SIDS LIGHTHOUSES

IRENA
International Renewable Energy Agency

SIDS LIGHTHOUSES INITIATIVE

Progress and way forward

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Cover photo: Mirador Tera Kòta, windmills, Curacao; © cdwheatley/Getty Images

Figures

Abbreviations

ADFD	Abu Dhabi Fund for Development
AIS	Atlantic, Indian Ocean and South China Seas
AOSIS	Alliance of Small Island States
ASPIRE	Accelerating Sustainable Investment in Renewable Energy
°C	degree Celsius
CARILEC	Caribbean Electric Utility Services Corporation
CCCCC	Caribbean Community Climate Change Centre
CCREEE	Caribbean Center for Renewable Energy and Energy Efficiency
CIP	Climate Investment Platform
CO_2	carbon dioxide
COP27	27th meeting of the United Nations Climate Change Conference of Parties
COP28	28th meeting of the United Nations Climate Change Conference of Parties
EE	energy efficiency
ETAF	Energy Transition Accelerator Financing
EV	electric vehicle
FESRIP	Framework for Energy Security and Resilience in the Pacific
GCF	Green Climate Fund
GDP	gross domestic product
GGA	Global Geothermal Alliance
GHG	greenhouse gas
GST	global stocktake
GW	gigawatt
HE	His Excellency
IRENA	International Renewable Energy Agency
kWh	kilowatt hour
LCOE	levelised cost of electricity
LHI	Lighthouses Initiative
MOU	memorandum of understanding
MRV	monitoring, reporting and verification
MWac	megawatt alternating current
MW	megawatt
MWh	megawatt hour
MWp	megawatt peak
NDCs	Nationally Determined Contributions
OECS	Organisation of Eastern Caribbean States
OTEC	ocean thermal energy conversion
PCREEE	Pacific Centre for Renewable Energy and Energy Efficiency
PID	Project Information Document
PPA	power purchase agreement
PV	photovoltaic
RRA	Renewable Readiness Assessment
SAMOA	SIDS Accelerated Modalities of Action
SDGs	Sustainable Development Goal
SIDS	Small Island Developing States
SPC	Pacific Community
SWEET	Solar and Sea Water for Energy Transition
UAE	United Arab Emirates
UN	United Nations
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollars

Contents

From pledges to action for Small Island Developing States in energy transition and climate resilience

Small Island Developing States (SIDS) have suffered immeasurably due to decades of recurring natural disasters that have continued to worsen as a result of the impacts of climate change. At the 27th meeting of the United Nations Climate Change Conference of Parties (COP27), held in Sharm El Sheikh in November 2022, the countries agreed to set up a specific fund on loss and damage for vulnerable countries, including SIDS, to address their existential threats.

Developing countries are also calling for streamlined procedures to accompany the proposed loss and damage fund. These procedures will enable easy access to climate adaptation and mitigation financing for technology transfer and capacity support for SIDS. Additionally, the first global stocktake (GST) of Article 14 of the Paris Agreement represents a crucial opportunity for enhancing the collective ambition of action towards achieving the long-term objectives of the Paris Agreement. Stocktaking of regional and local initiatives is a prerequisite to ratcheting up the multisectoral energy transition with a view to boosting climate action on the 1.5-degree Celsius (°C) pathway. It will also provide the basis for enhancing international co-operation for energy transition and climate action in SIDS, recognising that their targets remain conditional on international support. The financing of SIDS' climate pledges will facilitate the energy transition and action on the ground, yet the developed countries have not met the initial pledge to provide USD 100 billion (United States dollars) annually for the vulnerable countries.

Left to right: Honourable Molwyn Joseph, Minister of Health & Environment, Antigua and Barbuda; HE Rob Jetten, Minister of Climate and Energy Policy, the Netherlands; Honourable Fiame Mataafa, Prime Minister of Samoa; and Mr Francesco La Camera, IRENA Director-General, at the SIDS High-Level Event held on the margins of COP27, Sharm El Sheikh, Egypt

The International Renewable Energy Agency's (IRENA's) analyses highlight that over 90% of the solutions to achieve the 1.5°C pathway involve renewable energy through direct supply, electrification, energy efficiency (EE), green hydrogen and bioenergy that can be deployed rapidly and at scale. Furthermore, SIDS have shown climate leadership in this regard, reflected in the 34 updated Nationally Determined Contributions (NDCs). Of these 34 NDCs, at least 18 have underscored stronger pledges to amplify energy targets in the power and end-use sectors, such as transport, heating and cooling.

IRENA through the SIDS Lighthouses Initiative (LHI) has been supporting SIDS' energy transition efforts towards the achievement of the Paris Agreement and Sustainable Development Goals (SDGs). IRENA has provided technical assistance, capacity building, knowledge sharing, and energy data and statistics analysis, as well as developing progress indicators and impact measures of implementing the SIDS LHI 12 priority areas.

Following COP27 and building on the outcomes of the SIDS High-Level Event that was convened in Sharm El Sheikh, IRENA through the SIDS LHI convened another Ministerial in the lead-up to the 13th IRENA Assembly in Abu Dhabi. The SIDS leaders, ministers and representatives of development partners came together to share insights on amplifying the energy transition to abate climate change and strengthen sustainable development and to highlight their expectations for COP28, which will be hosted by the United Arab Emirates (UAE) in November 2023.

The SIDS Lighthouses Initiative is the framework of action for SIDS' energy transition and climate action. It seeks to achieve a target of 10 gigawatts of total renewable energy installed capacity in all SIDS by 2030. This objective has been enshrined in the IRENA-AOSIS Energy Compact.

SIDS spoke with a strong, unified voice in calling for appropriate financing, technology and capacity support to be provided to SIDS at scale, while emphasising the necessity of addressing the critical need to move beyond assessment and negotiations to implementation. SIDS also highlighted the need to simplify bureaucratic processes to access the necessary financial support that SIDS need to accelerate energy transition and climate action efforts and to help get back on track to the 1.5°C pathway. Emerging renewable energy technologies such as ocean and geothermal energy, green hydrogen, and battery storage must be exhausted in addition to the accelerated deployment of other renewables such as solar, wind, bioenergy and hydro.

SIDS Ministerial convened in the lead-up to the 13th Session of the IRENA Assembly

Attention was called to the contribution the uptake of renewables in SIDS makes to resilient development by addressing food and water security, health, socio-economic development, lives, and livelihoods. This contribution is underscored by private sector engagement, genuine strategic partnerships, appropriate financing mechanisms and implementation of the Loss and Damage Fund to be operational by COP28.

The SIDS Lighthouses Initiative

The SIDS LHI was launched at the United Nations (UN) Climate Summit in 2014 in response to the SIDS' call for action for support to achieve the objectives laid out by the SIDS Accelerated Modalities of Action (SAMOA) Pathway. Taking into consideration the commitments of SIDS and development partners and the evolution of the energy context, new priority areas and targets were identified and endorsed by partners in a high-level meeting held at the UN General Assembly in New York in September 2018.

The initiative brings together 40 SIDS from the Caribbean, the Pacific, and the Atlantic, Indian Ocean and South China Sea (AIS) regions, as well as 37 other partners, including developed countries, regional and international organisations, development partners, private companies, research institutes, and non-profit organisations. In 2022, Curacao, Australia, the Netherlands, Akuo, the Caribbean Climate-Smart Accelerator, the Organisation of African, Caribbean and Pacific States, joined as new partners.

The initial LHI targets for 2020[1] and 2023[2] have been met and exceeded ahead of schedule. SIDS and partners of the initiative have now agreed to a new target of 10 gigawatts (GW) of installed renewable energy capacity by 2030.

As the LHI's co-ordinator, IRENA facilitates and enhances dialogue at all levels, including through the operationalisation of the Alliance of Small Island States (AOSIS)-IRENA Energy Compact – Island Energy Transition towards a 1.5°C world. Other AOSIS-led initiatives, such as SIDS Climate Action Summit Package, which includes ambitious political action to support the achievement of as much as 100% renewable energy and EE targets in the power sector by 2030, are also facilitated by IRENA.

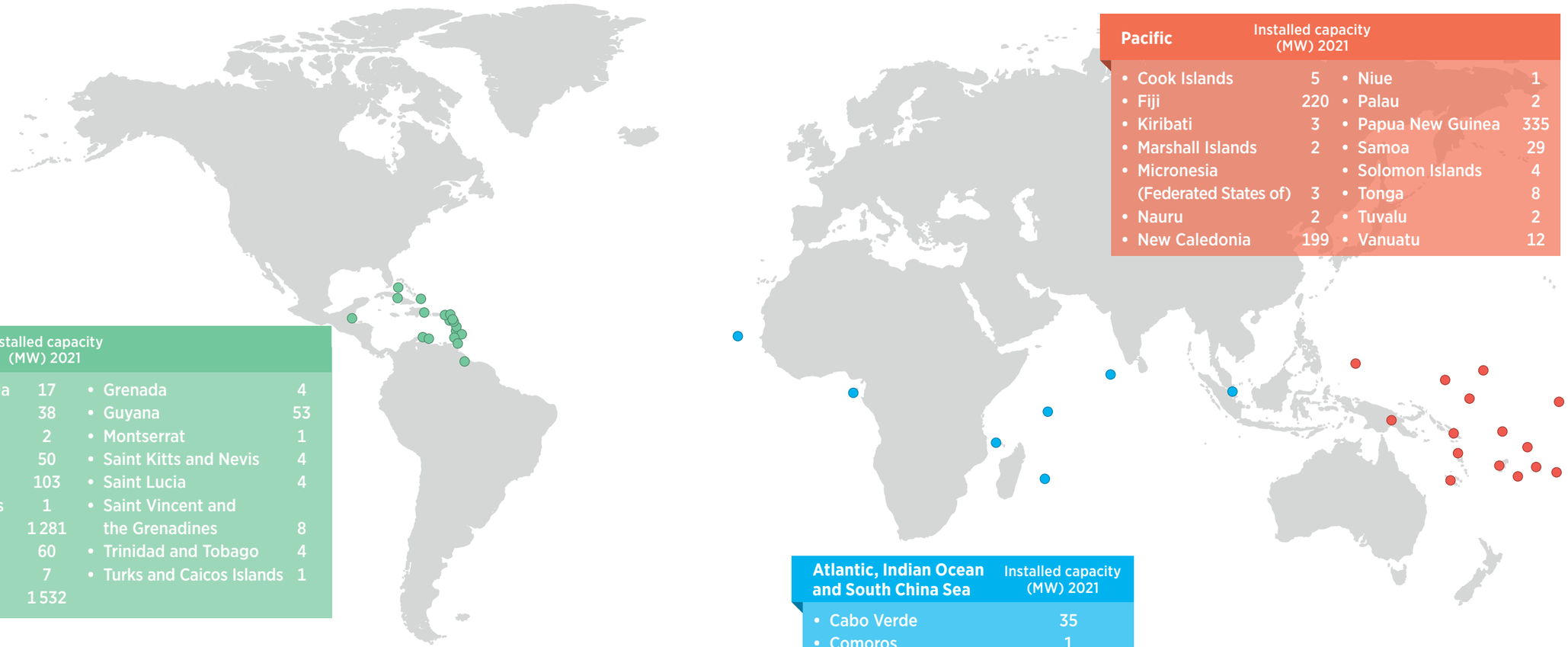
Joining the SIDS Lighthouses Initiative

The SIDS LHI is an inclusive and neutral multi-stakeholder platform that brings together public, private, intergovernmental and non-governmental actors. Participating SIDS and other partners share a common vision to accelerate energy transformation to bolster climate resilience and sustainable development. All SIDS and development partners are invited to join this initiative. More information is available at **islands.irena.org** or by contacting **islands@irena.org**.

[1] For 2020, the target was to mobilise USD 500 million and deploy 100 megawatts (MW) of new solar photovoltaic (PV), 20 MW of new wind power, significant quantities of small hydropower and geothermal energy, and a number of marine technology projects already in progress. The target also included a requirement for all SIDS to develop renewable energy roadmaps.

[2] For 2023, the target was 5 GW of installed renewable energy capacity.

Figure 1 Total installed renewable energy capacity (MW) of SIDS that are LHI partners, 2021



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

"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.

Strategic engagements and partnerships

IRENA continues to strengthen its strategic engagements with regional organisations, financial institutions, the private sector, and other development partners to assist SIDS in implementing their NDCs, capacity building and knowledge sharing, as well as facilitating access to finance and developing bankable project pipelines. IRENA's presence in the region has been impactful with the presence of the Pacific and Caribbean Focal Points on the ground.

IRENA and the Pacific Community strengthened co-ordinated support for the Pacific SIDS

In the Pacific region, the co-ordinated support for the Pacific SIDS and strengthening IRENA's strategic engagement in the region has been facilitated through the renewal of the memorandum of understanding (MOU) and the Hosting Agreement between IRENA and the Pacific Community (SPC). IRENA through the SIDS LHI has actively participated in the Energy Officials Meeting and presented an information paper on green hydrogen. IRENA is also partnering with the SPC to undertake a comprehensive, holistic approach in the provision of support of the energy transition among its members through the implementation of the Framework for Energy Security and Resilience in the Pacific (FESRIP) priorities, which was launched on the margins of COP27. The SPC provides support through the development of frameworks for the exploration of innovative technologies, technical assistance, and co-operation. Plans for 2023 include the elaboration of a Regional Hydrogen Roadmap in conjunction with international developmental partners, a training programme on energy audits and energy management, and support for the Pacific Regional Energy and Transport Ministers' Meeting, held in Vanuatu in May 2023.

Launching of the Framework for Energy Security and Resilience in the Pacific on the margins of COP27, Sharm El Sheikh, Egypt

IRENA, CCREEE and CCCCC to leverage synergies to boost renewables-based energy transition and climate action in the Caribbean region.

IRENA, the Caribbean Center for Renewable Energy and Energy Efficiency (CCREEE) and the Caribbean Community Climate Change Centre (CCCCC) joined the effort to accelerate Caribbean SIDS' energy transition in support of SDGs and climate action through the signing of a tripartite agreement on 30 October 2022. Under the MOU, IRENA, CCREEE and CCCCC will partner to advance the implementation of the Caribbean SIDS' NDCs, including strengthening the nexus between health, water, food and energy security. Through existing initiatives, the three parties will also jointly work on improving access to finance and project bankability with an aim to increase renewable energy investment in the region. The agencies will also share data and knowledge and co-operate on building capacity in Caribbean SIDS on sustainable energy and climate change, including their interlinkages across multiple sectors in the region.

Dr Colin Young, Executive Director, CCCCC; Francesco La Camera, Director-General, IRENA; and Dr Gary Jackson, Executive Director, CCREEE, commemorate the signing of a tripartite agreement at COP27, Sharm El Sheikh, Egypt

IRENA and AOSIS continue to strengthen co-operation through the operationalisation of the MOU and the Energy Compact through the SIDS LHI

IRENA works in co-ordination with AOSIS to implement the MOU and the Energy Compact through the SIDS LHI. This has been demonstrated through the high-level leadership and commitment to accelerate and adapt to adverse impacts of climate change and foster climate-resilient and low greenhouse gas (GHG) emission development. Furthermore, increased information knowledge exchange, tailored capacity-building activities, assessment of the opportunities for renewable energy use and application, and joint high-level events at COP27 have been undertaken.

Honourable Molwyn Joseph, Minister of Environment and Health, Antigua and Barbuda and AOSIS Chair moderates the SIDS High-Level Event at COP27, Sharm El Sheikh, Egypt

IRENA also undertook a detailed analysis of the updated NDCs submitted by SIDS in relation to the achievement of the Paris Agreement. A detailed costing analysis is currently ongoing to gauge how the low renewable energy costs, in particular for wind and solar, are not translated to SIDS. An investment forum for the SIDS regions is currently being planned. It will provide an opportunity to promote access to finance and share information on direct access modalities for tailored investment opportunities.

Uptake of renewable energy in SIDS

Since the launch of the SIDS LHI in 2014 until 2021, total installed renewable energy capacity has almost doubled. The greatest growth in technology has been in solar, which has grown sevenfold in capacity. Wind power capacity has doubled, with about a 60% increase in bioenergy capacity. Installed renewable energy capacity in SIDS grew from around 3.5 GW in 2014 to 6.5 GW in 2021. SIDS have maintained the momentum of their efforts and taken advantage of the evolutions in technology, cost reductions and the support of a wide range of partners that together make renewables an affordable and reliable option contributing to energy security and climate resilience. According to IRENA data, new installations in 2021 compared to 2020 included 350 megawatts (MW) of solar photovoltaics (PVs), 22 MW of wind and 7 MW of bioenergy. Growth in hydropower and geothermal renewable sources remained the same during this period due to post-pandemic challenges.

Figure 2 Total installed renewable energy capacity by technology for all SIDS (2014-2021)

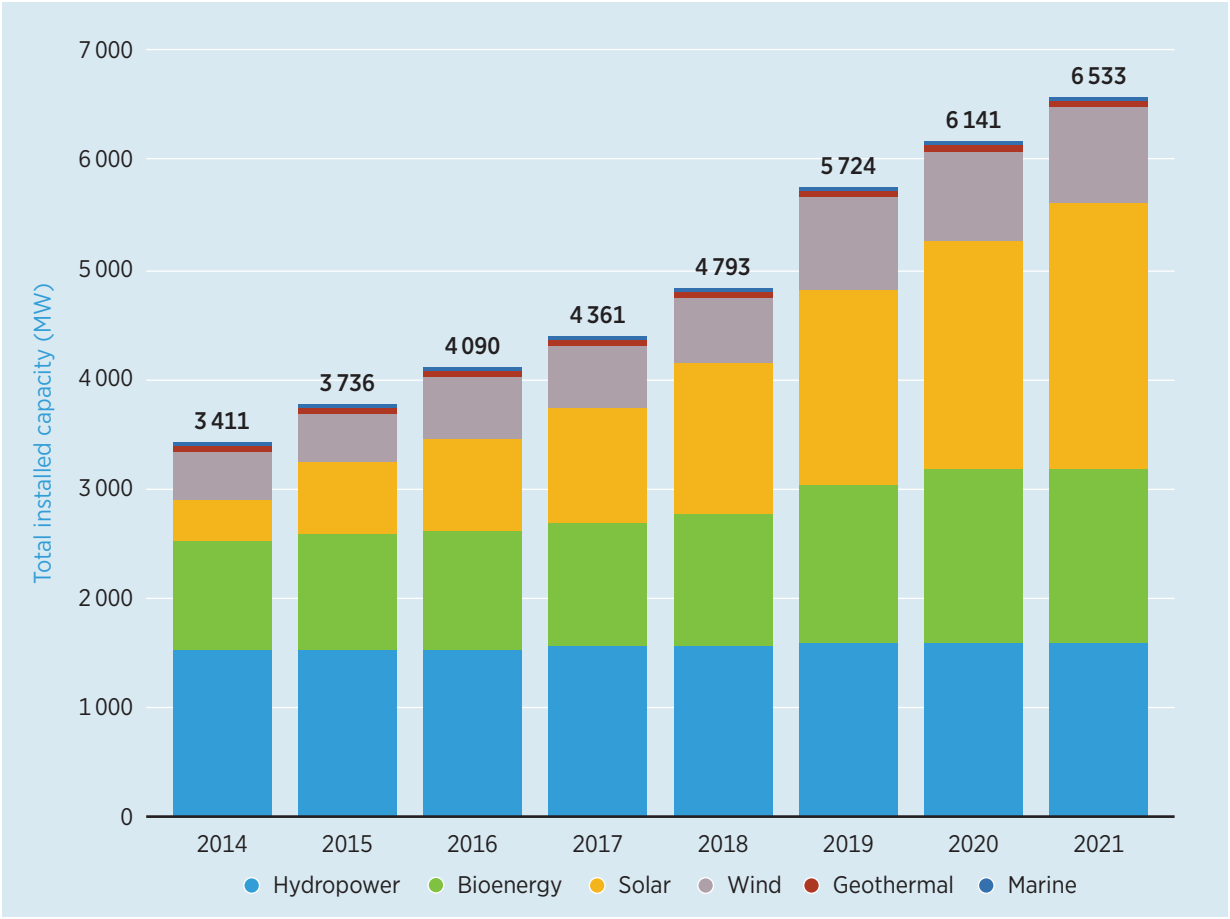
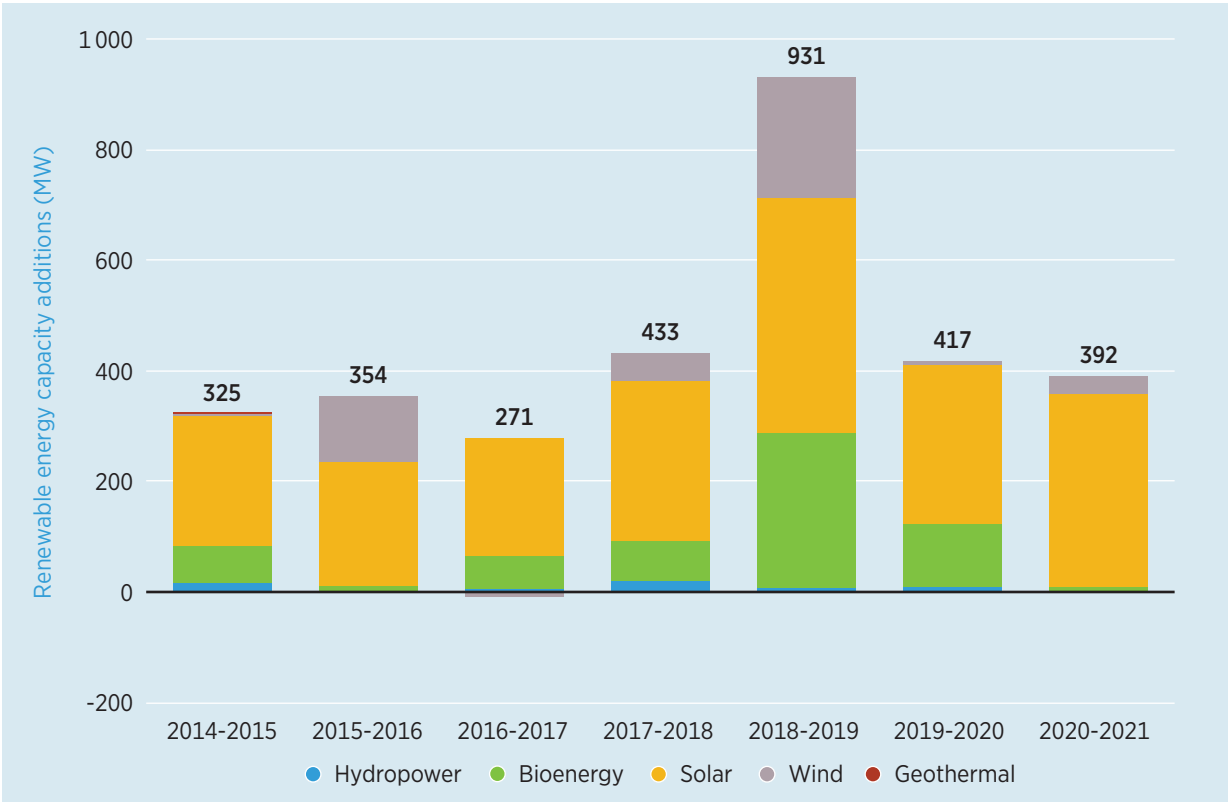


Figure 3 Additional renewable energy capacity (MW) per year for all SIDS (2014-2021)



Summary of SIDS LHI priority areas

Since the launch of the second phase of the SIDS LHI in 2018, IRENA has continued to support SIDS' energy transition efforts in alignment with the priority areas that were endorsed by the partners.

SIDS LHI priority areas

1. Support SIDS in reviewing and implementing NDCs and extending technical assistance and capacity building where needed.
2. Expand from assessment and planning to implementing effective, innovative solutions, with continued technical and regulatory advisory services to help SIDS overcome the unique challenges they face.
3. Promote all renewable sources, including geothermal and ocean energy, and step-up work to integrate solar PV and wind power.
4. Support the development of bankable projects, fostering access to finance and closer co-operation with the private sector.
5. Strengthen institutional and human capacity development in all segments of the renewable energy value chain.
6. Expand focus beyond power generation to include transportation and other end-use sectors.
7. Leverage synergies between renewables and EE.
8. Reinforce links between renewables and non-energy sectors – including agriculture, food, health and water – to foster broad socio-economic development, as well as raise awareness about job creation, gender equality and women's empowerment through renewable energy development.
9. Link renewable energy uptake to climate resilience and more effective disaster recovery.
10. Enhance collection and dissemination of data and statistics, supporting informed decision-making and effective monitoring.
11. Reinforce and expand partner engagement, leveraging synergies with existing SIDS initiatives and other IRENA co-ordinated platforms such as the Global Geothermal Alliance (GGA), the International Off-Grid Renewable Energy Conference and the Coalition for Action.
12. Increase the development of renewable-based electricity to achieve the target of 10 GW of installed capacity in all SIDS by 2030.

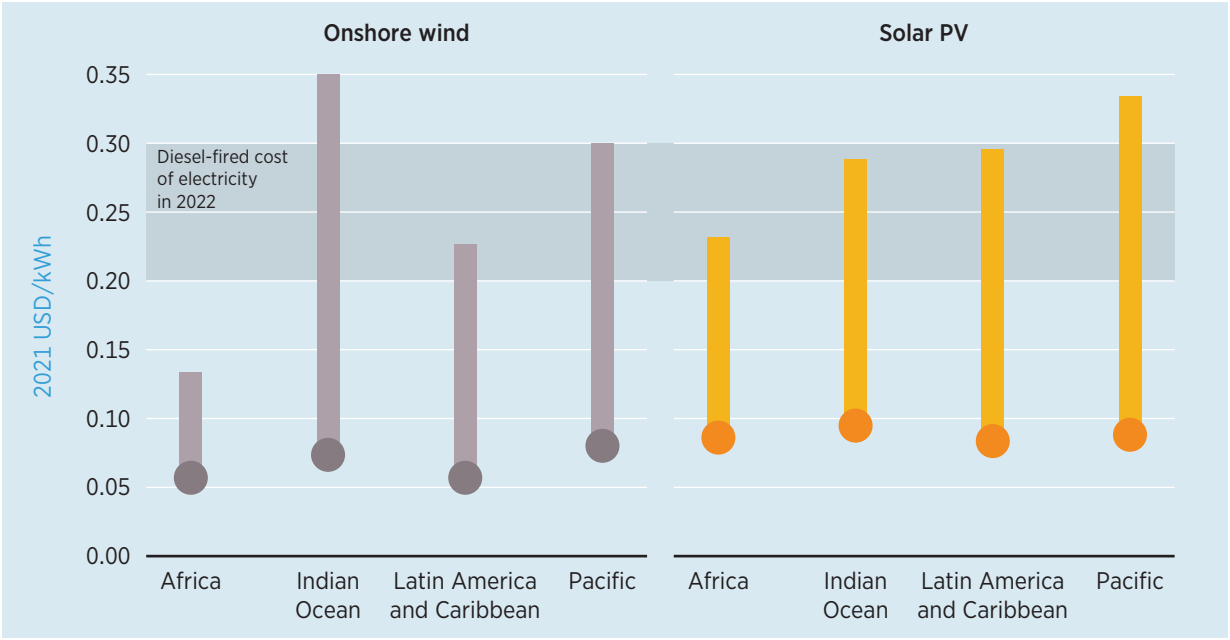
"Over the next seven years, we will need to cut global emissions by 43% to keep 1.5°C alive. That means we need to hit the accelerator like never before to get finance flowing and projects underway in every country and on every continent."

HE Mr Majid Al Suwaidi, COP28 Director-General and Special Representative to COP28 President, SIDS Ministerial, IRENA 13th General Assembly, Abu Dhabi, UAE, 13 January 2023

In addition to the above-mentioned priority areas, IRENA, in consultation with all the partners of the SIDS LHI, set a new target amount of 10 GW of total installed renewable energy capacity by 2030 for all SIDS. The key drivers for renewables deployment in SIDS are energy security and independence, economic growth, job creation and gender equality, quality of life improvements, access to education and healthcare, food and water security, resilience to disasters, and digital transformation.

Cost reductions for solar PV and onshore wind as shown by global trends have made renewables an attractive, sustainable, and economic solution in SIDS. It is essential to ensure the quality of the site for the onshore solar PV and onshore wind projects during project development processes. For onshore solar PV, larger projects may result in lower logistical costs and increased savings. renewable energy project costs remain high in SIDS owing to the project development costs, whilst the cost of renewable energy technologies remains low. In addition, small renewable energy projects, including storage in remote SIDS, are still cheaper compared to alternative fossil-based solutions.

Figure 4 Cost reductions for solar PV and onshore wind



"The Netherlands wants to join forces with you in supporting the development and implementation of SIDS's national, regional, and inter-regional sustainable energy strategies. I firmly believe that if we do not co-operate with SIDS, we will not have made our best effort for future generations. That is why I have joined this initiative and why am I speaking to other countries with a close relation to islands to join as well."

HE Rob Jetten, Minister for Climate and Energy Policy, the Netherlands; "Securing Lives, Creating Livelihoods in Small Islands Developing States", 16 November 2022, COP27, Sharm El Sheikh, Egypt

Priority 1: Support SIDS in reviewing and implementing NDCs, extending technical assistance and capacity building where needed.

The political commitment to renewables among SIDS remains unwavering despite pandemic-related setbacks. Given SIDS' evolving energy needs and the development partners' commitment to advancing the energy transformation through the implementation of NDCs, strengthening collaborations and establishing durable and genuine partnerships are essential. In this regard, through joint collaborations and partnerships, 34 SIDS continue to lead by example in submitting their updated and second NDCs to the United Nations Framework Convention on Climate Change (UNFCCC). IRENA is supporting 16 SIDS in their NDC enhancements and implementation: Antigua and Barbuda, the Bahamas, Comoros, Fiji, Grenada, Kiribati, Palau, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, São Tomé and Príncipe, Seychelles, Solomon Islands, Tonga, Trinidad and Tobago, and Vanuatu.

Partner update: Launch of Saint Kitts and Nevis NDC Implementation Plan

In April 2022, the government of Saint Kitts and Nevis launched its NDC implementation plan, which outlines the country's mitigation and adaptation strategies to reduce economy-wide carbon dioxide (CO_2) emissions by 61% by 2030, compared to the base year, 2010.

The plan is conditional upon adequate access to resources, including climate finance as well as capacity-building support and technical assistance. The country has committed to interventions that include:

- 35.7 MW of utility-scale solar PV in Saint Kitts
- 6.6 MW of wind power capacity to be installed in Saint Kitts
- 25 MW of geothermal power capacity (10 MW in Nevis and 15 MW in Saint Kitts)
- improvement in transmission and distribution infrastructure to reduce losses
- two 0.75 MW solar PV plants to supply a desalination plant
- a 5% reduction in power demand through the introduction of solar water heaters
- penetration of electric vehicles (EVs) reaching 2% of the vehicle fleet.

The implementation plan was developed through the support of the NDC Partnership and builds on collaboration with Climate Analytics and IRENA in the update and enhancement of Saint Kitts and Nevis' NDC and the development of an initial implementation and financing strategy.

Summary of IRENA's support for NDC enhancement and implementation

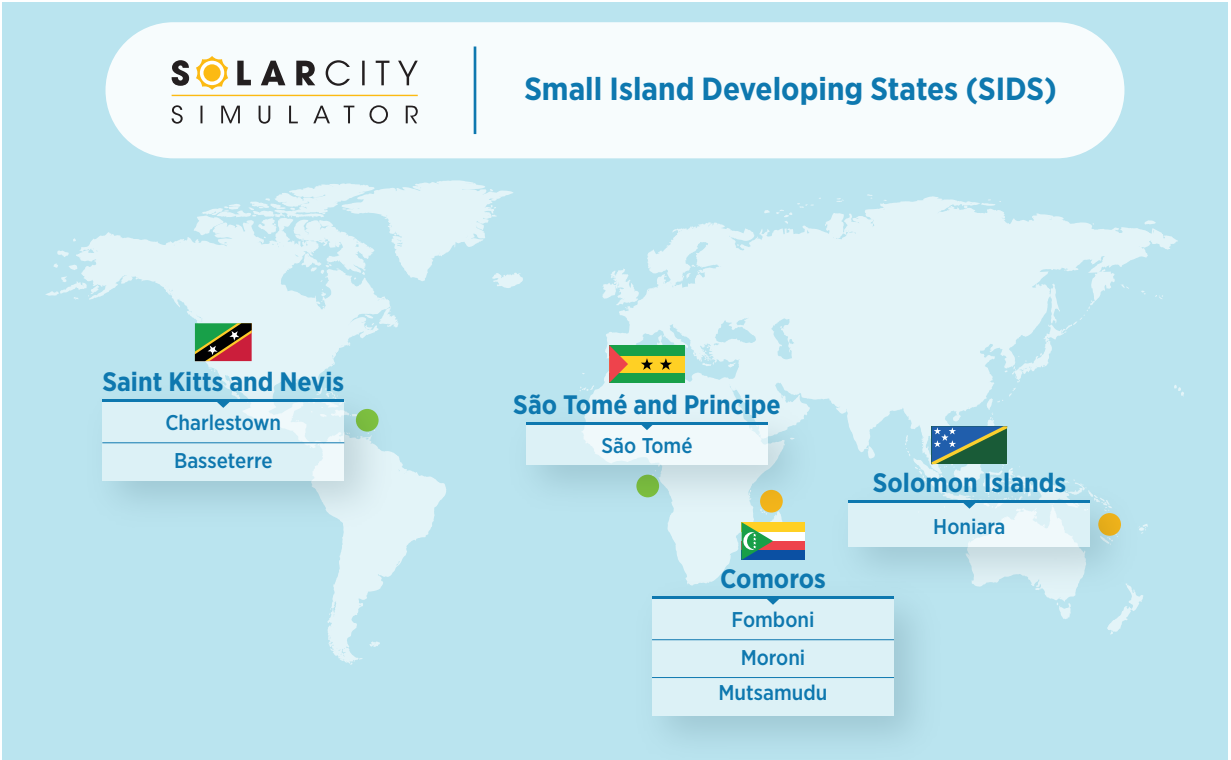
1. **Antigua and Barbuda**
   - Socio-economic analysis of the impact of e-mobility on communities
2. **The Bahamas**
   - Capacity building for youth on renewable energy and climate change
3. **Comoros**
   - Solar City Simulator
4. **Fiji**
   - Electricity sector gap analysis
5. **Grenada**
   - Technical analysis for power sector development
6. **Kiribati**
   - Support the development of bankable projects
7. **Palau**
   - Capacity building in update and analysis of monitoring, reporting and verification (MRV) template
8. **Saint Kitts and Nevis**
   - Solar City Simulator for Basseterre and Charlestown
   - Renewable energy technology capacity building
9. **Saint Lucia**
   - Strengthening bioenergy data for monitoring SDGs and NDCs
   - Energy surveys for NDC implementation roadmaps
10. **Saint Vincent and the Grenadines**
    - Capacity building on energy management and energy audits
11. **São Tomé and Príncipe**
    - Solar City Simulator for São Tomé
    - Assessment for the deployment of renewable energy solutions for healthcare facilities
    - Cost effectiveness analysis of renewable energy technology options
12. **Seychelles**
    - Grid integration study
    - Techno-economic assessment of various e-mobility options
13. **Solomon Islands**
    - Renewables readiness assessment
    - Development of SolarCity Simulator
    - Grid integration study
14. **Tonga**
    - Energy surveys for NDC implementation roadmaps
15. **Trinidad and Tobago**
    - Techno-economic analysis of mitigation options for the power and transport sectors
    - Renewables readiness assessment
    - Transition plan for sustainable transportation
16. **Vanuatu**
    - Support for the development of bankable projects
    - Capacity building on renewable-grid code development

IRENA's work on renewable potential assessment in SIDS.

The SIDS **Global Atlas for Renewable Energy** initiative is an international partnership co-ordinated by IRENA since 2010 to identify renewable energy sites in advance. The updated Global Atlas for renewable energy platform enhances users' experience with updated datasets covering all renewable technologies and infrastructure. It aims to provide free, online, updated renewable energy resource data and advanced tools for countries and communities to prospect for their renewable energy potential at different scales, ranging from mapping renewable potential to performing advanced renewable energy-site prospecting. IRENA has also scaled up the **SolarCity** simulator methodology, which support households, businesses and municipal authorities in assessing their technical (hourly and annual energy production) and financial (payback, equity internal rate of return and investment cash flow) potentials for deploying rooftop PV installations. The simulator tests out different installation scenarios, policy instruments and incentive schemes that could lead to potential economic savings and social-environmental benefits.

In 2022, IRENA through the SIDS LHI developed the SolarCity simulators for **Basseterre** and **Charlestown** in Saint Kitts and Nevis, and **São Tomé** in São Tomé and Príncipe. These simulators supplemented those for **Castries** in Saint Lucia, **Victoria** in Seychelles and **Port Louis** in Mauritius, developed in 2021. The simulators for Saint Kitts and Nevis were released and presented during the **Capacity building on design of bankable power purchase agreements in Caribbean Small Island Developing States (SIDS)** workshop, conducted for the Caribbean countries in Saint Vincent and the Grenadines. The upcoming simulators under development are for Solomon Islands (Honiara) and the Comoros (Fomboni, Moroni, Mutsamudu) and will be released in 2023.

Figure 5 SolarCity simulator with newly developed simulators in SIDS



Disclaimer: This map is provided for illustration purposes only. Boundaries and names shown on this map do not imply any endorsement or opinion on the part of IRENA.

Following the release of the simulators, the hyperlink for the SolarCity simulator was integrated into the **Organisation of Eastern Caribbean States** (OECS) website to promote rooftop solar PV project development in the Caribbean region. The hyperlink of the simulator will also be integrated into ministerial websites of Antigua and Barbuda, Saint Kitts and Nevis, and Saint Lucia for local dissemination of the tool. The **Global Solar Council** will also integrate the hyperlink of the simulator into its website for wide dissemination of the simulator.

IRENA's site and spatial assessment services

Site assessment is a cost-effective pre-feasibility analysis that supports countries in finding economically viable sites for solar (PV, parabolic trough collector, central receiver system and linear Fresnel) and onshore wind project development. The service relies on site-specific resource profiles, industry standard energy yield and financial assessment methodologies to establish a range of tariffs and levelised costs of a site for potential investment on ground measurements and subsequent development. Through this service, IRENA has assisted local authorities – ministries and public utilities in several SIDS – in selecting and screening more than 15 promising sites for solar and onshore wind power projects. In 2023, IRENA intends to extend the service to include floating solar and offshore wind project development. The tool will support countries in evaluating prospective sites for project development.

Spatial assessment is a geographic information system (GIS)-based multicriteria analysis that identifies the favourable zones within a country for developing utility-scale solar PV and wind projects. The methodology combines high-quality resource data with data related to infrastructure and land features – including road and transmission line networks, topography, protected areas, and population density – to identify zones with high degrees of feasibility for the development of solar and onshore wind projects. These zones are further characterised with attributes, which include potential installed capacity, hourly energy generation profiles, distances to transmission and road infrastructure, and levelised cost of electricity (LCOE). This service aims to support countries in developing and implementing their national energy masterplans.

"SIDS have always come together in setting the pace for our energy transition in a collective race to resilience, a means to building back better, and we have taken responsibility for building our climate resilience and see the energy sector as the entry point. As SIDS, we urgently need more measures in the system in our rapidly changing environment, especially with resilient infrastructure, stable and smarter grids, battery storage, sustainable transport, decentralised systems and more focus on energy efficiency"

HE Siaosi Sovaleni - Huakavameiliku, Prime Minister of Tonga,
IRENA 13th General Assembly, SIDS Ministerial, 13 January 2023

Partner update: Maldives

The World Bank **featured** the inauguration in December 2022 of the 5 MW solar project under the Accelerating Sustainable Private Investment in Renewable Energy (ASPIRE) Project. The project has seen increased interest from investors due to a robust risk-mitigation package that includes a three-tier risk mitigation structure composed of World Bank Group guarantees, a payment security mechanism, and a currency convertibility clause. The three-tier structure provides investors with confidence in the case of non-performance by a power utility and can be used by investors to ensure that they do not incur a loss on their investment. With this structure, the Maldives has successfully established itself as an investment destination for sustainable energy projects, in addition to tourism and hospitality.

Partner update: Akuo

Following the signing of an MOU between Akuo and IRENA, Akuo became a SIDS LHI partner in February 2023. Akuo has been operating since 2007, undertaking numerous renewable energy projects in SIDS such as 100 MW solar PV projects with battery storage and 50 MW of wind energy in SIDS. Akuo pioneered the innovative agrivoltaics design, in the form of solar power-generating greenhouses for agricultural purposes. These renewable energy projects have provided not only renewable energy but also jobs and improved lives and livelihoods for the communities. In Bora Bora, French Polynesia, Akuo is currently working on a Solar and Sea Water Experiment for Energy Transition (SWEET), which includes 2.5 MW of ground-mounted solar PV, PV greenhouses and PV shade houses on fishponds, which will be operational in September 2023. This integrated solution addresses the energy-fisheries-agriculture nexus as well as that of tourism and the environment. The SWEET project will offset annual carbon emissions of 3 746 tonnes of CO_2 and increase the share of renewables in the island's energy mix by 10%, as well as contribute to local production of fruits and vegetables.

SWEET project implemented by Akuo in Bora Bora, French Polynesia (Credit: Akuo)

Partner update: First large-scale solar PV project in Trinidad and Tobago

The government of Trinidad and Tobago has completed negotiations on the development of a 112 MWac/148-megawatt peak (MWp) solar project with consortium partners bp Alternative Energy Trinidad and Tobago, Shell Renewables Caribbean and Lightsource bp. The project, which has begun construction in early 2023, is expected to produce 302 500 megawatt hours (MWh) and avoid 165 500 tonnes of CO_2 emissions annually, underscoring the country's commitment to the Paris Agreement to reduce GHG emissions by 15% in the power generation sector by 2030. The establishment of the consortium demonstrates the important role of public-private partnerships in leveraging the engineering, finance and new market entry experience. It also represents a significant milestone for Trinidad and Tobago's energy transition due to its potential to unlock future investments in renewable energy.

Priority 2: **Expand from assessment and planning to implementing effective, innovative solutions, with continued technical and regulatory advisory services to help SIDS overcome the unique challenges they face.**

Given IRENA's mandate to support the member countries in their energy transition through the adoption and sustainable use of all forms of renewable energy, it is cognisant of the importance of collaborating with implementing agencies, development partners and the private sector to showcase the innovative renewable energy solutions that have been implemented in SIDS.

Priority 3: **Promote all renewable sources, including geothermal and ocean energy, and step-up work to integrate solar PV and wind power.**

SIDS are custodians of the largest oceanic continents, which have great potential to be developed sustainably as a renewable energy source through ocean-based technologies – such as ocean thermal energy conversion (OTEC), wave and tidal, among others – to transform SIDS' economies and improve lives and livelihoods.

OTEC was featured in a second webinar held on 11 February 2022, which was part of the three-part "Technical Webinar Series on the development of Ocean Energy Technologies, which can be considered by SIDS. Experiences and best practices from projects in various phases of development were presented by government representatives, project developers and researchers to provide an understanding of OTEC system designs, technical innovation, findings of feasibility studies, and applications in the tourism sector, as well as other sustainable water use and food production opportunities. Wave and tidal energy will be the focus of the third webinar, scheduled to take place in 2023.

Partner update: Tonga 6 MW solar project

With the support of the Asian Development Bank, a 25-year deal for a 6 MW solar power plant with Sunergise New Zealand Ltd was signed in 2019. The project was commissioned on 7 December 2022 by King Tupou VI. The project was initially delayed by the COVID-19 pandemic and then by the eruption of a submarine volcano in the island kingdom in January 2022.

The project – the largest of its kind in the South Pacific – involves the installation of three interconnected ground-mounted solar arrays sited in western Tongatapu, Tonga's main island. Each of the arrays will have a capacity of 2.3 MWp. They will be built with the assistance of local civil, mechanical and electrical subcontractors.

Tonga is currently witnessing first-hand the negative impacts of a heavy reliance on imported fossil fuels, according to Prime Minister Hon. Hu'akavameiliku. Approximately 87% of Tonga's electricity generation is from diesel generation. The solar farm will assist Tonga in reducing its reliance on imported fossil fuels. The project is a testament to Tonga's commitment, spelled out in its revamped energy roadmap, to produce 70% of electricity generation from renewable energy by the end of 2025.

Priority 4: Support the development of bankable projects, fostering access to finance and closer co-operation with the private sector.

SIDS have articulated ambitious commitments in their NDCs, national policies and action plans. Notwithstanding, renewable energy projects in SIDS face several barriers owing to their small economies, limited capacities, and gaps in institutional, regulatory and policy frameworks that can hinder their development and uptake. These challenges thus present an opportunity to close the gap in the delivery of appropriate financing for SIDS. To narrow the gap, IRENA has undertaken action to attract new investment pathways that are flexible and cater to the unique needs and circumstances of SIDS. To meet this mandate, IRENA established the Climate Investment Platform (CIP) and the Energy Transition Accelerator Financing (ETAF) Platform, which serve to attract project investors interested in investing in bankable renewable energy projects at all scales.

Climate Investment Platform Frequently Asked Questions

1. **Which SIDS are eligible for support?** Projects located in all SIDS regions are eligible.
2. **What technologies are eligible for support?** All types of renewable energy technologies including but not limited to solar PV (utility scale/rooftop), solar thermal, wind (on-shore/off-shore), bioenergy (biogas/solid biofuels/liquid biofuels/renewable waste), geothermal, marine energy and hydropower are eligible.
3. **What size projects can be supported?** Small-scale (off-grid and mini-grid) and utility-scale project proposals are welcome.
4. **Does IRENA provide project development support?** The CIP support focuses on projects beyond conceptual stage, but we have key partnerships that provide technical assistance and support for early-stage projects.
5. **What is the estimated timeline for approval of the project submission?** IRENA undertakes the first assessment of applications within a month after submission.
6. **Who develops the Project Information Document (PID) for investors?** After CIP's internal assessment, transaction advisers and senior consultants support the development of PIDs.
7. **What is the estimated timeline to match with an investor?** Matchmaking timeframes vary according to each project profile and the internal procedure of financial partners. However, IRENA immediately starts identifying potential partners once the PID is completed.
8. **Who can register projects under the CIP?** Public, private and public-private partnerships and community-based projects can be registered.
9. **What happens after matchmaking?** Once project documentation is completed, the CIP identifies potential investors and introduces them to the developer. The CIP is not involved in the investment negotiations.
10. **What are the benefits of registering under the CIP?** Renewable energy project developers are thoroughly supported in strengthening their proposals and can access a selection of financial partners specialised in renewable energy investment.

Capacity building on project finance and facilitation in the Caribbean and AIS SIDS

Understanding the role of robust project finance structures within renewable energy project development and its ability to significantly increase the chances of deployment is even more compelling today than in the past, as many SIDS are seeking to transition their electricity sector to 100% renewable energy. Renewable energy project development in SIDS have increased over time, but technically sound projects falter at the financial hurdle as a result of bureaucratic processes that deem these projects unfeasible due to their scale. Enhancing the capacities of developers and other project proponents on the practical aspects of project finance is needed to increase the number of projects that are able to secure financing.

IRENA through the SIDS LHI undertook regional capacity building activities in the Caribbean and AIS regions focusing on enhancing the competencies of local players in SIDS in structuring renewable energy project financing deals. The objective was to increase the number of renewable energy projects financed in their respective regions.

The Caribbean-focused event, held on 22-24 November 2022 at the Harbour Club, Rodney Bay, Saint Lucia, was hosted in collaboration with the OECS. It built on IRENA's support of the Eastern Caribbean Solar Challenge, an initiative under the **Caribbean NDC Finance Initiative**, which supports OECS Member States in their efforts to meet climate change objectives. Twenty-three participants, including representatives of government ministries, financial institutions and project developers from nine Caribbean SIDS (Belize, Dominica, the Dominican Republic, Grenada, Guyana, Montserrat, Saint Lucia, Saint Vincent and the Grenadines, and Suriname) and the OECS were in attendance.

Similarly, a three-day workshop was held from 12-14 December 2022 in Mauritius, where 13 participants representing government and utilities from 5 AIS SIDS (Comoros, Maldives, Mauritius, São Tomé and Príncipe and Seychelles) were in attendance. Topics covered during the training included IRENA's project facilitation and support, an introduction to project finance, project finance risk, structuring project finance, and project finance security, which were complemented with case studies and interactive exercises.

IRENA supported the workshop under the **CIP**, a demand-driven vehicle facilitating the development and scale-up of renewable energy technologies through tailored technical assistance to member countries. Since the workshop, participants have sought to incorporate the training expertise into their project proposals before submission to the CIP. The recommendations from these workshops will be incorporated into the third training for Pacific SIDS, which is earmarked for 2023.

Priority 5: Strengthen institutional and human capacity development in all segments of the renewable energy value chain.

Strengthening human and institutional capacity for energy transition planning and management in government ministries that are responsible for the energy sector and power utilities is key to the increased deployment of renewables in SIDS. Appropriate financing can be attracted by building capacity to operate and maintain renewable technologies and ensuring that the policy and regulatory frameworks are in place and bankable project proposals are developed. The procurement of appropriate renewable energy technologies is also dependent on effective tender processes that stakeholders need to be trained in to ensure that applicable renewable energy technologies are procured and installed to advance socio-economic development in SIDS.

Capacity Building on Design of Bankable Power Purchase Agreements in SIDS in the AIS Region

The **Capacity Building on Design of Bankable Power Purchase Agreements in the AIS SIDS** event was convened in the UAE from 29 August to 2 September 2022. The event brought together 18 participants from Cabo Verde, Comoros, Maldives, Mauritius, São Tomé and Príncipe, and Seychelles. Representatives of the Asian Infrastructure Investment Bank and Singapore also joined virtually to provide their perspectives on supporting SIDS' energy transition efforts and increasing private sector participation in SIDS' energy sectors. IRENA also provided an overview of the support provided for the countries through the SIDS LHI in undertaking resource assessment, rooftop solar analysis, geothermal development through the GGA, grid integration analysis, and addressing energy access and nexus issues relating to water and food security, including health.

The one-week event kicked off with roundtables on the first day in which the AIS SIDS and partners provided their perspectives on policy and regulatory frameworks, renewable energy development, financing and implementation as well as highlighting some of the success stories, best practices and the lessons learnt over the years in developing and implementing bankable power purchase agreements (PPAs) for renewable energy projects and increased participation of independent power producers in the AIS SIDS energy sector. The remaining four days focused on training the participants in designing bankable PPAs utilising a PPA financial model specifically designed for SIDS. It had been tailor-made and utilised in the training for the Pacific SIDS in 2019 and adapted to the AIS SIDS context. The training materials were also available in the French, Portuguese and Spanish languages.

Participants in the AIS Regional Capacity Building Programme on Developing Bankable PPAs

Capacity building on design of bankable PPAs in SIDS in the Caribbean region

Building on the previous training events for Pacific and AIS SIDS, the third regional **Capacity Building on Design of Bankable Power Purchase Agreements for Caribbean SIDS** was held from 28 November to 2 December 2022 in Saint Vincent and the Grenadines and co-hosted by the Ministry of Urban Development, Energy, Airports, Seaports, Grenadines Affairs and Local Government with support from the OECS through the Geothermal Energy: Capacity Building for Utilization, Investment and Local Development (GEOBUILD) Programme. The event convened 49 participants from 14 Caribbean SIDS, including Antigua and Barbuda, Aruba, the Bahamas, Barbados, Belize, Dominica, the Dominican Republic, Grenada, Guyana, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago, as well as the OECS Commission and the Caribbean Electric Utility Services Corporation (CARILEC).

In his keynote address, Dr the Honourable Ralph Gonsalves, prime minister of Saint Vincent and the Grenadines, highlighted the best practices and lessons learnt during the design and negotiation of the PPA for geothermal development. This was complemented by a panel discussion featuring government, utility and private sector representatives involved in the country's two-year negotiation process. The roundtable discussion shared the efforts of regional institutions such as the OECS Commission, CARILEC and the Caribbean Development Bank to strengthen the policy and regulatory frameworks and capacity within the region as a prerequisite for increased renewable energy investments. IRENA also highlighted progress of the SIDS LHI and opportunities to further support Caribbean SIDS in their energy transition and climate action, including but not limited to resource assessments such as SolarCity Simulator for Saint Kitts and Nevis. This was followed by a four-day training including theoretical and practical components.

Dr the Honourable Ralph Gonsalves, Prime Minister of Saint Vincent and the Grenadines, delivering the keynote or the Caribbean Regional Capacity Building Programme on Developing Bankable PPAs

Priority 6: Expand focus beyond power generation to include transportation and other end-use sectors.

The transport sector in SIDS have been the largest energy consumer accounting for more than 50 % of total imported petroleum products, which is contributing to significant greenhouse gas emissions. Cost-effective and energy efficient solutions should be further investigated to promote and implement sustainable transport measures in SIDS. IRENA through the SIDS LHI have been providing technical assistance to various SIDS in the development of renewable energy roadmaps including e-mobility and increasing energy efficiency in the transport sector.

Partner update: A beacon of sustainable transport in the face of climate change

The pristine island nation of Seychelles is courageously addressing climate change and forging a path toward a sustainable future. Recognising the urgent need for action, the government has committed to ambitious goals in its updated NDC, including achieving net zero emissions by 2050 and significantly transitioning to low-carbon transport by 2030.

As a leader among SIDS, Seychelles is demonstrating how bold policy measures and innovative technologies can drive transformative change. In pursuit of these objectives, the Seychelles has championed the adoption of EVs, making strides in decarbonising the transportation sector. With a population of around 100 000, Seychelles is experiencing a remarkable year-on-year growth in EV per capita rates. According to the Seychelles Licensing Authority, the number of registered EVs reached 365 by the end of 2022, marking an 18% increase compared to 2021. This tangible progress demonstrates the country's commitment to achieving 30% EVs for new private vehicle sales by 2030. Recognising the financial barriers associated with EV adoption, the government has introduced a range of fiscal incentives and policy measures to promote EVs. Furthermore, Seychelles has taken a holistic approach to sustainable transportation by integrating renewable energy sources into its electrification strategy. As part of the national E-Mobility Project launched in November 2022, the government plans to introduce 22 electric buses to the Seychelles Public Transport Corporation fleet, which is expected to decrease fossil fuel expenditure by 15-30% by 2030. This initiative not only showcases the techno-economic and environmental feasibility of low-carbon public transport but also raises public awareness and informs policy development for increased EV adoption.

In a concerted effort to guarantee the success of this initiative, IRENA through the SIDS LHI is playing a pivotal role by collaborating with the Ministry of Agriculture, Climate Change and Environment, and one of the largest companies in the Seychelles, the Public Utilities Corporation. With IRENA's support, Seychelles is evaluating the feasibility of expanded solar energy integration to address the energy requirements of EVs, thereby reinforcing the interconnectivity between renewable power generation and electromobility. This assessment involves a comprehensive evaluation of solar resource availability, technical feasibility, grid stability and the corresponding impact on the transportation sector's energy consumption patterns. The objective of this activity is to identify optimal strategies for harnessing renewable energy to sustainably fuel the country's growing fleet of EVs and bolster the transition towards a low-carbon future. IRENA is working closely with the NDC Partnership and the United Nations Environment Programme to ensure a comprehensive and effective approach to addressing the challenges and harnessing the opportunities presented by the transition to renewable energy and sustainable transport in Seychelles. Seychelles' unwavering commitment to addressing climate change and pioneering sustainable transportation solutions serves as an inspiration for other SIDS and the global community.

Figure 6 Tonga's Battery Storage

Partner update: Facilitating disaster recovery efforts in Tonga through energy storage

Akuo's renewable energy storage solutions are tailored to the specific needs of the environment, as in the case of the South Pacific's largest energy storage facility constructed in Nuku'alofa, Tonga in 2021. The facility's two battery storage facilities function complementarily, with the first 5 MWh/10 MW battery facility aiming to stabilise the grid in terms of regulating the voltage and frequency, while the second 23 MWh/7 MW battery facility is designed to transfer the electrical load to sustain the electricity supply at peak times, especially in the evenings. This installation has contributed to Tonga working towards achieving its NDC target, which is to increase the share of renewables in the country's energy mix to 70% by 2030.

The storage facility also played a key role in disaster recovery efforts following the devastating volcanic eruption and tsunami of January 2022 by providing power to the people, especially the first responders. This project is operated by Tonga Power Limited and was financed by Australia, the Asian Development Bank and the Green Climate Fund.

Priority 7: **Leverage synergies between renewables and EE.**

To quickly reduce energy intensity and energy costs, SIDS need to leverage synergies between renewables and EE. Improved efficiency also reduces energy demand and provides opportunities for renewables deployment in the energy mix. Increasing EE measures in the transport, buildings and other sectors also contributes to lowering CO_2 emissions. Energy efficient homes and appliances also positively impact SIDS' economies through reduced fuel bills, which are a large part of their gross domestic product (GDP).

Pacific Regional Capacity Building Programme on Energy Management and Energy Audit

Pacific SIDS are particularly vulnerable to the impacts of climate change and remain heavily dependent on fossil fuel imports to meet their energy needs, including the generation of electricity. The high cost of fossil fuel imports has resulted in the relatively high price of electricity in key economic sectors such as tourism, agriculture and fisheries. An understanding of energy consumption through an energy audit is the first step to the energy management process and provides the basis for informed decision making among stakeholders. Reducing energy consumption and improving EE therefore will not only help SIDS to alleviate current vulnerabilities related to climate change, energy security and energy access but also create opportunities for economic growth – thereby improving the lives and livelihoods of citizens.

From 27 February to 3 March 2023, IRENA through the SIDS LHI and in collaboration with SPC, the Pacific Centre for Renewable Energy and Energy Efficiency (PCREEE), and the Ministry of Public Works, Transport and Meteorological Services of Fiji hosted a five-day training aiming to strengthen the capacity of entry-level officers in the Pacific SIDS energy divisions, power utilities and other relevant sectors to conduct energy audits to better understand and manage energy consumption. Through a combination of theoretical and practical sessions, participants gained an understanding of the principles of energy use, including the importance of EE and conservation and their contribution to addressing climate change and sustainable development. The participants were also trained in how to conduct an energy audit and manage electricity consumption through a range of energy-saving measures and best practices in various sectors. The event was attended by 31 participants from 14 Pacific SIDS that included Cook Islands, Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

"The deliberation of the workshop is excellent and very informative on a level one basis. This allows for more efficient work to be carried out and also paving pending works on energy auditing at the starting stage. This also allows for new opportunities of project creation and establishment"

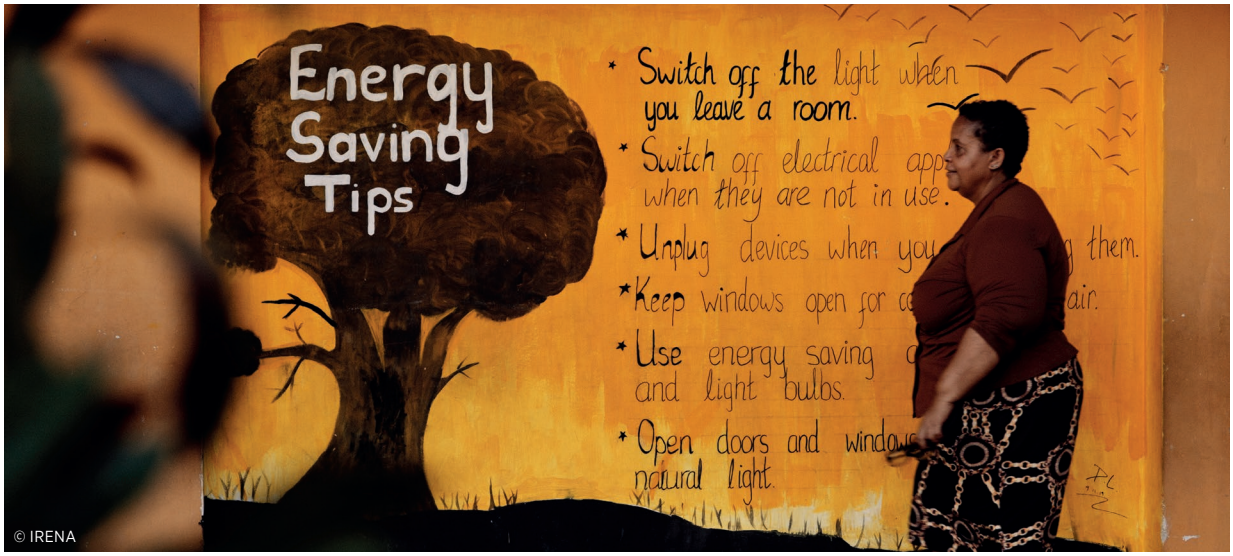
Ms Chloe Vorbach, Energy Communications Officer, NEEDS Project, Energy Division, Nauru

Participants of the Pacific Capacity Building on Energy Management and Energy Audit held in Nadi, Fiji

Partner update: EE and renewable energy in Montserrat

With the financial support of the European Union and in accordance with the National Energy Policy, the Montserrat government is undertaking a transformative programme focusing on EE and integrating renewable energy technology in its public sector. The aim of this intervention is to influence behaviours and attitudes towards EE and conservation, contribute to reducing the government's utility cost, and allow financial resources to be directed to more essential services and needs.

The Energy Department is charged with the mandate of ensuring that the public is aware of EE and conservation; developing modern, reliable and sustainable energy infrastructure; maximising the use of indigenous energy resources; and establishing governance, institutional, legal and regulatory frameworks to support future energy sector development. All these activities are geared towards improving the island's energy security. To this end, the programme designed by the department features several components to meet the project objectives: EE auditing at ASHRAE Level 2 of ten government occupied and owned buildings, building retrofits with the inclusion of equipment upgrade per the energy audit recommendations, developing a training programme in energy auditing that is accessible to professionals as well as community college students, and elaborating a draft policy to support the development of a sustainable EE financial model. The implementation of this programme is intended to reduce the island's energy intensity and assist it in achieving some of the goals set out in the National Energy Policy and the Sustainable Development Plan.



The Solar School Project builds on the energy conservation efforts at Baie Ste Anne Primary School, Seychelles.

Priority 8: Reinforce links between renewables and non-energy sectors – including agriculture, food, health and water – to foster broad socio-economic development, as well as raise awareness about job creation, gender equality and women's empowerment through renewable energy development.

Lack of access to appropriate and affordable finance for renewable energy and value addition in the agri-food value chains impedes poor smallholder farmers, farmer organisations and small businesses from building climate resilience, achieving increased farm productivity, reducing losses and earning higher income from value-addition. Furthermore, the delivery of health services is hindered by climate-related disasters and lack of electricity to power facilities, particularly in rural and remote areas.

IRENA has gradually increased its services to Member States (SIDS included) to include assessments on powering health and agri-food value chains with renewable energy. To enhance access to appropriate and affordable finance in SIDS and other developing countries, IRENA and partners are developing programmes such as Empowering Lives and Livelihoods – Renewables for Adaptation to be launched at COP28.

SIDS continue to show leadership and strong political commitment to the implementation of renewable energy as a key driver for the energy transition and achievement of climate goals and SDGs, despite financial and capacity constraints. To showcase SIDS' efforts and to highlight the human impacts of renewable energy deployment in SIDS, IRENA through the SIDS LHI produced a short video series in Samoa, Seychelles and Saint Vincent and the Grenadines. The videos serve not only to raise awareness among the general public, partners and other key stakeholders on the achievements, opportunities and challenges of SIDS energy transition but also as a call to action for the international community to support replication and scalability in other SIDS through the provision of appropriate financial support, technical assistance and capacity building.

Empowering women and rural communities with economic opportunities through renewables in Samoa

The government of Samoa recognises the importance of strengthening women's involvement in the energy transition and raising the visibility of female role models working in the energy sector. Implemented by the Ministry of Natural Resources and Environment, the Sa'asa'ai Biogas Project forms part of the Improving the Performance and Reliability of RE Power System in Samoa (IMPRESS) Project, which supports the national objective to achieve the 100% renewable energy target by 2025. The video showcases a 10 cubic metre biogas digester system installation, established on the island of Savai'i to provide biogas from the piggery, kitchen and organic wastes of the Sa'asa'ai community. The project has significant potential to be replicated in other Pacific SIDS due to its multiple socio-economic benefits. Not only has it contributed to sustainable waste management in the community and improved the quality of agricultural produce through the generation of liquid fertiliser, but it has also generated business opportunities and empowered women in rural communities through the provision of affordable gas for cooking and lighting.

Samoa has prioritised the active participation of women in the energy sector

Building the capacity of future generations to lead the energy transition in Seychelles through the Solar School Project

The Seychelles government has prioritised promoting youth participation for a just and sustainable energy transition. As part of the government's broader objective to reduce its fossil fuel consumption by 15% by 2030 and to build capacity among the younger generation, the School Solar Project is being implemented with an aim to install solar PV systems on all 32 public schools located on the three main islands of Seychelles (La Digue, Mahé and Praslin). The video shows how the schools' rooftop systems provide students with an on-site learning experience while contributing to the energy needs of the school. Recognising the important role that youth play within their communities as advocates and agents of change for the energy transition and climate action, the project has been instrumental in the government's plan to raise the level of awareness and educate the public about the use of renewable energy and the impacts of climate change.

The Solar School Project builds on the energy conservation efforts at Baie Ste Anne Primary School

Securing access to an affordable, reliable, and clean water supply for multiple sectors in Saint Vincent and the Grenadines through renewables

Saint Vincent and the Grenadines, like other SIDS, face water scarcity challenges that are exacerbated by natural disasters and climate change impacts. The video highlights how the government of St. Vincent and the Grenadines has sought to enhance water security, build resilience, and reduce energy consumption through the implementation of a solar-powered reverse osmosis desalination pilot project in the outer island of Bequia. The desalination plant, which has the capacity to produce 34 560 gallons of potable water for approximately 1000 inhabitants, has improved the quality of life and livelihoods of the community. It has also aided the health, education, fisheries and tourism sectors by significantly reducing the cost and improving the availability and quality of the water. With appropriate financing, the long-term plan is to increase the size of the solar PV system and to replicate it on the other Grenadine islands of Canouan, Mayreau and Union Island.

Primary school students after recess enjoying water provided by the solar-powered desalination plant in Bequia, Saint Vincent and the Grenadines

Priority 9: Link renewable energy uptake to climate resilience and more effective disaster recovery.

COP27 marked a breakthrough for SIDS with the realisation of the agreement to provide loss and damage funding for vulnerable countries, which are largely made up of SIDS. AOSIS has been at the forefront of the decade-long discussion and negotiation on this topic. This advancement has opened the door on how the global community responds to those countries that are the most vulnerable and hardest hit by slow- and fast-onset catastrophic events and whose lives and livelihoods have been ruined by climate change.

With this progressive step taken by the international community, IRENA through the SIDS LHI intends, as part of its medium- to long-term planning, to respond by exploring renewable energy and disaster risk and recovery efforts. Undertaking the mainstreaming of results from climate risks assessments within analysis and recommendations where possible, targeted, innovative, and climate-resilient solutions will be tailored to SIDS to address their unique geographical, cultural, political and economic conditions. Continued provision of technical assistance will be geared towards exploring the nexus of renewable energy and disaster risk and recovery, and financing opportunities will be explored under climate adaptation and mitigation portfolios. The deployment of renewable energy across various sectors can reinvent SIDS' economies, build resilience, and include other economic and developmental sectors including the tourism, fisheries, transport, food, and agricultural sectors.

Wind- and solar-powered earthquake and tsunami observation system

Priority 10: **Enhance collection and dissemination of data and statistics, supporting informed decision-making and effective monitoring.**

Energy data and statistics are critical to formulating policies and enabling frameworks. They support the decision-making processes of transitioning to renewables and undertaking EE interventions. The availability of such information facilitates effective monitoring mechanisms at the national, regional, and global levels, in which SIDS can highlight how they have progressed over the years in meeting their commitments towards the Paris Agreement and the SDGs.

Figure 7 SIDS Regional Profiles on renewables

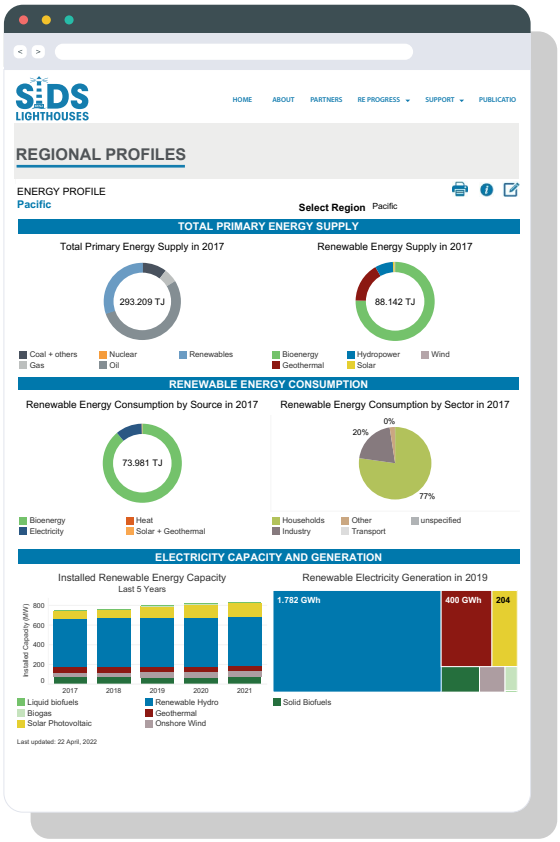
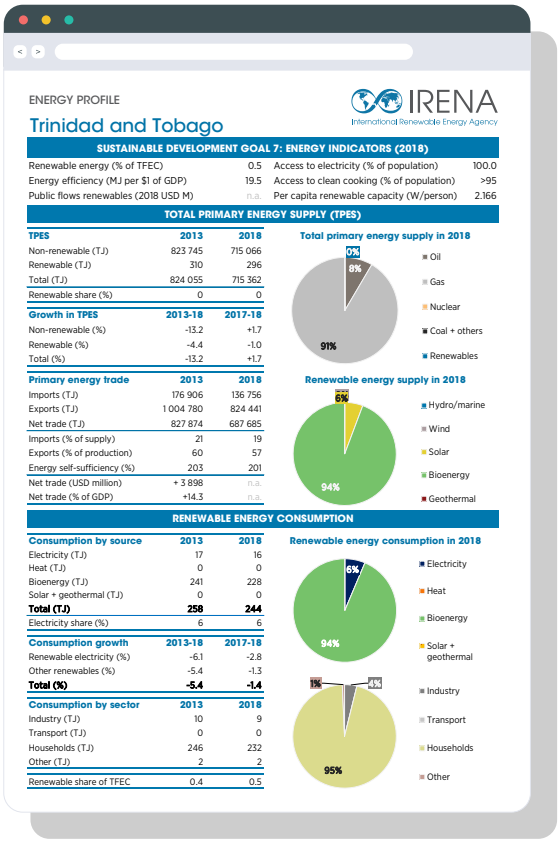
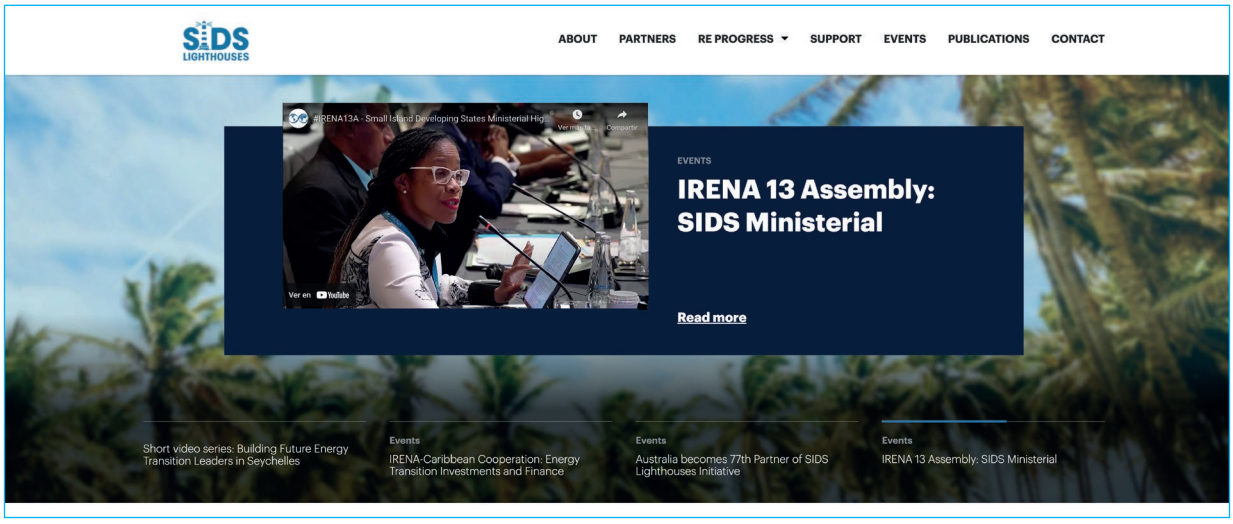


Figure 8 SIDS Country Profiles on renewables

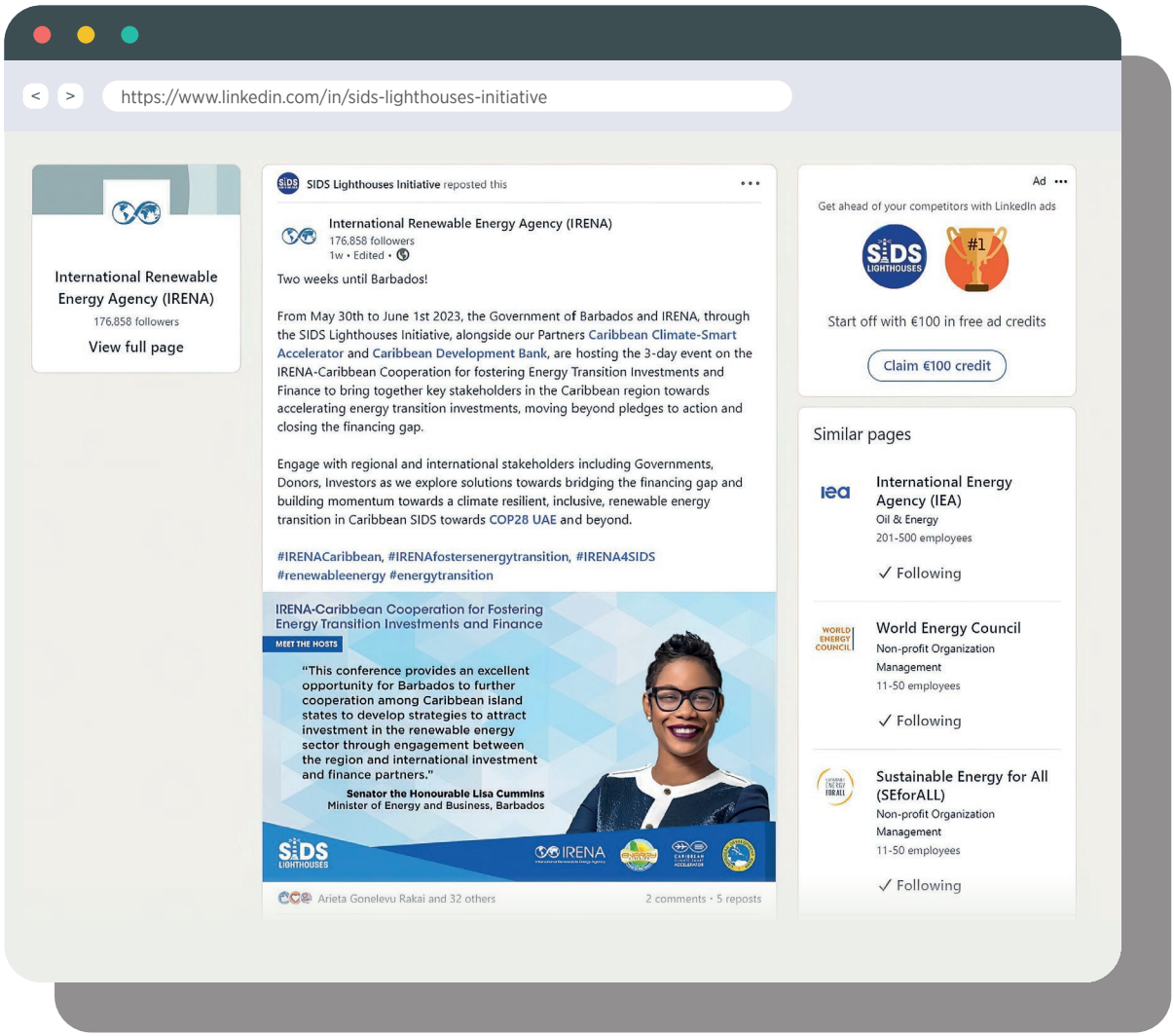


The SIDS LHI knowledge-sharing platform



The SIDS knowledge-sharing platform consists of the **SIDS LHI website**, complemented by the **SIDS LHI LinkedIn page**. The platform is a one-stop shop for energy transition efforts that are being pursued in SIDS by the LHI partners. The SIDS LHI website features analytical tools and services, technical assistance and advice, capacity-building activities, videos, high-level and technical events, and other relevant information that can be accessed and used by students, policy makers, the private sector, development partners, financing institutions and other stakeholders that are committed to making a difference in SIDS.

SIDS Regional and Country profiles on renewables, examples of which are featured in figures 6 and 7, respectively, provide an overview of key indicators, renewable energy developments and recent initiatives. The videos and articles highlight the best practices and human impacts of renewables in individual homes, education and health facilities and also highlight the important role of renewables in strengthening food and water security in SIDS.



The SIDS LHI LinkedIn page, part of the Knowledge Sharing Platform

Priority 11: Reinforce and expand partner engagement, leveraging synergies with existing SIDS initiatives and other IRENA co-ordinated platforms such as the GGA, the International Off-Grid Renewable Energy Conference and the Coalition for Action.

SIDS face several challenges in developing their geothermal resources. These are the high investment and risk profile of geothermal projects, limited technical geothermal expertise, small and isolated power networks, limits to economy of scale, and inadequate political support for geothermal development. To accelerate geothermal development in SIDS, action and support are needed in areas ranging from access to financing to technology assessment and deployment, policy and regulatory innovation, improved capacity building, business models, and governance structures. Geothermal energy could play a key role in meeting the energy requirement of SIDS. Geographically, many SIDS are located along the earth's plate boundaries where tectonic activities are high, resulting in excellent geothermal resources.

High-Level Conference of the GGA

In the framework of the **Second GGA High-Level Conference**, convened in El Salvador in 2022, the SIDS LHI and GGA co-organised a side event to explore opportunities for the use of geothermal as an integral energy solution in SIDS. The side event was a platform for SIDS, partners, and relevant stakeholders to share insights on what is needed to develop a thriving geothermal industry in their respective economies.

The event kickstarted with a fireside chat between the minister for Infrastructure and Meteorological Services of Fiji and the executive director of the International Geothermal Association. Discussion focussed on the World Bank-sponsored geothermal exploration programme in Fiji, existing opportunities for utilising geothermal in end-use sectors as well as benefits to local communities. This was followed by a moderated panel discussion, in which the representatives from Belize, Papua New Guinea and the Solomon Islands shared their countries' plans for geothermal development, while representatives from Kenya and Mexico shared their best practices and lessons learnt from geothermal projects implemented in their countries.

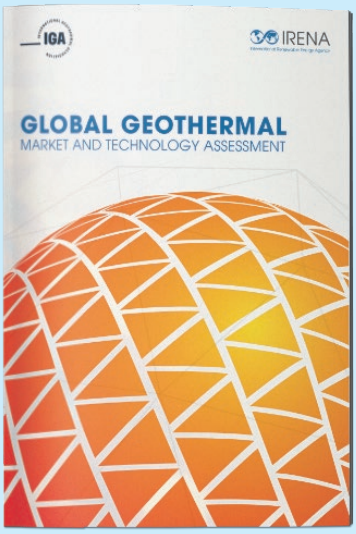
Panellists for the Accelerating Geothermal Development in SIDS session, Second GGA High-Level Conference, September 2022, El Salvador

SIDS were also represented at various panels that looked at the role of geothermal energy as a key driver for energy transition towards sustainable development and climate action. These panels included the ministerial roundtable (Dominica and Fiji), high-level panel discussion (Dominica), geothermal power generation (Papua New Guinea), geothermal heating and cooling (Belize), and financing of geothermal projects (Dominica).

IRENA's geothermal-related publications

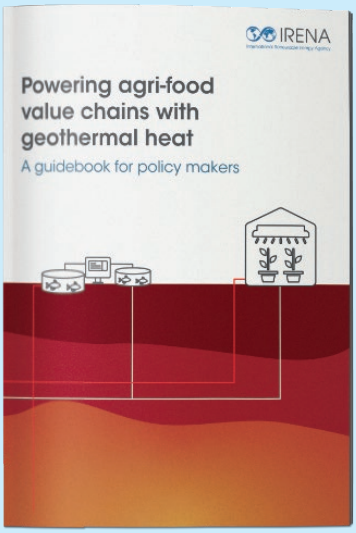
IRENA has collaborated with stakeholders in East Africa and Latin America to stimulate discussion at the regional and national level on the deployment of geothermal energy in the agri-food sector. Similar engagement with SIDS could lead to accelerated development of geothermal agri-food applications.

Global ggeothermal market and technology assessment



The report provides an overview of the developments in the geothermal sector worldwide and the key elements that are likely to drive growth in geothermal markets in the near future. It discusses the status of geothermal energy today and the trajectory of its recent developments. It also reviews the status of geothermal technologies, with reference to new technological approaches and developments that have the potential to scale up geothermal utilisation. Furthermore, the different geothermal markets are analysed to establish the current and expected future place of geothermal energy in the global energy mix. The purpose of this report is to provide actionable recommendations to guide policy makers, governments, the private sector, potential investors, development partners and other relevant stakeholders on how to promote market growth, demonstrate the potential of geothermal energy and further expand its integration within the global energy systems.

Powering agri-food value chains with geothermal heat: A guidebook for policy makers



This report provides recommendations for accelerating the deployment of geothermal energy in the agri-food sector. It addresses the challenges related to inadequate data on the available geothermal resources and mapping of heating demand in the agri-food sector, absent or misaligned enabling framework conditions, inadequate financing, and lack of awareness, among others. The guidebook proposes key priority areas whose implementation would result in accelerated development of geothermal heat in the agri-food sector. The recommendations in the guidebook are derived from an assessment of global case studies to identify key factors, which have resulted in the successful deployment of geothermal heat in the agri-food sector.

IRENA tools and advisory services available to SIDS

Climate Investment Platform (CIP)

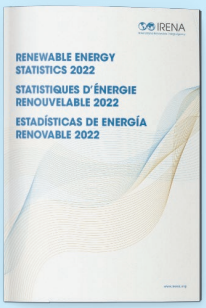
The CIP is a joint initiative of IRENA, UNDP and SEforALL, in collaboration with the Green Climate Fund (GCF). The CIP provides tailored technical assistance and project support to facilitate the development and scale-up of renewable energy technologies, especially in developing economies. The platform also connects projects with registered financial institutions and other CIP partners.

Collaborative Frameworks

Collaborative Frameworks are multi-stakeholder platforms to engage public, private, intergovernmental, and non-governmental actors in co-ordinated support and actions for the global energy transition. IRENA has established Collaborative Frameworks on hydropower, green hydrogen, geopolitics, offshore renewables/oceans, enhancing dialogue on high shares of renewables in energy systems, and just and inclusive energy transitions, which are serving as effective vehicles for dialogue, peer-to-peer collaboration, and the exchange of knowledge.

Data and statistics

IRENA publishes detailed statistics on renewable energy capacity, power generation and renewable energy balances by collecting data from member countries using the IRENA Renewable Energy Statistics questionnaire, with desk research carried out in instances where official statistics are not available. Such data and statistics help analysts, policy makers and the public make informed decisions for renewable energy uptake. Renewable power generation capacity statistics are released annually in March, and renewable power generation and renewable energy balances datasets are released in July.



ETAF Platform

ETAF is a multi-stakeholder platform providing innovative climate financing solutions to advance the energy transition, implement NDCs and realise SDGs across IRENA's membership. The platform facilitates matchmaking of renewable energy projects with financing solutions from various funding partners, investors, the private sector, and donors with the aim to mobilise approximately USD 1 billion of capital by 2030. The United Arab Emirates via the Abu Dhabi Fund for Development (ADFD) has provided anchor funding of USD 400 million to promote climate finance partnerships between the Middle East and the world.

Global Atlas

The Global Atlas for Renewable Energy is a free online resource-assessment tool with maps on solar, wind, ocean, and bioenergy resources. It also facilitates a first screening of sites and areas for renewable energy investment opportunities.

Grid integration analysis

Grid integration studies help in the transformation of the power to integrate higher shares of renewables through co-ordination between long-term, policy-driven renewable energy integration targets and their actual deployment in power systems. They allow policy makers to plan the required resources more accurately while also helping power utilities to identify the most suitable technical measures to deploy increased variable renewables without affecting the system's stability and reliability. IRENA works along with designated focal points, local stakeholders, external experts, and development partners to conduct technical workshops, expert discussions and capacity-building activities on the use of simulation tools and models like the power system simulation software DIgSILENT PowerFactory.

Investment forums

The investment forums' purpose is to strengthen the ecosystem for increasing renewable energy investments and to help developers prepare bankable projects and access relevant financing schemes. These forums, which work in 14 regional clusters, are a part of CIP and help realise project investments through a sub-regional approach. Each cluster is adjusted to the specific needs of its member countries and provides analytical, technical and project support, while also allowing countries to engage in one or more clusters.

Open Solar Contracts

Open Solar Contracts is a collaborative initiative by IRENA and the Terrawatt Initiative to accelerate the scale-up of solar energy. Open Solar Contracts offer simple and universally applicable legal agreements that make contracting much faster and more cost efficient to help streamline project development and finance processes.

Solar Contracts are fine-tuned for small and medium-sized, grid-connected solar PV projects. Standardised contracts include PPAs, implementation agreements, operation and maintenance agreements, supply agreements, installation agreements and finance facility term sheets. These are complemented by implementation guidelines.

Renewable energy roadmap

Renewable energy roadmaps lay out a clear pathway for an island to transition to renewable energy. The roadmap provides a holistic overview of the technical, economic and policy readiness necessary for renewables deployment. The analysis helps to identify the least-cost power system and can additionally examine the scope of renewable penetration in end-use activities as well as other sectors, such as heating, cooling, and transportation.

Renewables Readiness Assessment (RRA)

The RRA is a country-led, comprehensive tool for holistic evaluations and recommendations for actions to accelerate renewable energy development and deployment.

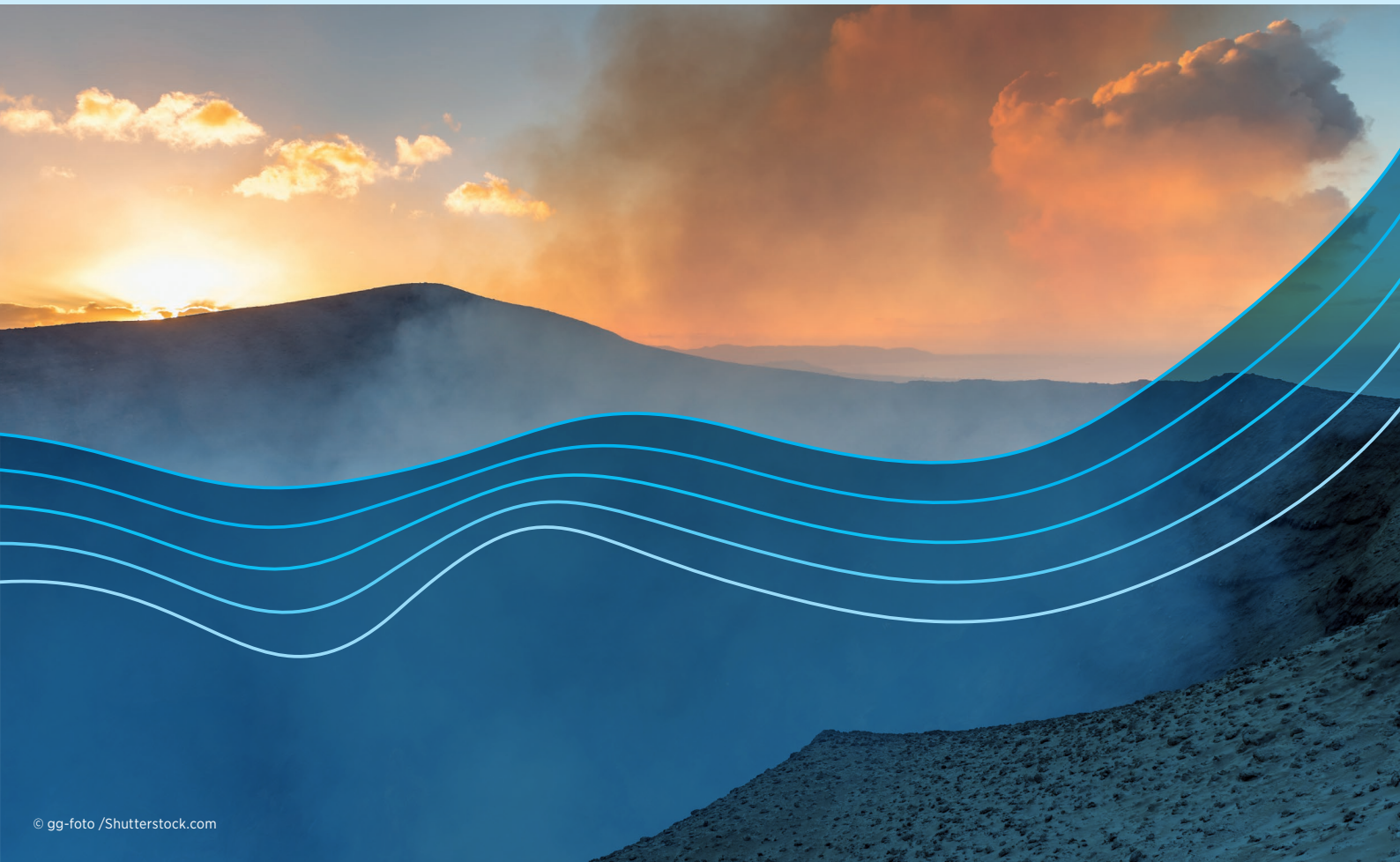
A multi-stakeholder consultation analyses challenges and formulates key recommendations to address these challenges with the help of an international community.

RENEWABLES READINESS ASSESSMENT

SolarCity Simulator

The SolarCity is a web-based simulator application that combines ultra-high-resolution three-dimensional building footprints with solar irradiation data computed at 1-metre grid cells. The simulator can be used by end-users such as households, businesses, and municipal authorities to evaluate the potential of rooftop solar PV systems. It helps to calculate the possible savings compared to other power sources based on a cash-flow financing model. Municipal authorities can additionally assess the impact of different policy incentives. The SolarCity Simulator is part of the Global Atlas online resource developed by IRENA.

SOLARCITY SIMULATOR



IRENA
International Renewable Energy Agency

For more information, visit the SIDS Lighthouses website, LinkedIn page or contact islands@irena.org.

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About IRENA

The International Renewable Energy Agency (IRENA) serves as the principal platform for international co-operation, a centre of excellence, a repository of policy, technology, resource and financial knowledge, and a driver of action on the ground to advance the transformation of the global energy system. An intergovernmental organisation established in 2011, IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy, in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity. **www.irena.org**

About the SIDS Ligthouses Initiative

The SIDS Lighthouses initiative (LHI) is a partnership framework for action to support Small Island Developing States in their energy transition efforts from fossil fuel dependence to renewables. The Initiative brings together partners, including SIDS, developed countries, regional and international organisations, development and multilateral agencies, private companies, research institutes and non-profit organisations that support the development and implementation of the SIDS national, regional and inter-regional and global sustainable energy strategies. IRENA is the co-ordinator and facilitator of the Initiative. **islands.irena.org**