

SIDS Lighthouses Initiative

OVERVIEW OF IRENA'S CLEAN ENERGY INITIATIVES IN THE PACIFIC REGION

7th September 2023

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- » Established in 2011
- » Headquarters in Masdar City, Abu Dhabi, UAE
- » IRENA Innovation and Technology Centre – Bonn, Germany
- » Permanent Observer to the United Nations – New York, USA

Mandate

To promote the widespread adoption and sustainable use of **all forms of renewable energy** worldwide.



Bioenergy



Geothermal Energy



Hydropower



Ocean
Energy



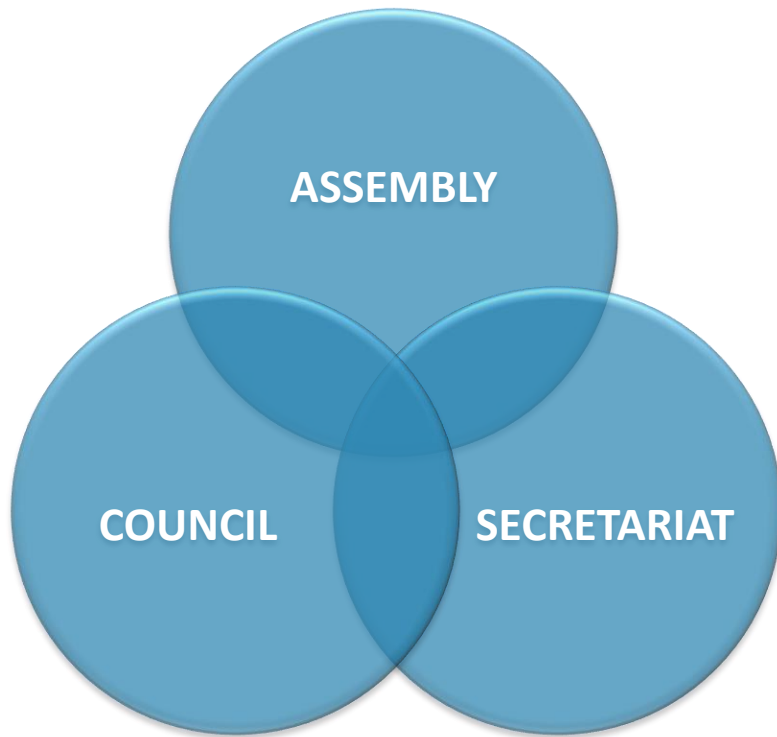
Solar
Energy



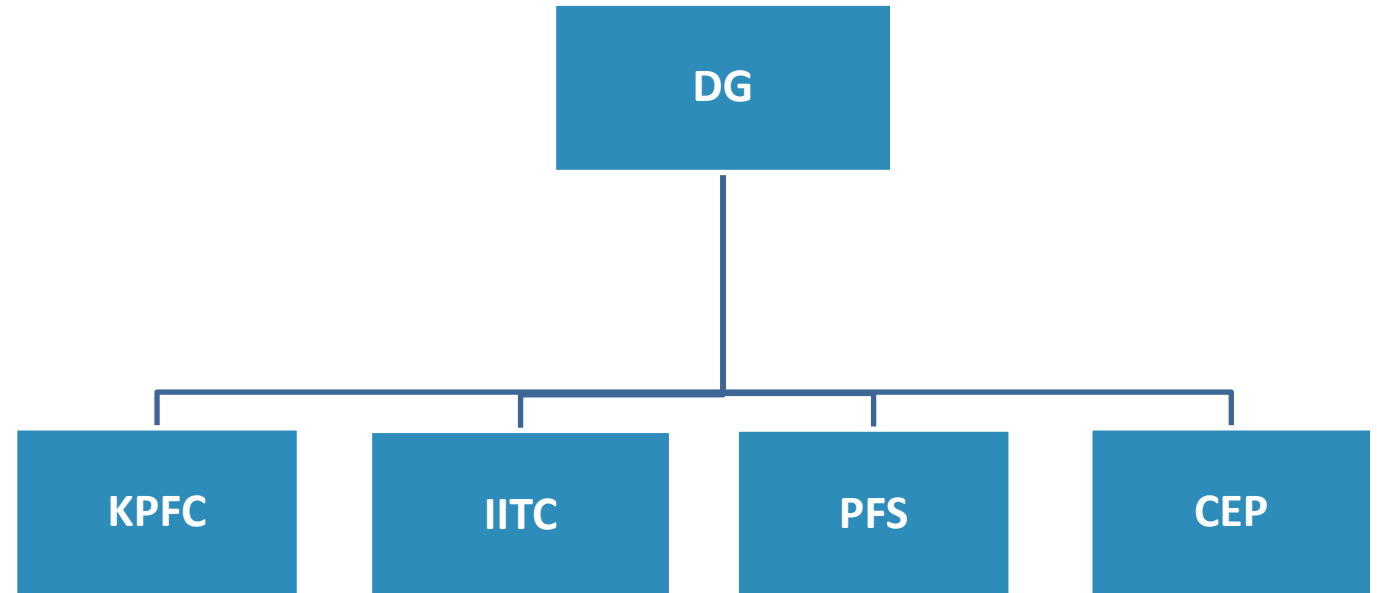
Wind
Energy

IRENA INSTITUTIONAL STRUCTURE

Principal Organs

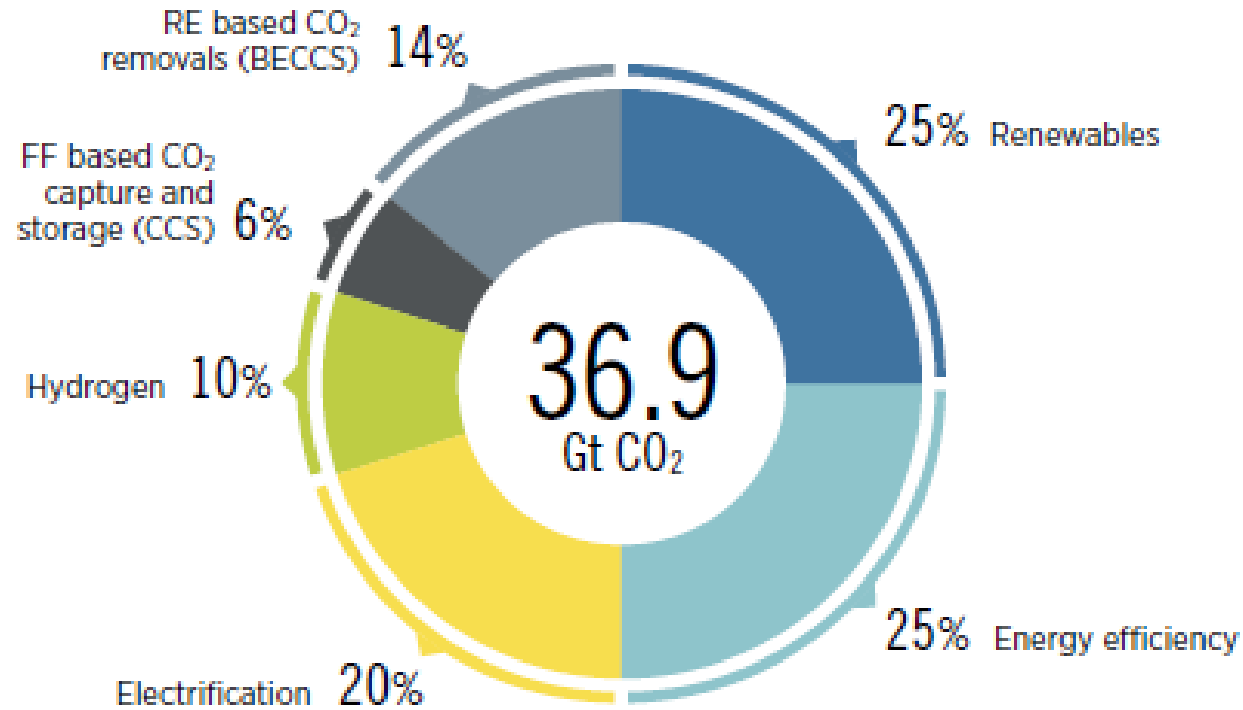


IRENA Secretariat

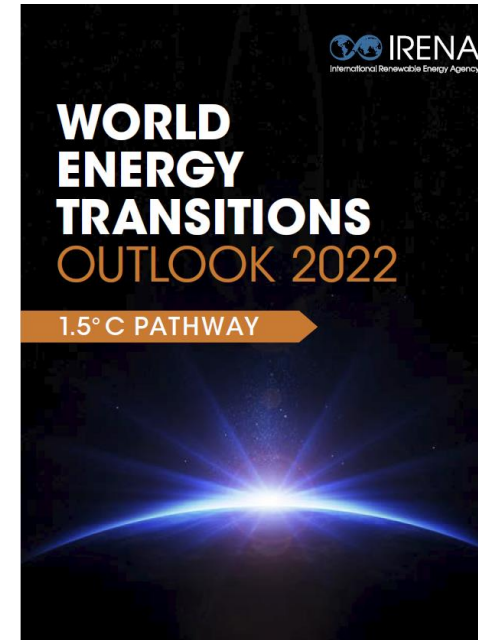


Technological avenues to climate targets

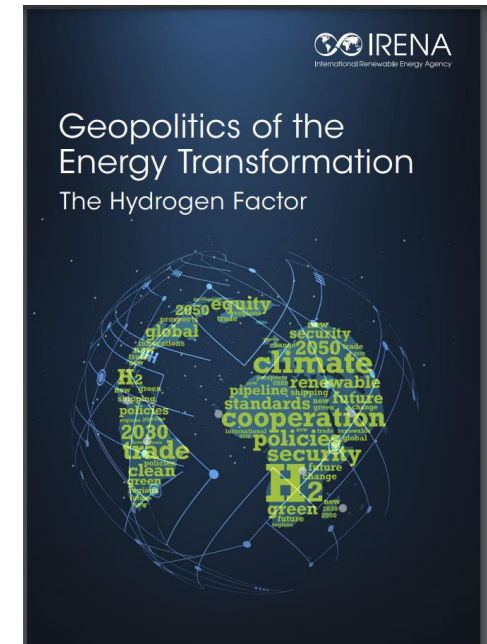
Reducing emissions by 2050 through six technological avenues



Source: IRENA, 2022

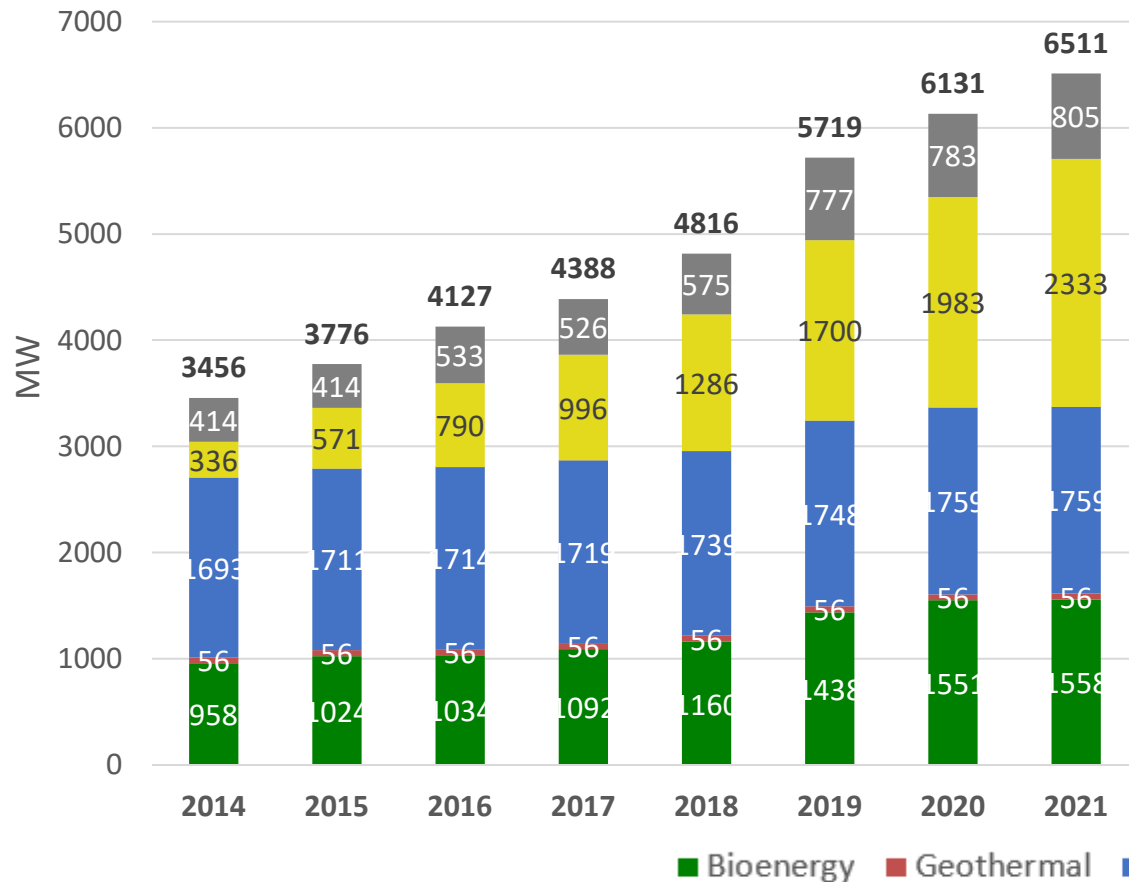


IRENA, 2022

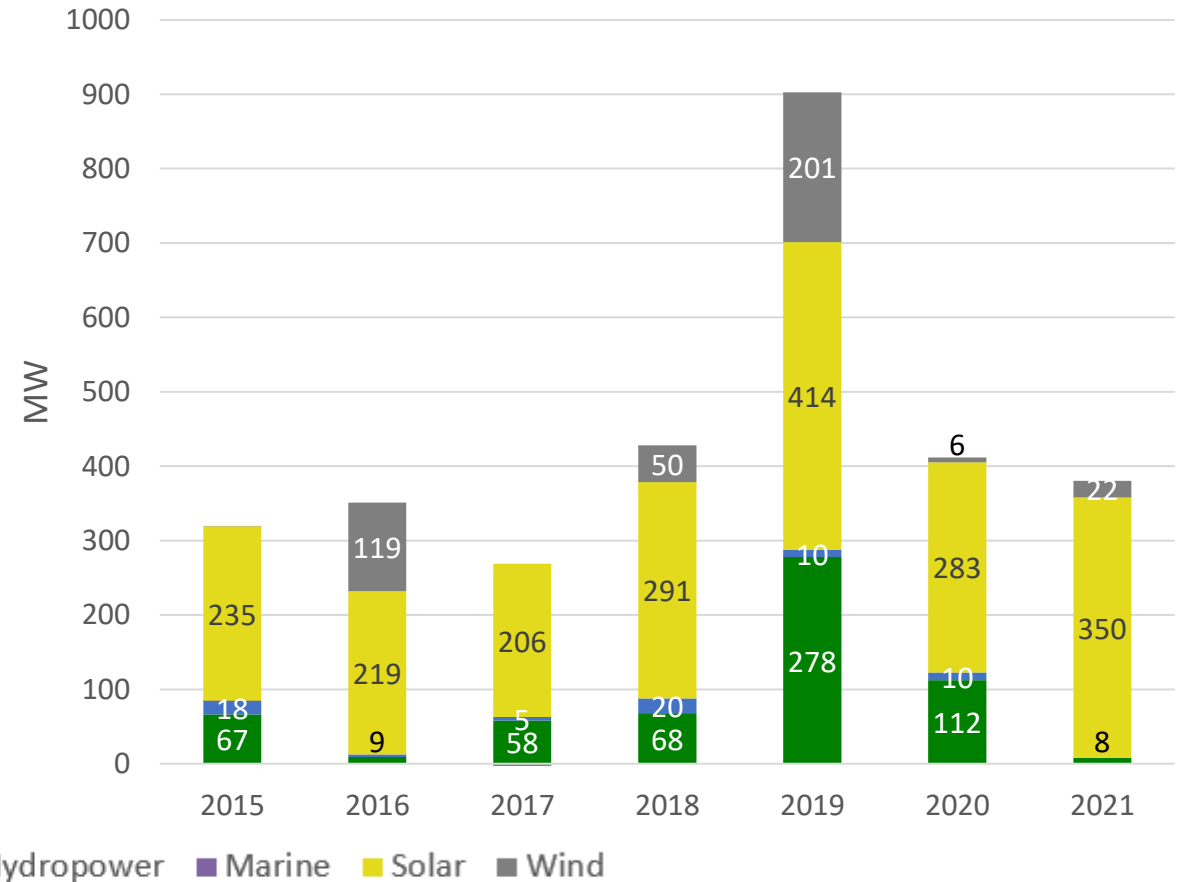


IRENA, 2022

Total installed renewable energy capacity by technology (MW, 2014 - 2021)



Yearly new renewable energy capacity additions (MW, 2015-2021)



SIDS LIGHTHOUSES INITIATIVE

PROGRESS AND WAY FORWARD



| Caribbean | | Installed capacity (MW) 2021 | |
|--------------------------|-------|------------------------------------|----|
| • Antigua and Barbuda | 17 | • Grenada | 4 |
| • Aruba | 38 | • Guyana | 53 |
| • The Bahamas | 2 | • Montserrat | 1 |
| • Barbados | 50 | • Saint Kitts and Nevis | 4 |
| • Belize | 103 | • Saint Lucia | 4 |
| • British Virgin Islands | 1 | • Saint Vincent and the Grenadines | 8 |
| • Cuba | 1 281 | • Trinidad and Tobago | 4 |
| • Curaçao | 60 | • Turks and Caicos Islands | 1 |
| • Dominica | 7 | | |
| • Dominican Republic | 1 532 | | |

| Pacific | | Installed capacity (MW) 2021 | |
|------------------------------------|-----|------------------------------|-----|
| • Cook Islands | 5 | • Niue | 1 |
| • Fiji | 220 | • Palau | 2 |
| • Kiribati | 3 | • Papua New Guinea | 335 |
| • Marshall Islands | 2 | • Samoa | 29 |
| • Micronesia (Federated States of) | 3 | • Solomon Islands | 4 |
| • Nauru | 2 | • Tonga | 8 |
| • New Caledonia | 199 | • Tuvalu | 2 |
| | | • Vanuatu | 12 |

| Atlantic, Indian Ocean and South China Sea | | Installed capacity (MW) 2021 | |
|--|--|------------------------------|--|
| • Cabo Verde | | 35 | |
| • Comoros | | 1 | |
| • Maldives | | 32 | |
| • Mauritius | | 246 | |
| • São Tomé and Príncipe | | 3 | |
| • Seychelles | | 15 | |
| • Singapore | | 651 | |

| Other Partners | |
|---|--|
| • Australia | • Indian Ocean Commission |
| • Denmark | • International Renewable Energy Agency |
| • France | • Islands and Small States Institute |
| • Germany | • Island Innovation |
| • Italy | • Islands Policy Lab-University of Delaware |
| • Japan | • Organisation of African, Caribbean and Pacific States |
| • Kingdom of the Netherlands | • Organisation of Eastern Caribbean States |
| • New Zealand | • Pacific Islands Development Forum |
| • Norway | • Pacific Community |
| • United Arab Emirates | • Pacific Power Association |
| • United States of America | • Rocky Mountain Institute - Carbon War Room |
| • Akvo | • Solar Head of State |
| • Association of the Overseas Countries and Territories of the European Union | • Sustainable Energy for All |
| • Caribbean Climate-Smart Accelerator | • Sur Futuro Foundation |
| • Caribbean Electric Utility Services Corporation | • United Nations Development Programme |
| • Clean Energy Solutions Center | • United Nations Office of the High Representative for the Least Developed Countries |
| • Clinton Climate Initiative | • University of Malta |
| • ENEL | • Landlocked Developing Countries and Small Island Developing States |
| • European Union | • World Bank |
| • Greening the Islands | |

“Although we stand at the forefront of climate change, we also need to do our part at home. We cannot ask our largest partners and our largest friends to act when we don’t take action at home; otherwise, we will never go anywhere.”

HE Mr Surangel Whipps, President of Palau, SIDS Ministerial, IRENA 13th General Assembly, Abu Dhabi, 13 January 2023

Disclaimer: This map is provided for illustration purposes only. Boundaries and names shown on this map do not imply the expression of any opinion on the part of IRENA concerning the status of any region, country, territory, city or area or of its authorities, or concerning the delimitation of frontiers or boundaries.

39 SIDS and 34 Partners

- Addresses all elements of energy transition for the holistic sustainable development of SIDS
- 11 priority areas
- Target of **total installed RE capacity of 10 GW for all SIDS by 2030** forms the basis of the AOSIS-IRENA energy compact.

NDC support,
Technical Assistance, Capacity Building

Implementation
Innovative Solutions

All renewable energy sources

Access to finance
Private Sector Engagement

Institutional and Human Capacity

Transport
Other end-use sectors

Energy Efficiency

Nexus
Socio-economic development
Gender

Climate Resilience
Disaster recovery

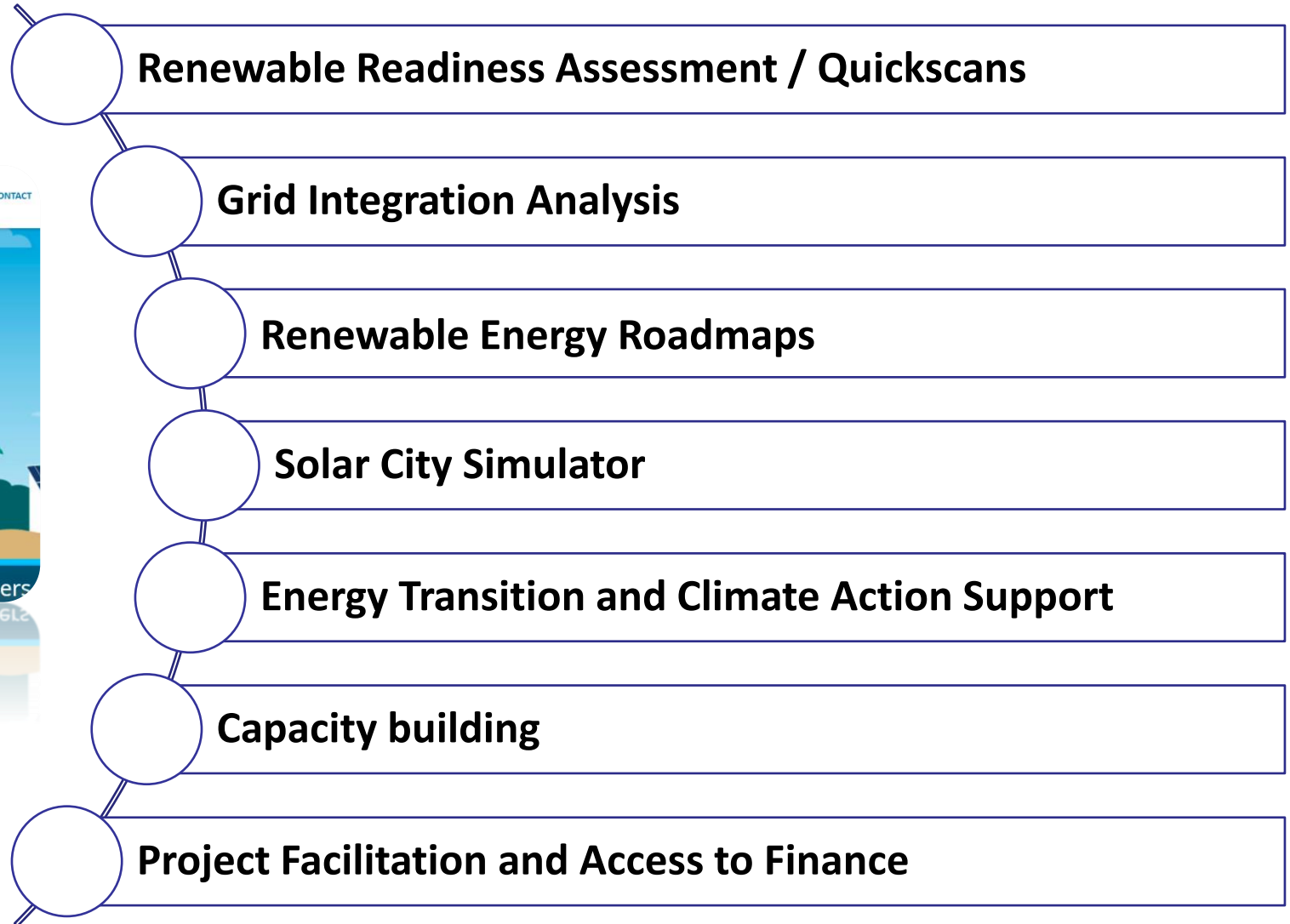
Statistics

Synergies with other SIDS initiatives

Target of a total of RE installed capacity of 10 GW for all SIDS by 2030



Knowledge Hub and Dissemination
<https://islands.irena.org/>



Renewable Readiness Assessment

- It is a comprehensive tool for assessing the conditions existing in a country for the development and deployment of renewables along with the actions required to improve those conditions.

Quickscan 2.0

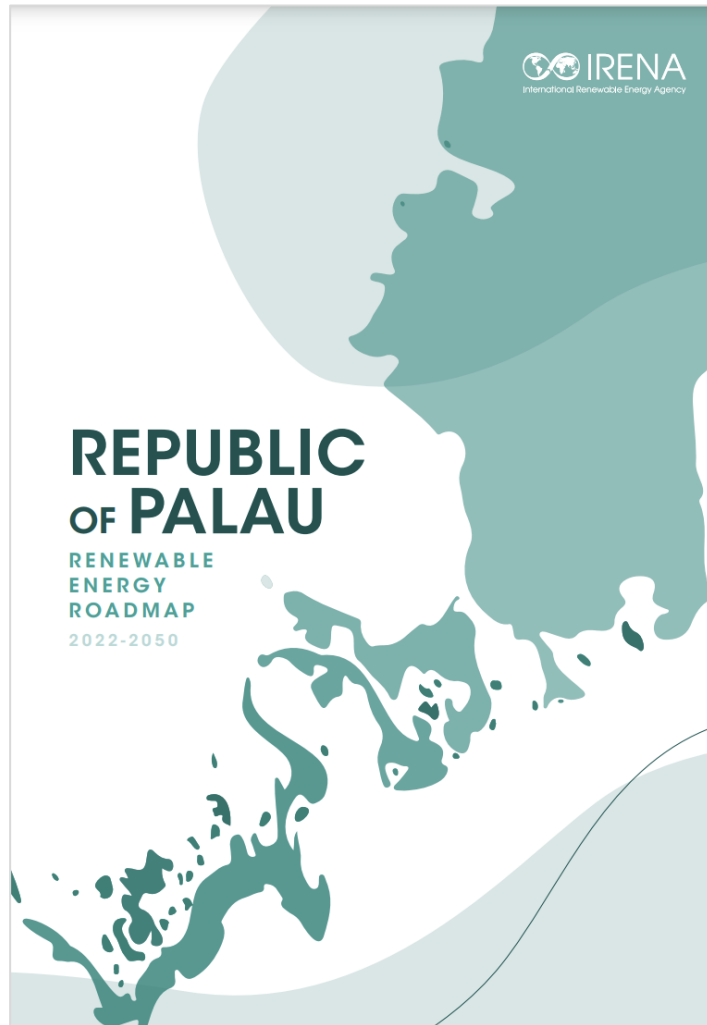
- Questionnaire encompassing 7 critical factors for a successful deployment of renewable energy in SIDS.
- It assesses deployment readiness within the power sector and identifies areas of immediate action to help SIDS governments and development partners in prioritising actions.

SolarCity Simulator

- It is a web-based simulator application combines ultra-high-resolution three-dimensional building footprints with solar irradiation data, computed at one meter grid cells.
- It can be used by end users such as households, businesses and municipal authorities to evaluate the potential of rooftop solar PV systems.

RE Roadmap

- Provides a holistic overview of the technical, economic and policy readiness necessary for renewables deployment.
- Helps to identify the least-cost power system and can additionally examine the scope of renewables penetration in end use activities and other sectors such as heating, cooling and transportation.



Source: IRENA, 2022

The RE Roadmap charts the way to net zero by 2050 for Palau’s power and transport sectors, looking in detail at several options for a least-cost, fully decarbonised power system. The 5 main scenarios modelled were:

1. Optimal system*
2. 100% renewable energy, PV plus wind
3. 100% renewable energy, PV only
4. 100% renewable energy, with hydrogen
5. 100% renewable energy, with hydrogen plus EVs

**The optimal system includes the current power system together with additional renewable capacity coupled with battery storage.*

Table S1: Investment requirements for each scenario

| MODEL/SCENARIO | OPTIMAL SYSTEM | 100% RENEWABLE ENERGY, PV+WIND | 100% RENEWABLE ENERGY, PV ONLY | 100% RENEWABLE ENERGY, HYDROGEN | 100% RENEWABLE ENERGY, HYDROGEN+EVs |
|-------------------------------------|----------------|--------------------------------|--------------------------------|---------------------------------|-------------------------------------|
| INITIAL CAPITAL COST (USD MILLIONS) | 126 | 249 | 266 | 179 | 189 |

A key recommendation for the government - if it is to achieve its proposed target of a 100% share for renewables by 2050 is to accelerate deployment of solar PV and battery storage systems through a combination of Palau Public Utilities Corporation (PPUC) investments and power purchase agreements (PPAs)

MRV Methodologies

- Technical assistance and capacity building on collecting, analysing, recording and reporting detailed and accurate data
- IRENA has supported SIDS to develop MRV for GHG emissions tracking, impacts of mitigation and adaptation actions, and climate finance flows

Fiji – Identification of data gaps and review of methodology for energy statistics to support the MRV process in the country

Palau – Technical assistance in implementing and analyzing the MRV template currently being used by UNFCCC

Grid Integration

- Synthesis report on findings of Grid Assessments in SIDS
- Survey to be issued to SIDS, utilities, regulators, private sector to identify key challenges and constraints to integrating RE; what impacts can be achieved by introducing VRE
- Workshop on findings to be scheduled for SIDS

Technical session conducted for countries on Grid Codes for Renewable Powered Systems

Socioeconomic Analyses

- Impact of the use of RE on inflation, income, employment
- Benefits of RE in terms of energy access and how it improves rural lives
- Effects of fossil fuels on GDP and cost of living actions, and climate finance flows

Pacific SIDS have expressed interest in the socioeconomic analysis.



- CIP is a joint initiative of IRENA, UNDP, and SEforALL in coordination with Green Climate Fund (GCF).
- Its mandate is to mobilise capital towards developing countries to accelerate the scale of RE technologies to meet NDCs targets and SDG compliance.
- CIP is a platform to facilitate the financing matchmaking between registered financing institutions and service providers and registered RE projects' proponents.



- ETAF is a climate finance platform to accelerate the Energy Transition
- ETAF is targeting USD 1Bn in capital mobilisation, with UAE's anchor investment of USD 400 million to deliver 1.5 GW renewable energy capacity
- It mobilises and helps channel financing through matchmaking funding with commercially feasible RE projects
- Support the implementation of ambitious NDCs and SDGs

Kiribati - Solar PV Off Grid projects (PID developed)

- PV Solar Off Grid for Outer Islands Church Headquarters Boarding Secondary School and 13 Outer Island Junior Secondary Schools communities

Fiji – Solar PV Home systems (under evaluation)

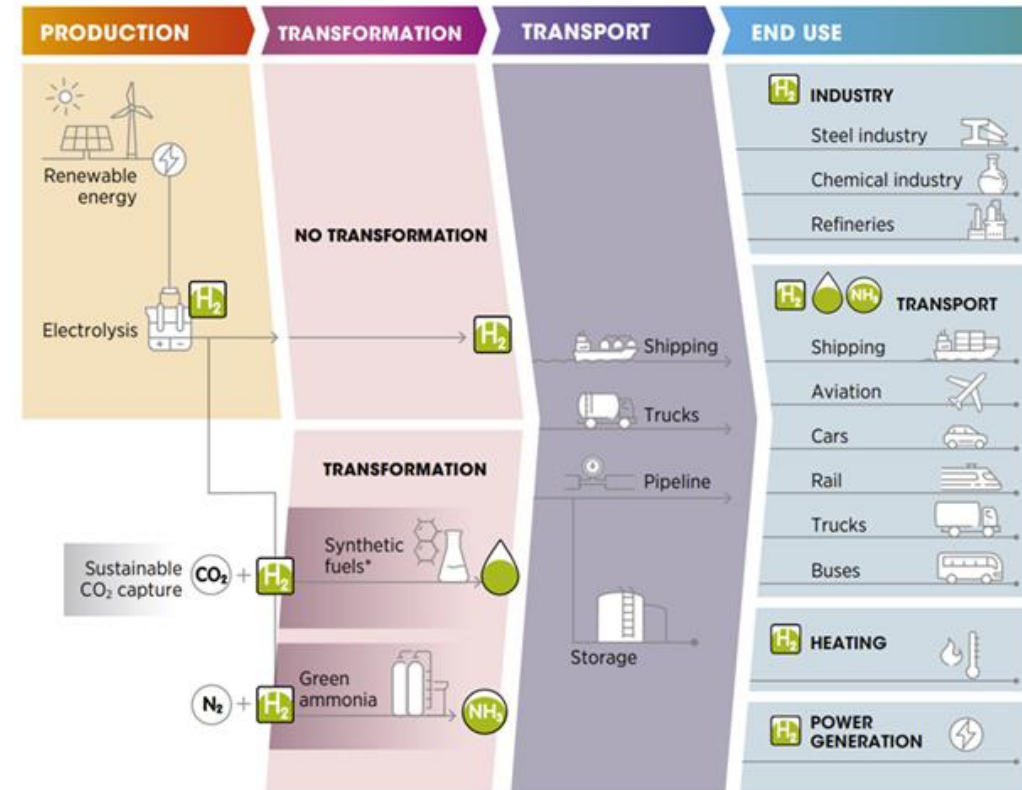
Other Programmes – IRENA SIDS LHI Initiatives

- i. Strategic Engagement and Partnerships
 - a. IRENA & AOSIS Strengthen Co-operation – MOU.
 - b. Islands energy transition towards a 1.5°C world: IRENA-AOSIS Energy Compact operationalized through the SIDS LHI
 - c. Greening the Islands Observatory
 - d. SPC Framework for Energy Security and Resilience in the Pacific
- ii. Supporting ADFD in the implementation of project of projects in PSIDS
 - a. ADFD Projects
 - b. Tina Hydro Power Project
 - c. Zayed Sustainability Prize
- iii. Promote all renewable sources, including geothermal and ocean energy, and step up work on wind and solar.
- iv. Leverage synergies between renewables and energy efficiency.
- v. Nexus for renewable energy and agriculture, food, health and water to foster broad socio-economic development including jobs, gender equality and women empowerment.
- vi. Data collection & Statistics.
- vii. Support development of bankable projects and cooperation with the private sector.
- viii. Capacity Building Support

Hydrogen Development (Global Level)

- In recent years, an increasing number of countries have committed to achieving net zero emissions.
- While energy efficiency, electrification and renewables can achieve 70% of the mitigation needed, hydrogen will be needed to decarbonise end uses where other options are less mature or more costly.
- Considering these applications, hydrogen could contribute around 10% of the mitigation needed to achieve the IRENA 1.5° C Scenario and 12% of final energy demand.
- Hydrogen is a versatile energy carrier.
- It can be produced from multiple feedstocks and can be used across virtually any application (see Figure).
- This renewable pathway which comprises the use of renewable energies to produce green hydrogen could potentially play a role for SIDS to reach a 100% renewable energy system.

Green hydrogen production pathway:



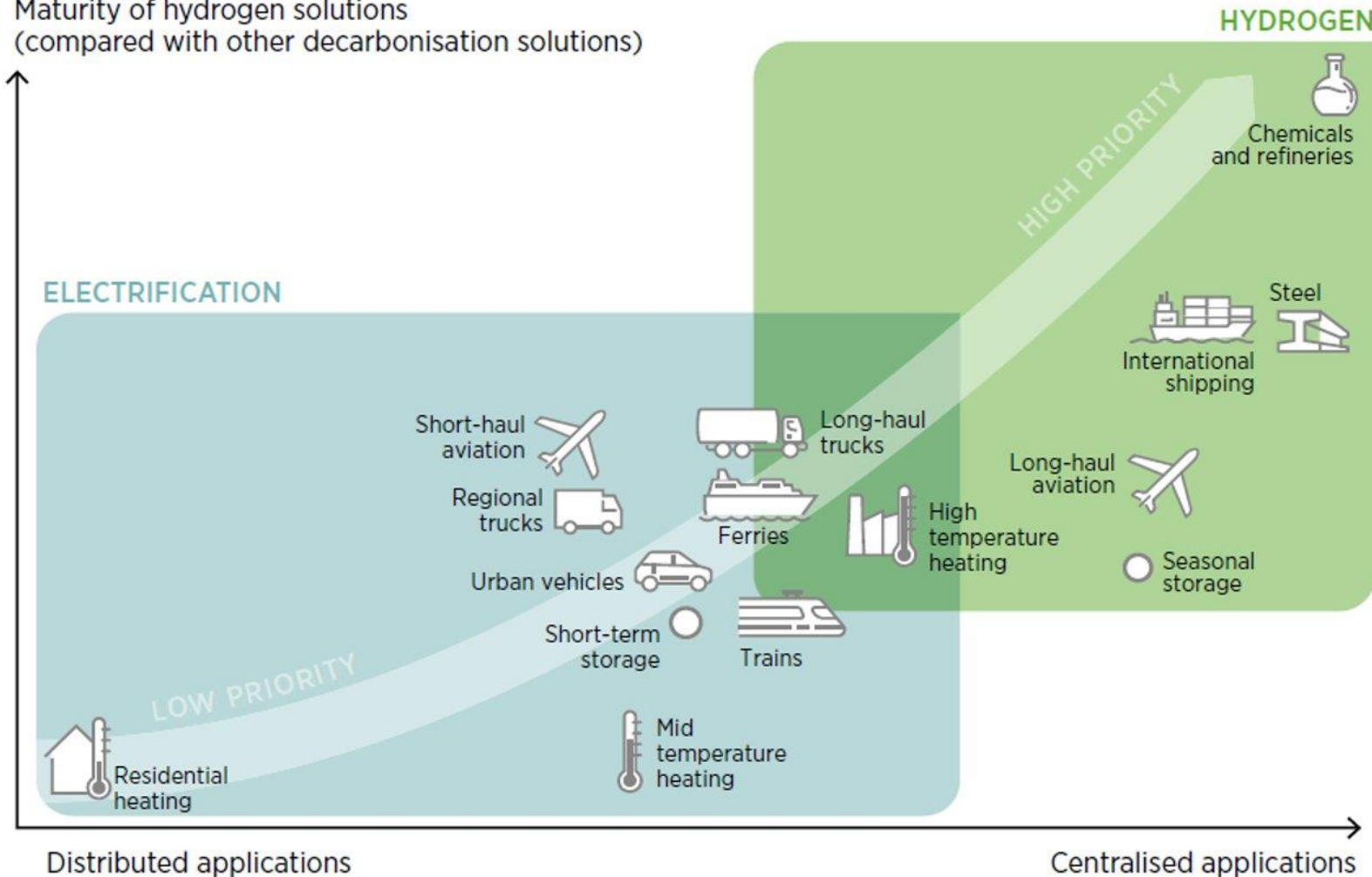
Source: IRENA.

* The term synthetic fuels refers here to a range of hydrogen-based fuels produced through chemical processes with a carbon source (CO and CO_2 captured from emission streams, biogenic sources or directly from the air). They include methanol, jet fuels, methane and other hydrocarbons. The main advantage of these fuels is that they can be used to replace their fossil fuel-based counterparts and in many cases be used as direct replacements – that is, as drop-in fuels. Synthetic fuels produce carbon emissions when combusted, but if their production process consumes the same amount of CO_2 , in principle it allows them to have net-zero carbon emissions.

HYDROGEN DEVELOPMENT (Global Level)

Green hydrogen application priorities:

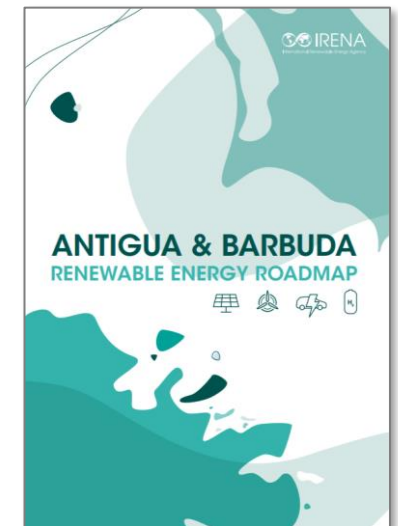
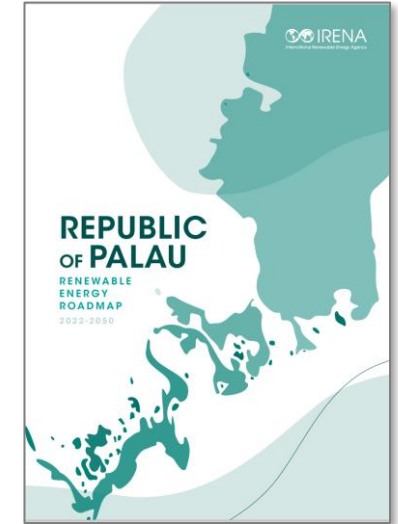
Maturity of hydrogen solutions
(compared with other decarbonisation solutions)



- Hydrogen can be used for many applications.
- Its production, transport and conversion requires energy, leading to an overall increased electricity demand.
- Hydrogen is therefore best prioritized for the applications that do not have a viable alternative, such as heavy industry, long-haul transport and seasonal energy storage.

CURRENT STATUS

- Green hydrogen remains a high priority on the global energy policy agenda. Project announcements and offtake agreements aiming to kick-start international hydrogen trade, accelerated in 2022 and are expected to increase further in 2023.
- Most project announcements involve governments and companies in future demand centres without sufficient hydrogen production potential to meet possible demands.
- Countries with major renewable energy potential are also exploring opportunities to produce renewable hydrogen and derivatives for domestic use and export.
- Most green hydrogen developments and discussions are occurring in the non-SIDS countries.
- IRENA developed Renewable Energy Roadmaps for Antigua & Barbuda and for the Republic of Palau:
 - Both roadmaps express the **importance of setting renewable energy deployment on top of the agenda for a successful system transformation.**
 - Manufacturing green hydrogen in SIDS would require an abundance of spare renewable electricity, water, expensive plant, skilled workers and infrastructure.



CURRENT STATUS

- The Asia-Pacific region has gained significant momentum in hydrogen developments.
- Two players in proximity to the Pacific SIDS are committed to play an important role in the future international hydrogen supply chains: Australia and Japan:
 - Australia is striving to leverage its renewable energy potential to produce hydrogen and derivatives to meet growing global demand.
 - Japan has initiated discussions with numerous potential power-to-X technology suppliers and plans to increase its energy security by importing hydrogen

One demonstration project shows the potential impact this could have on Pacific SIDS:

- It aims to transport green hydrogen produced in Australia to the Republic of Palau.
- In Queensland solar power will be used to produce the green hydrogen that will be applied in Palau's shipping sector.
- The project includes plans to retrofit gasoline-fueled vessels to hydrogen-fueled vessels and to implement stationary fuel cells as backup power sources to replace diesel fuel.
- A consortium of Japanese companies (including Sojitz Corporation, CS Energy Ltd. and Nippon Engineering Consultants Co., Ltd.) is in charge for the overall project management and for generating the hydrogen in Australia.



ISSUES / OPPORTUNITIES

- A **combination of energy efficiency and direct use of renewable energy sources** can deliver the bulk of the emission reductions needed to meet the goals of the Paris Agreement.
- **Accelerated renewable energy deployment for its direct use is therefore most important step** on the way forward to reach net-zero and enhance energy security for SIDS.
- It will also **decrease the exposure to external price shocks in the fossil fuel market** and the dependency on fuel imports.
- **Green hydrogen as a grid flexibility option and to decarbonize end-use sectors** could potentially play a role to reach the last step to a 100% renewables-based system.
- Other jurisdictions in the region will of course have different renewable potential and hence possible mixes of local green hydrogen production versus international market participation.
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SIDS LHI Website

- **Data and statistics** on RE capacity at total and regional levels
- **Country-wise energy profiles**
- **Sharing of SIDS LHI annual progress report**, regional publications, IRENA publications relevant to SIDS, partner publications
- **Event summaries**, recordings and materials

SIDS LIGHTHOUSES

HOME ABOUT PARTNERS RE PROGRESS SUPPORT PUBLICATIONS EVENTS CONTACT

GRENADA CAPACITY BUILDING PROGRAMME

for Energy Management and Energy Audits

Grenada Capacity Building Programme

SIDS LIGHTHOUSES

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PROGRESS DATA

In spite of the Covid-19 pandemic and recurring and intensifying natural disasters, SIDS continue to reflect consistent increase of renewable energy uptake. IRENA statistics show that an increase in installed renewable capacity by 7% in 2020 and 6% in 2021 over the previous year.

According to IRENA data, solar energy accounts for 36% of total installed renewable capacity in the SIDS followed by 27% of hydropower, 24% of bioenergy, 12% of wind energy and 1% of geothermal energy. Between 2019 and 2021, 633 MW of solar energy capacity has been installed in the SIDS followed by 120 MW of bioenergy and 29 MW of wind energy.

In terms of the regional trends, IRENA data in the Atlantic, Indian Ocean and South China Sea (AIS) region indicates that solar energy technologies are the most widely adopted accounting for 58% shares of the total installed renewable energy capacity, whereas, in the Caribbean region, solar energy, bioenergy and hydropower technologies show similar uptake trends accounting for 34%, 26% and 25% respectively of the total installed renewable energy capacity. For the Pacific region, hydropower technologies account for 57% of the total installed renewable energy capacity.

Total Installed Renewable Energy Capacity in SIDS

Total Installed Renewable Energy Capacity by Technology in SIDS 2014-2021

Annual Renewable Energy Additions in SIDS 2014-2022

Renewable Energy Additions in MW 2014-2022

IRENA

Last updated: 17 June 2022

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HOME ABOUT PARTNERS RE PROGRESS SUPPORT PUBLICATIONS

REGIONAL PROFILES

RENEWABLE ENERGY PROFILE Pacific

Select Region: Pacific

TRENDS IN POWER CAPACITY

Total Power Capacity in 2021: 3,976 MW

Installed Capacity by Technology in 2021

Installed Renewable Energy Capacity Last 5 Years

Top 10 Countries/areas Cumulative Renewable Capacity in 2021

ELECTRICITY GENERATION TRENDS

Renewable Electricity Generation in 2000-2019

Renewable Electricity Generation in 2010

1,942 GWh

400 GWh

317 GWh

Last updated: 17 June 2022

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PUBLICATIONS

SIDS LHI ANNUAL PROGRESS REPORT SIDS REGIONAL REPORTS IRENA PUBLICATIONS

SIDS Lighthouses Initiative Progress and way forward 2021

This SIDS LHI progress report provides an overview of SIDS energy transformation since the initiative's launch in 2014. It highlights key developments in the energy transformation undertaken jointly by SIDS and development partners, as shared with IRENA and featured on the associated knowledge-sharing platform.

More

2021

SIDS Lighthouses Initiative Progress and way forward 2020

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More

2020

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EVENTS

Energy Management and Energy Audits in SIDS

22 June 2022 | 23 June 2022

Several SIDS has prioritised energy efficiency and conservation in various sectors including strengthening the capacity of its citizens to undertake energy assessments of their homes and businesses, to identify cost saving measures and to reduce their energy consumption. In particular, emphasis is also being placed on the active engagement of young people in the energy transition as they are key actors in raising awareness as well as driving social change, innovation and environmental protection.

International Renewable Energy Agency (IRENA) through the SIDS Lighthouses Initiative (LHI) organised this two day webinar targeting homeowners, students, youth and other participants, with the aim aims to provide an introduction to energy conservation and management with a focus on the conduct of home energy assessments.

More

Grenada Capacity Building Programme for Energy Management and Energy Audits

20 April 2022 | Virtual

Through the SIDS Lighthouses Initiative, IRENA, in collaboration with the Energy Division, Ministry of Finance, Planning, Economic Development and Physical Development, Grenada, have developed a Capacity Building Programme for Energy Management and Energy Audits targeting different audiences such as homeowners, youth, hotels and financial institutions as well as government ministries and statutory organisations.

You may view the recording of the various webinars as below:



- Upcoming IRENA and SIDS LHI events
- Partner events
- Vacancy posts
- Publications announcements



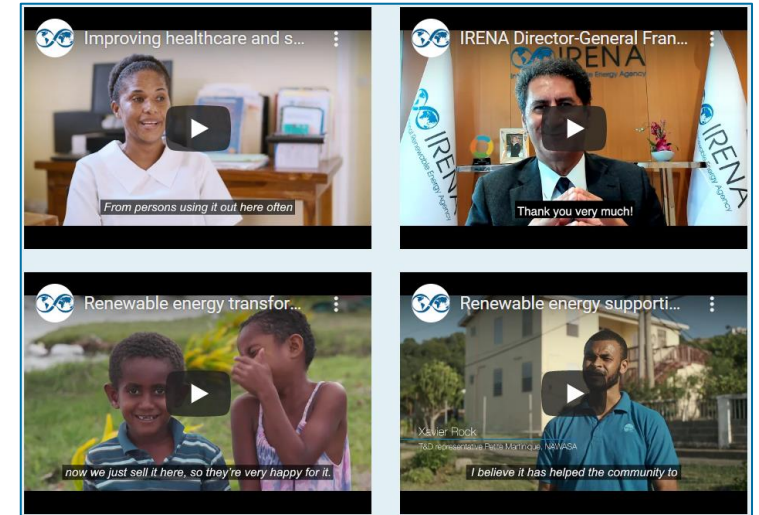
- Event invitations to SIDS LHI and partner events
- Information dissemination
- Call for interest for various IRENA and SIDS LHI services and tools



- Human impact of energy transition videos
- Impacts of RE in food, water and health nexus
- Call for accelerating RE uptake in SIDS



Video production on socio-economics benefits and human impacts of the uptake of renewables in SIDS : **job creation, entrepreneurship, gender equality; education; to address food and water security, as well as other disaster resilience measures in SIDS.**



Thank You

SIDS Lighthouses Initiative



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[SIDS Lighthouses Initiative](#)

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