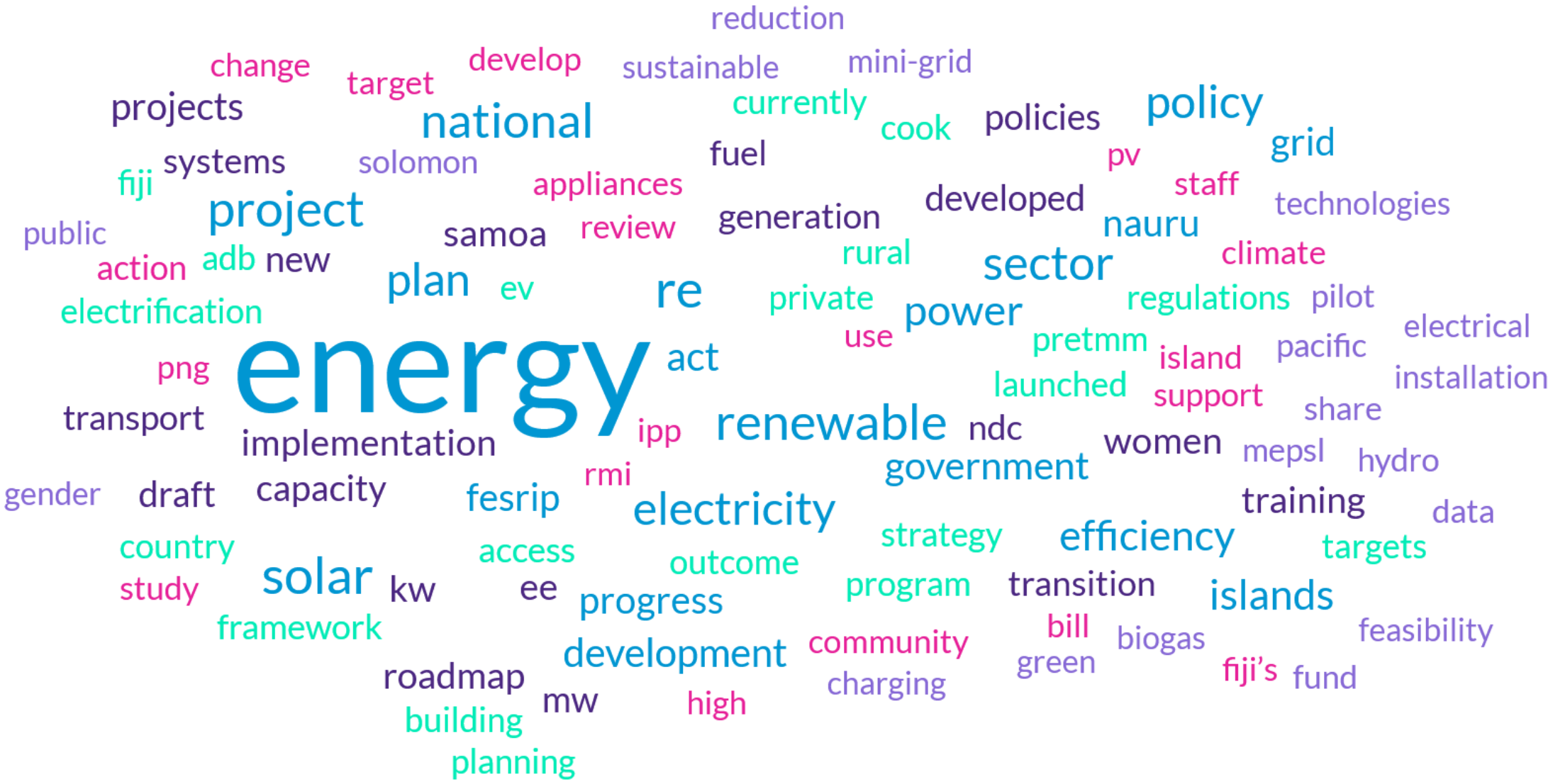
Country report responses to each priority



Country summary presentations



Word cloud – top 100



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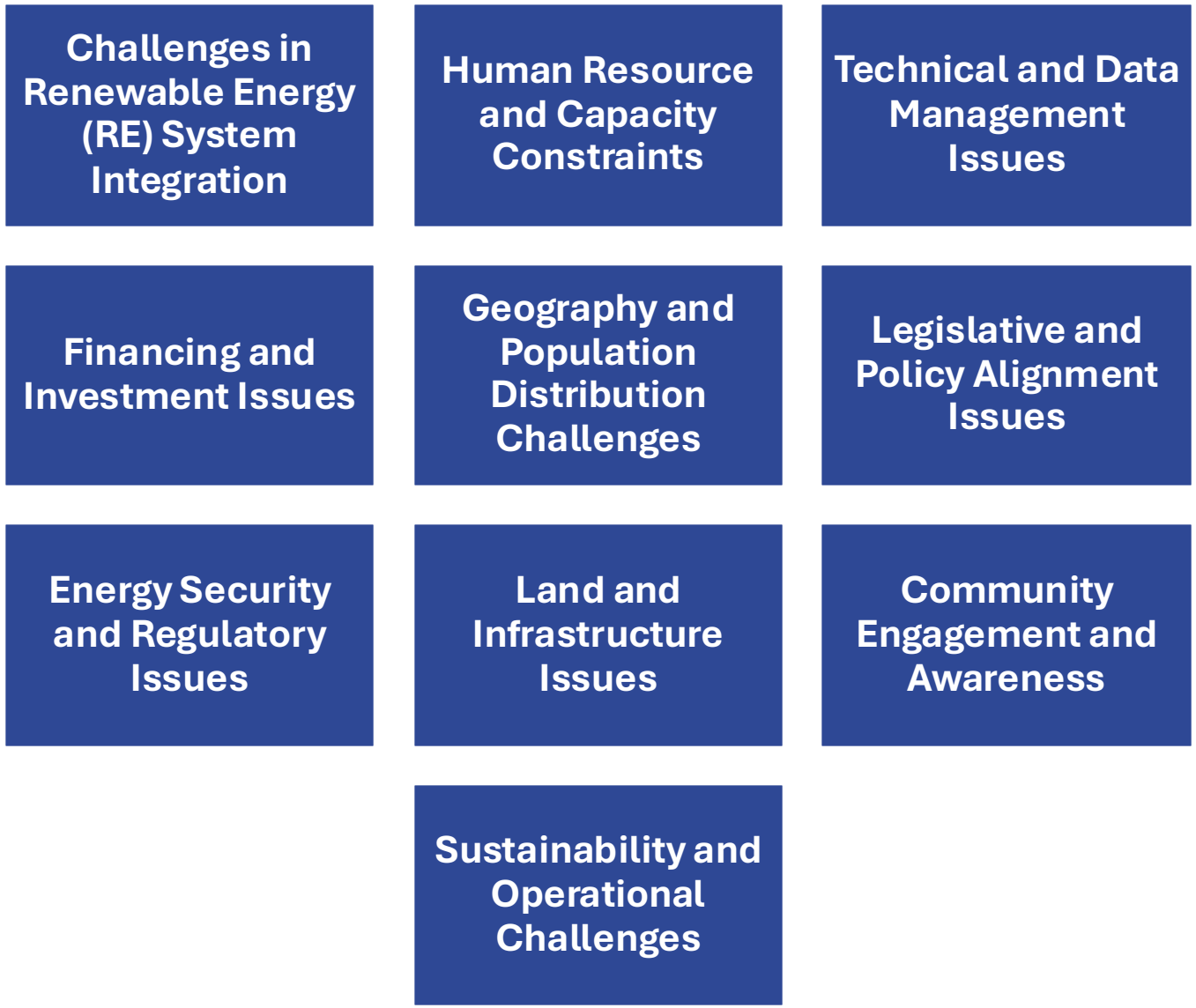
CHALLENGES



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CHALLENGES

1. Challenges in Renewable Energy (RE) System Integration:

- Larger systems and high RE penetration are more costly and complex.
- Balancing future demand with investment costs.
- Skilled labour mobility and costs.
- Equipment availability
- Market volatility and sustainability issues (companies going off-market).

2. Legislative and Policy Alignment Issues:

•Shifts in government priorities

- Slow transition to renewable energy compared to targets.
- Delayed adoption of Minimum Energy Efficiency Standards (MEPSL).
- Need for legislative alignment to drive RE investments.
- Lack of data from other sectors like transport and industry.
- Impact of adverse weather on projects implementation, as well as RES such as dry weather on hydro power

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CHALLENGES

3. Human Resource and Capacity Constraints:

- High employee turnover and understaffing.
- Transition challenges under new energy legislation
- Insufficient capacity to develop energy regulations and policies.
- Lack of skilled human resources.
- Limited capacity for data management and policy development.

4. Geography and Population Distribution Challenges:

- Geographically scattered communities with high percentage of population living in rural areas
- Difficulty accessing and maintaining RE systems.
- High transportation costs.
- Vulnerability to natural disasters and climate change impacts.

5. Financing and Investment Issues:

- Limited funding for RE and electricity programs.
- No conditional NDC funding support for RE project implementation.

CHALLENGES

6. Energy Security and Regulatory Issues:

- Energy security concerns due to reliance on fossil fuels.
- Slow policy and regulatory framework development.
- Transition of energy management from the Ministry of Finance to Ministry of Works and Infrastructure.

7. Community Engagement and Awareness:

- Lack of community commitment and societal divisions.
- Need for better engagement and coordination of RE projects across all sectors.
- Inadequate outreach and funding for energy awareness campaigns.

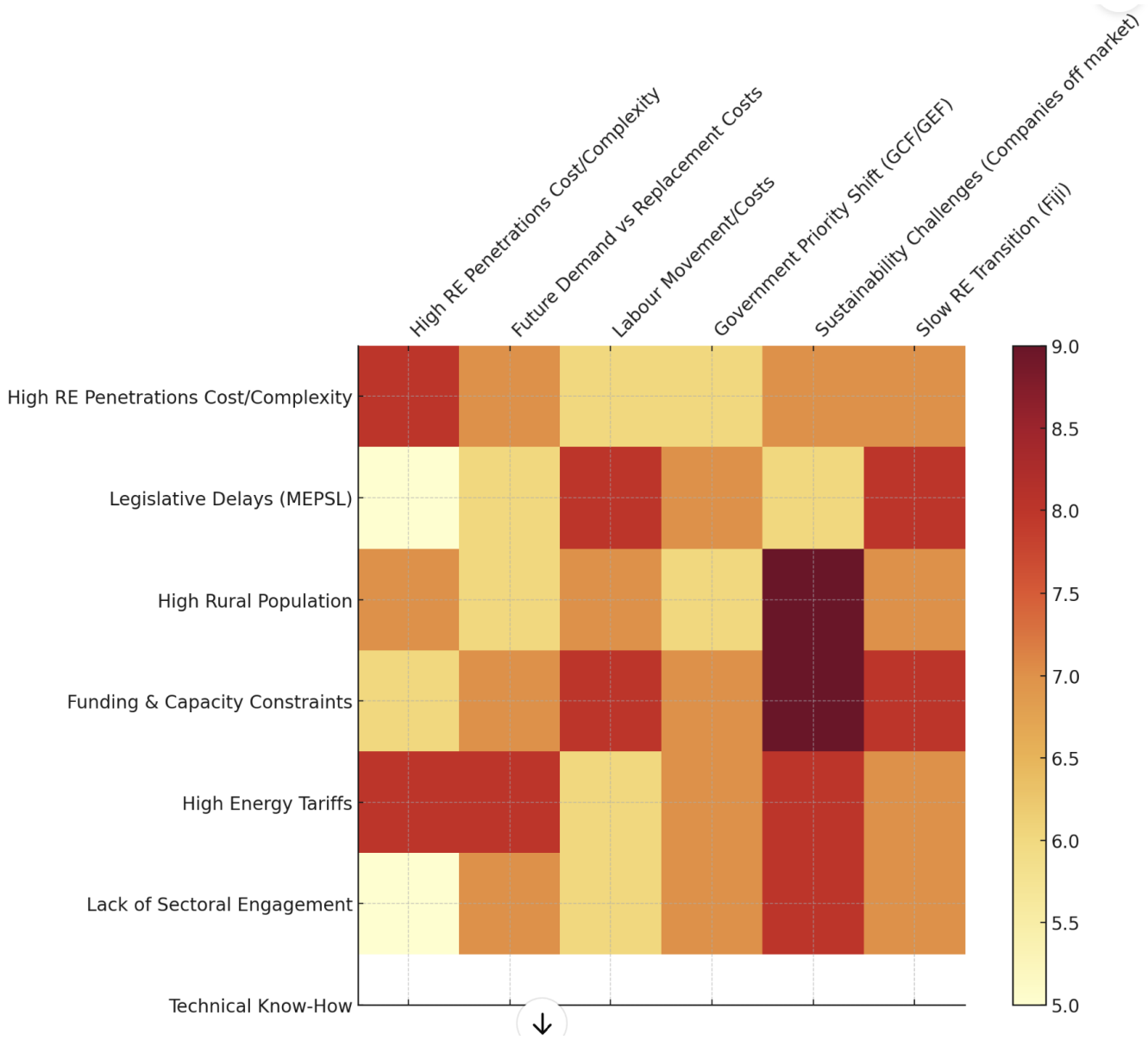
8. Land and Infrastructure Issues:

- Customary land ownership poses challenges to RE project development.
- Geographical landscape and ownership issues complicate energy access and development.

9. Technical and Data Management Issues:

- Lack of technical expertise in RE implementation.
- Limited data collection and management capacity.
- Absence of up-to-date educational resources on RE, particularly at primary and tertiary levels.

CHALLENGES


High RE Penetrations Cost/Complexity
Future Demand vs Replacement Costs
Labour Movement/Costs
Government Priority Shift (GCF/GEF)
Sustainability Challenges (Companies off market)
Slow RE Transition (Fiji)
High RE Penetrations Cost/Complexity
Legislative Delays (MEPSL)
High Rural Population
Funding & Capacity Constraints
High Energy Tariffs
Lack of Sectoral Engagement
Technical Know-How
9.0
8.5
8.0
7.5
7.0
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6.0
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5.0

OPPORTUNITIES

Business Opportunities	Public-Private Partnerships and Innovation	Capacity Building and Policy Development
Political Support	Electricity Roadmap	Decentralized Energy Solutions
Development Partner Support	New Energy Sources	Policy and Funding Initiatives

OPPORTUNITIES

Business Opportunities:

Renewable energy (RE) through net metering and independent power producers (IPP).

Introduction of new technologies and skills.

Clean, reliable energy available 24/7.

Public-Private Partnerships and Innovation:

Increased involvement of public-private partnerships (PPPs) and IPPs.

Exploring innovative RE solutions beyond solar and creating mechanisms for R&D.

Opportunities to empower Pacific women as energy professionals.

More RE will reduce business costs and drive economic growth.

Capacity Building and Policy Development:

Short-term, in-country training.

Engagement of consultants to review and develop energy policies.

OPPORTUNITIES

Political Support:

High political will and strong partnerships.

High potential for renewable energy projects in some countries

Electricity Roadmap:

Biennial Energy Week lacks budget, relying on development partners.

Focus on streamlining policies, capacity building, data training, and sectoral development.

Raising community awareness and enhancing development.

Decentralized Energy Solutions:

Implementation of decentralized energy and climate-resilient infrastructure.

Focus on community benefits, storage systems, and base-load development via hydropower/geothermal.

Training and support required for accelerated RE implementation.

OPPORTUNITIES

Development Partner Support

Bilateral cooperation for specific projects.

Scholarships for skill development to be delivered through educational institutions (TTI, TNU).

New Energy Sources:

Focus on ocean energy, waste energy, wind, and hydrogen.

Policy and Funding Initiatives:

Article 6.2 (Internationally transferred mitigation outcomes ITMOs).

Policy reforms in renewable energy, PPPs, and incentives.

Leveraging the National Green Energy Fund (NGEF) and UNDP initiatives.

Implementation of the National Electrification Master Plan and energy transition pathways.

Q&A, Feedback

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