Powering Pacific Island Countries
Renewable Electricity Generation in the Pacific

30th September 2024

IFC International Finance Corporation
WORLD BANK GROUP

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The Problem: Oil-based generation in the Pacific results in high cost, local pollution and high Consumer Tariffs

1. Diesel is most expensive source of power generation (cost of generation US$ 30-50 cents per kWh)

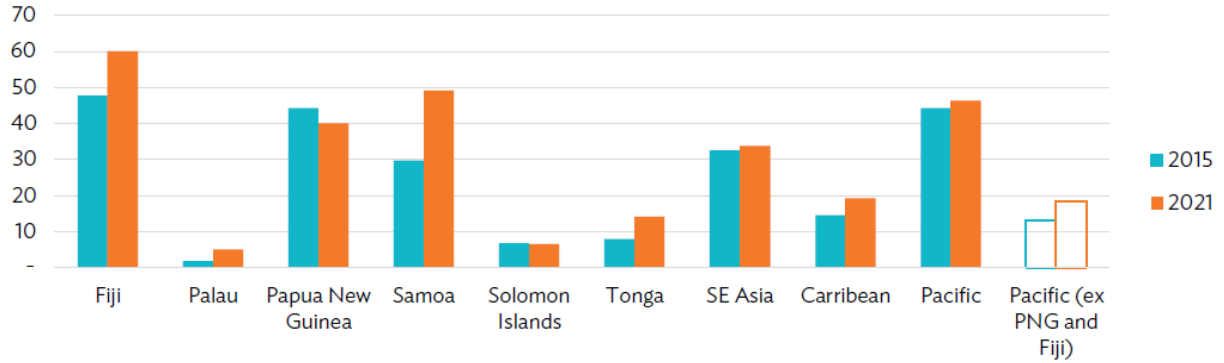
2. Pacific Island Countries (PICs) have highest diesel usage in power generation worldwide (30% to 100% of primary energy usage)

3. Pacific region has the highest electricity tariffs in the world (US$ 25 cents to US$ 1 per kWh)

4. Some PICs choose to subsidize end-user tariff at great cost to government annual budgets

Renewable Energy Generation Targets already reflect this economic reality, but implementation is lagging

Current Generation Share of RE (2015-2021) %

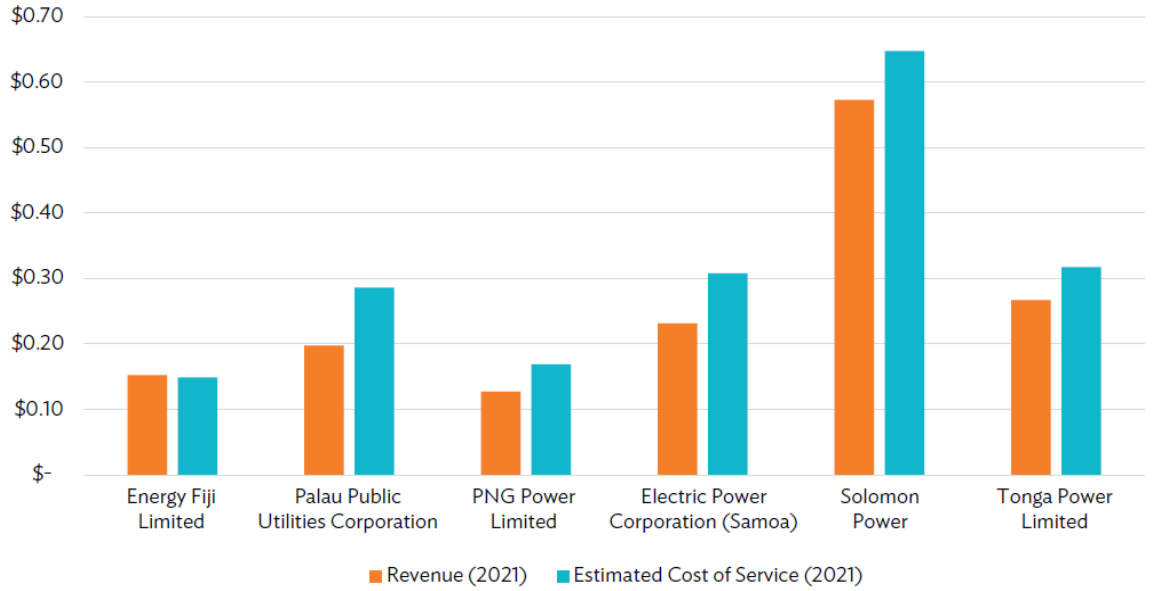


PNG =Papua New Guinea, SE = Southeast

Note: The increase in renewable energy share in the Pacific over the period is largely accounted for by Fiji, which saw a rise of 12% of its renewable energy share and 34% of total renewable energy generation in the region. This 12% increase in Fiji is due to the unusually low contribution of hydroelectric generation in 2015 (48%) due to drought, where it historically averaged 60%. The increase is not due to new investment in renewable energy capacity over the period.

Source: International Renewable Energy Agency. 2023. *Renewable Energy Statistics 2023*. https://www.irena.org/Publications/2023/Jul/Renewable-energy-statistics-2023.

Comparing utilities cost vs revenue $/kWh



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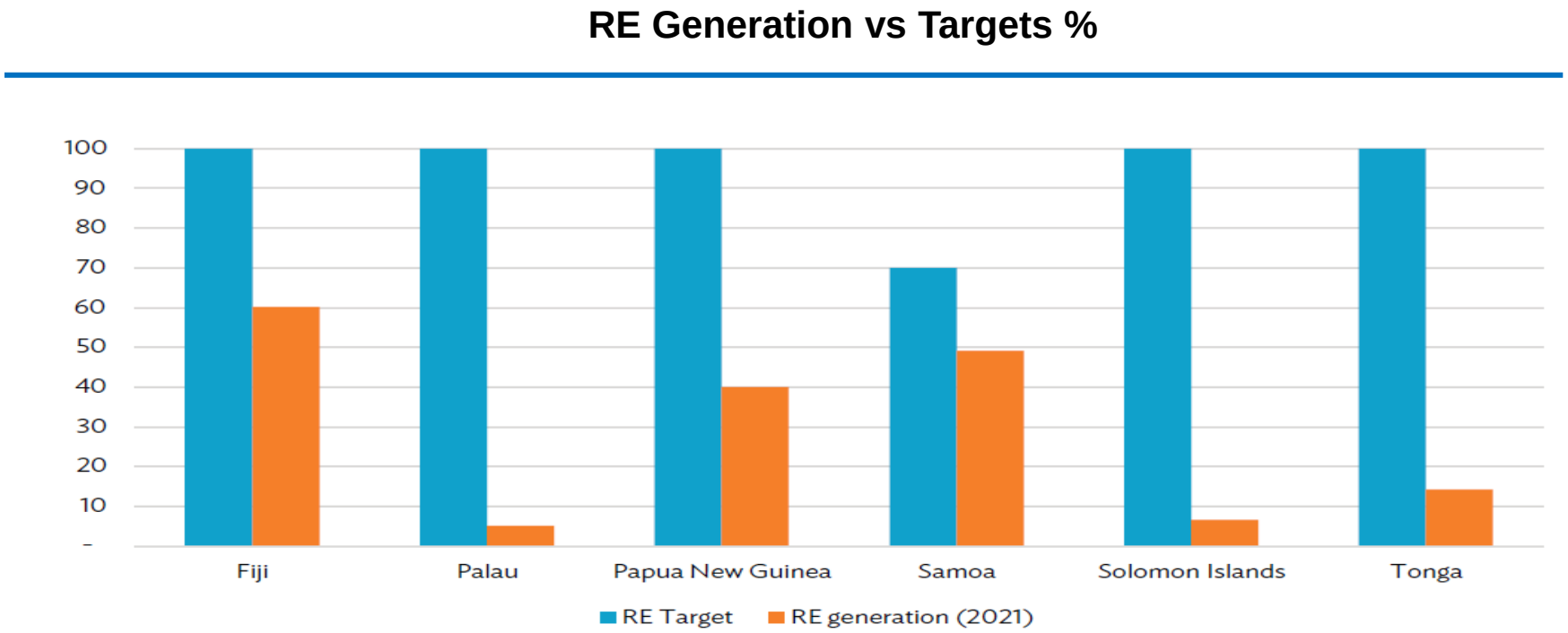

RE = renewable energy

Sources: Global Green Growth Institute. 2022. Tonga Adopts Policies to Achieve NDC Targets and Renewable Energy Goals. *News release.* 23 September;

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Government of Solomon Islands. 2022. Solomon Islands Renewable Energy Roadmap Launched. *News release.* 22 July. https://solomons.gov.sb/solomon-islands-renewable-energy-roadmap-launched.

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United Nations Development Programme. 2020. Promoting Renewable Energy in Papua New Guinea. *News release.* 14 July. https://www.undp.org/papua-new-guinea/press-releases/promoting-renewable-energy-papua-new-guinea.

The Solution? Renewable energy solutions in the Pacific are available at lower costs and can reduce reliance on diesel

	Cost US c/kWh	Diesel replacement	Ease of implementation	Time	Size	Investment cost
Solar	5-10	Low	Easy	Short	0.5-50 MW	Low
Solar + Battery	15-25	Med-High	Easy	Short	5-50 MW	Medium
Hydro	12-25	Med-High	Medium	Long	1-30 MW	High
Mini/Off Grid	25-40	Medium	Medium	Medium	5-30 MW	High

Solution: Increase utilization of Renewable Energy

Solar resource is strong across the Pacific






Solar resource potential is good throughout the Pacific






Hydro potential is very good in the large islands






Wind has some potential but not tested






Biomass appears promising in the larger countries






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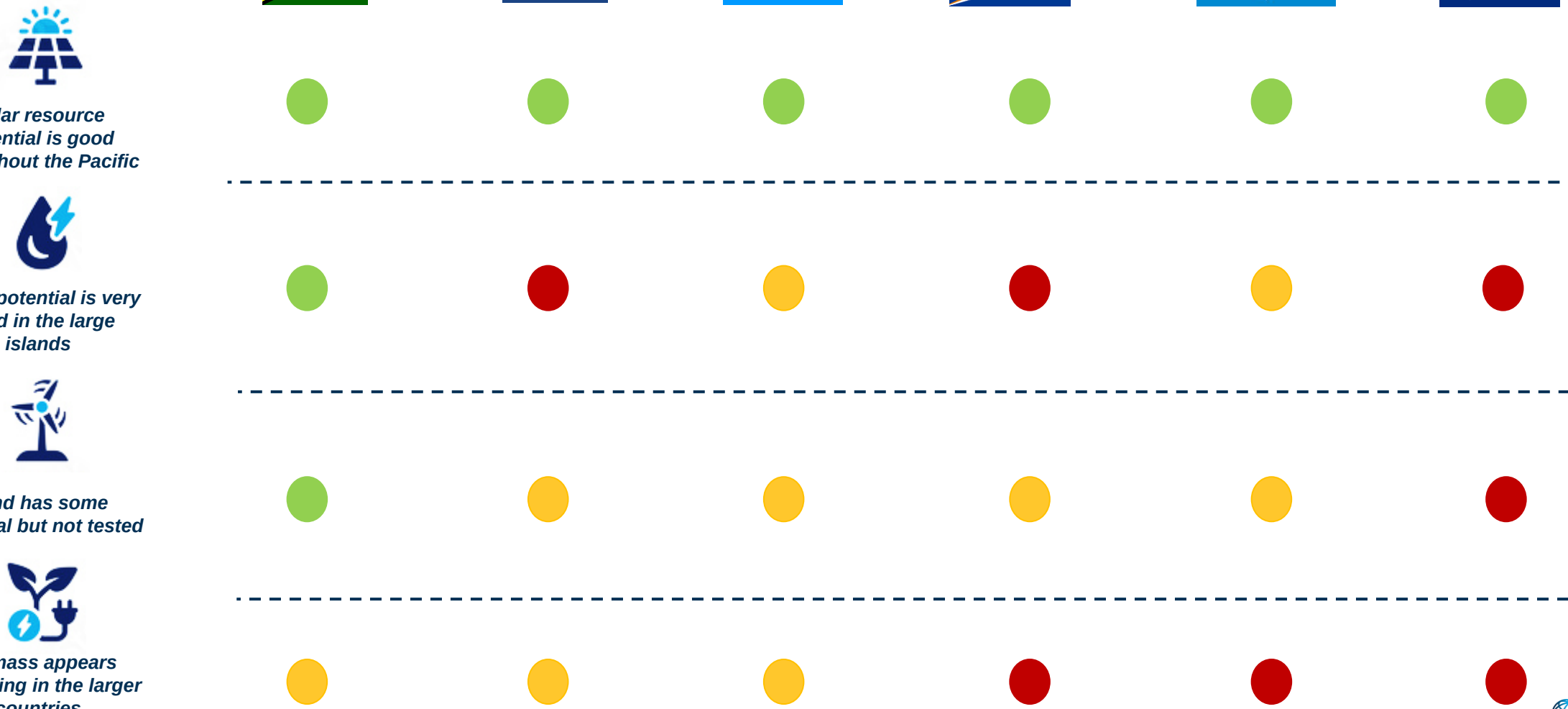

How to achieve the goals?
Private Investments will be needed

1. Investment needs are large
2. Government and Utility budgets are stretched
3. Private capital and know-how is available
4. Donor support for energy transition is available for private sector solutions

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How can IFC help? By mobilizing private capital to achieve long term targets

Creating Markets

- Government/regulator dialogue
- Private sector enabling
- Diagnostic and scoping studies

Creating Opportunities

- Early-stage project development
- Transaction advisory for tender

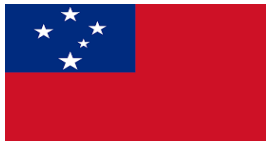
Crystalizing Investments

- Providing long term capital
- De-risking of projects for financing
- Mobilizing 3rd party investors
- Local currency financing solutions

Sector Intervention | **Project Stage** | **Investment**

Idea → Diagnostics → Tender → Client → Implementation → Financing

IFC engagement in energy transition in Pacific Islands - Examples

	Sectoral	Tender	Financing
	• Achieve RE Generation mix of 70% by 2025 and 100% by 2030. • **24 MW solar plus battery IPP tender to mobilize private investment.**		✓
	• Achieve RE Generation mix of 70% by 2025 and 100% by 2030. • **Tender solar plus battery IPP project to** replace diesel-based generation and reduce the cost to consumers.		✓
	• National energy policy committing to low carbon & RE • **Energy Fiji Limited working with IFC to tender first solar plus battery IPP** to replace diesel generation	✓	✓
	• Aim to connect 70% of PNG's population to electricity by 2030. • **PNG Power Limited working with IFC to tender 5 mini grids** to increase energy access	✓	✓
All PICs	• Diagnostic to scope opportunities in the Green Hydrogen for energy and other potential use cases	✓	
	• Engagement with the Prime Minister's Office and other stakeholders on development of a roadmap for electricity self-generation in PNG	✓	

Engage in mini grid/Off-grid Solutions in the Pacific

Critical role for private sector participation to provide Mini-grid and Off grid solutions to enable Pacific Island Nations to meet their renewable energy aspirations

EXAMPLE → IFC's support for PNG's remote mini grids

Provide advisory support to KCH/PNG Power Limited (PPL) – the state-owned power utility responsible for generation, transmission, distribution, and retailing of electricity – to structure and conduct a competitive tender to select a private sector concessionaire. The concessionaire will invest, upgrade, maintain and operate power generation, transmission and distribution assets at a selection of remote mini-grid centers:

PROBLEMS TO SOLVE

- Bridge urban-rural electricity divide in access to electricity
- Power cuts and high cost of traditional alternatives such as generators affect productivity and profitability
- Potential to increase efficiency and reliability across PPL operated 17 mini-grids across various locations in
- PPL loses about 4-500 million Kinas (KCH figure) per annum on servicing key provisional grids: low fixed national tariff vs high operational cost

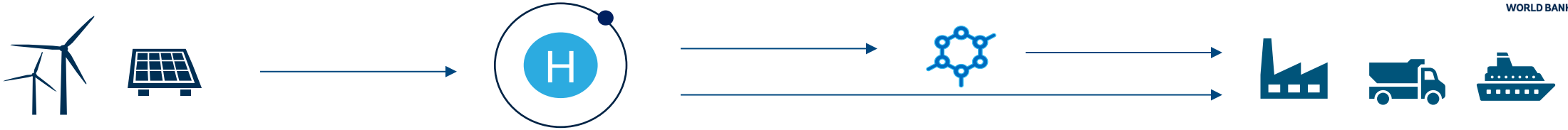
DEVELOPMENT IMPACT

- Increased access to reliable and affordable energy in remote and rural areas of PNG for up to more than 300,000 people
- Reliable power supply can foster the economic development of provincial centers
- Fiscal benefit for PPL as a result of annual fuel savings
- Introduce renewable energy to the current 100% diesel generation.
- Role for extensive extensive stakeholder and donor support with high impact

Any Questions?

Explore opportunities in new technologies such as Green Hydrogen

IFC is present in the hydrogen value chain



Renewable energy

- Financed over 20 GW of renewables in emerging markets – one of largest financiers
- Often plays market creator role (Scaling Solar, offshore wind)
- Work with premier clients, e.g.:

Green Hydrogen

- IFC works closely with World Bank on market-enabling activities, including:
  - Market studies (e.g. South Asia, H2 Fuel Cell – Transportation etc)
  - Country-level policy engagements
- IFC partnering with GH2 developers at early stage (co-financing studies, development work) in, for example, Chile, Brazil, Pakistan, India, Barbados, etc

Chemicals

- IFC has decades of experience in financing projects with hydrogen derivatives (ammonia, methanol, etc) in emerging markets
- Current portfolio includes 68 projects* in chemicals and fertilizer space. Key clients:

Downstream Uses

- Significant experience in sectors with downstream applications for hydrogen, including refining, transport, mining, steel
- Strong ties to clients across end-user industries, including Transport, metals and mining, gas and refineries, as well as steel, cement and glass

Scoping Use cases in the Pacific

Specific use cases may present possibilities for the Pacific. We are assessing these in conjunction with surplus RE availability, infrastructure constraints, regulatory frameworks, and potential donor support

- Exploring PNG's potential for export of Green Hydrogen and/or its derivatives leveraging the country's Hydro/geothermal potential and existing gas infrastructures
- Domestic use case in Fiji and Vanuatu in the port and transport sectors (e.g., shore power, port vehicles, heavy vehicle refueling)
- Use of GH2 Fuel Cell as energy storage together with intermittent renewable energy sources for potential early-stage project development

Thank you!

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What else IFC can do - Examples

Power for Mines - Potential opportunity for mining in PNG and Solomon Islands

Context for Renewable Energy in Mining

- Globally, there are an **estimated 6,000 MW of diesel gensets in off-grid mines, producing power at rates typically in excess of 15-18 US cents/kWh.** Utility-scale wind and solar plants can generate power at half this cost, below even HFO generation costs, and – when coupled with flexible generation or storage – can satisfy the majority of a mine's power demand.
- The traditional Independent Power Producer (IPP) model for renewable energy power supply is often not suitable for mining projects, usually because the operator:
  - prefers to retain control over key mine assets (for operational or fiscal reasons);
  - is unable to sign long term offtake agreements; and/or
  - is not comfortable taking the lead on Renewable Energy build-out (e.g., feasibility studies, financing, procurement, EPC contracting, O&M agreements etc.), as this is not their core business.

IFC Approaches to Renewable Energy in Mining

- IFC is able to:
  - **Provide corporate-level renewable energy facilities,** which mining firms can use to procure renewable energy plants on an EPC basis at several of their operations; or
  - **Help to structure and select an IPP**, who will procure and operate the renewable energy plant.
  - Alongside financing**, run the procurement process** based on IFC's successful Scaling Solar model, including standard documentation, technical requirements, bidder qualification criteria etc.
  - Provide advisory/upstream support for early stage project development as well as Blended finance resources

Complemented by IFC's Renewable Energy Portfolio

This builds on IFC's experience over 10 years of financing 3 GW+ of solar PV and 4 GW+ of wind projects. Working with IFC on renewable energy allows the mining company to benefit from low-cost renewables on a large scale without having to shift focus from their core business.

What else IFC can do - Examples

Distributed Generation - Opportunity for the Pacific if regulations are conducive

Why Distributed Generation

- Distributed Generation refers to business models where power is generated at or near the point of consumption by a variety of mostly dispersed, grid-connected or off-grid distributed energy resources. Accounting for 60-80% in cost reductions since 2010, distributed PV makes up most (~90%) of the overall DG segment.
- DG is now fundamentally cost competitive with limited atypical/unjustifiable regulatory support, other than a proper enabling environment. As compared to utility-scale solar PV, DG is relatively faster and easier to implement with smaller E&S impacts and permitting requirements
- DG's relatively smaller size facilitates access to competitive clean energy to smaller consumers which would not have otherwise access to wholesale markets or are able to anchor long term PPAs
- DG installed capacity is expected to grow 3x globally between 2022 and 2026

IFC Experience in DG

- IFC has invested in various business models in the C&I space since 2014, including $2 million equity investment in Sunergise in the Pacific.
- IFC portfolio includes several Commercial & Industrial (C&I) DG projects with a total commitment of US$224 million along with a robust near-term pipeline.
- IFC's also has extensive experience through several upstream initiatives including global and regional scoping and analysis as well as early-stage pipeline development and stakeholder management.