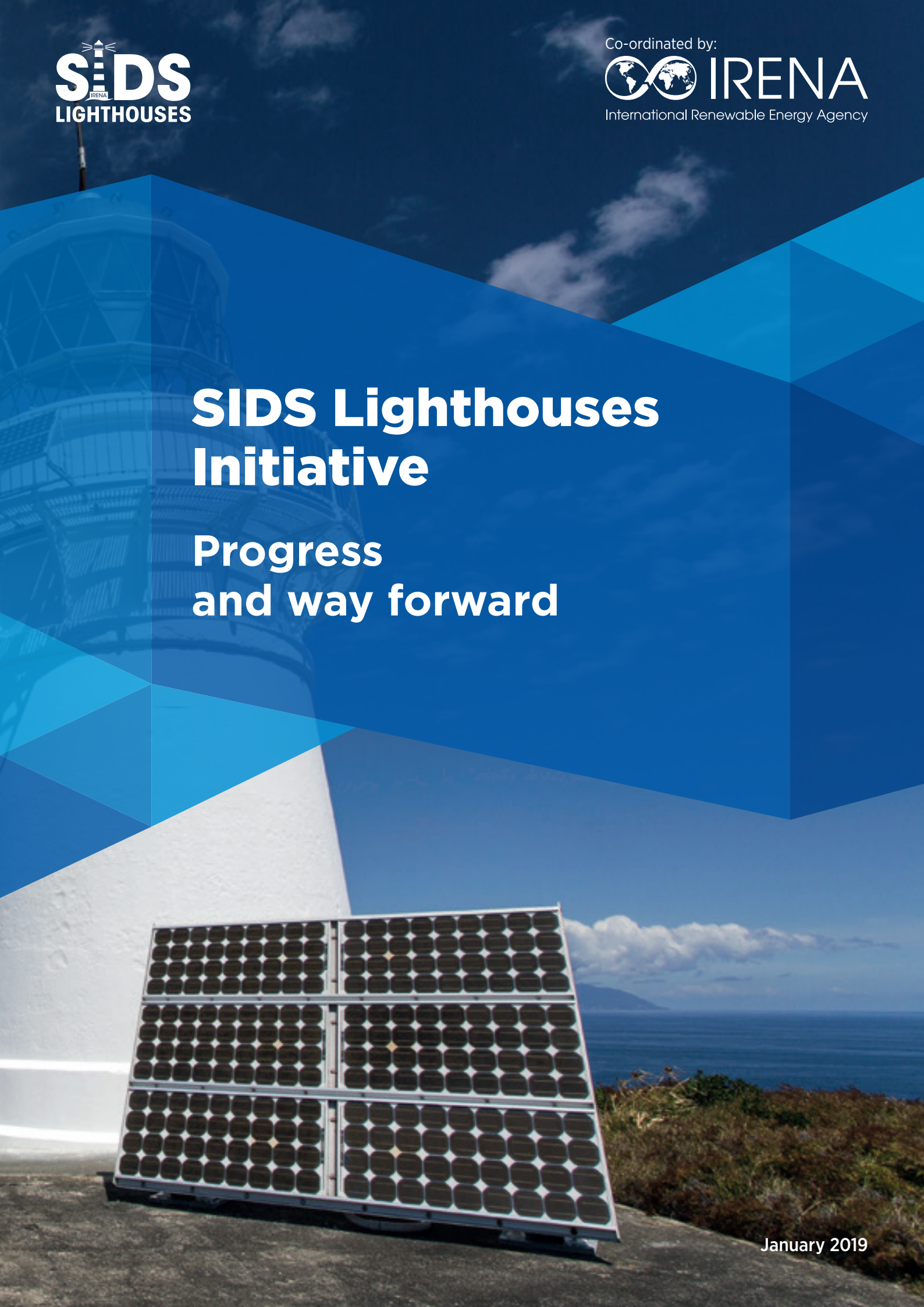
SIDS LIGHTHOUSES

Co-ordinated by:
IRENA
International Renewable Energy Agency

SIDS Lighthouses Initiative

Progress and way forward



January 2019

INTRODUCTION

For small island developing states (SIDS), energy challenges constrain sustainable economic development. Most SIDS, which are already among the most vulnerable to climate change, heavily depend on imported fossil fuels. Owing to their small market size and geographic isolation, their energy costs are high and are particularly susceptible to the impacts of oil price and supply volatility.

However, renewable energy technologies, combined with energy efficiency, can achieve transformational socio-economic impacts for SIDS. Renewable sources including solar, wind, geothermal, ocean energy, hydropower and biomass can ensure energy security and create local employment. Renewable energy development is also key to small islands' climate resilience and mitigation measures and forms a vital component in their Nationally Determined Contributions (NDCs) under the 2015 Paris Agreement.

The SIDS Lighthouses Initiative (LHI), launched at the United Nations Climate Summit in 2014, aims to support SIDS in their energy transformation. As a framework for action, it addresses all elements of the energy transition, from policy and market frameworks to technology options and capacity building. The Initiative facilitates co-ordinated support for SIDS, primarily through partnerships with public, private, intergovernmental and non-governmental stakeholder organisations.

This publication provides an overview of the progress achieved in the first four years of the Initiative and highlights key developments in 2018 that have paved the way for its second phase: SIDS Lighthouses Initiative 2.0.

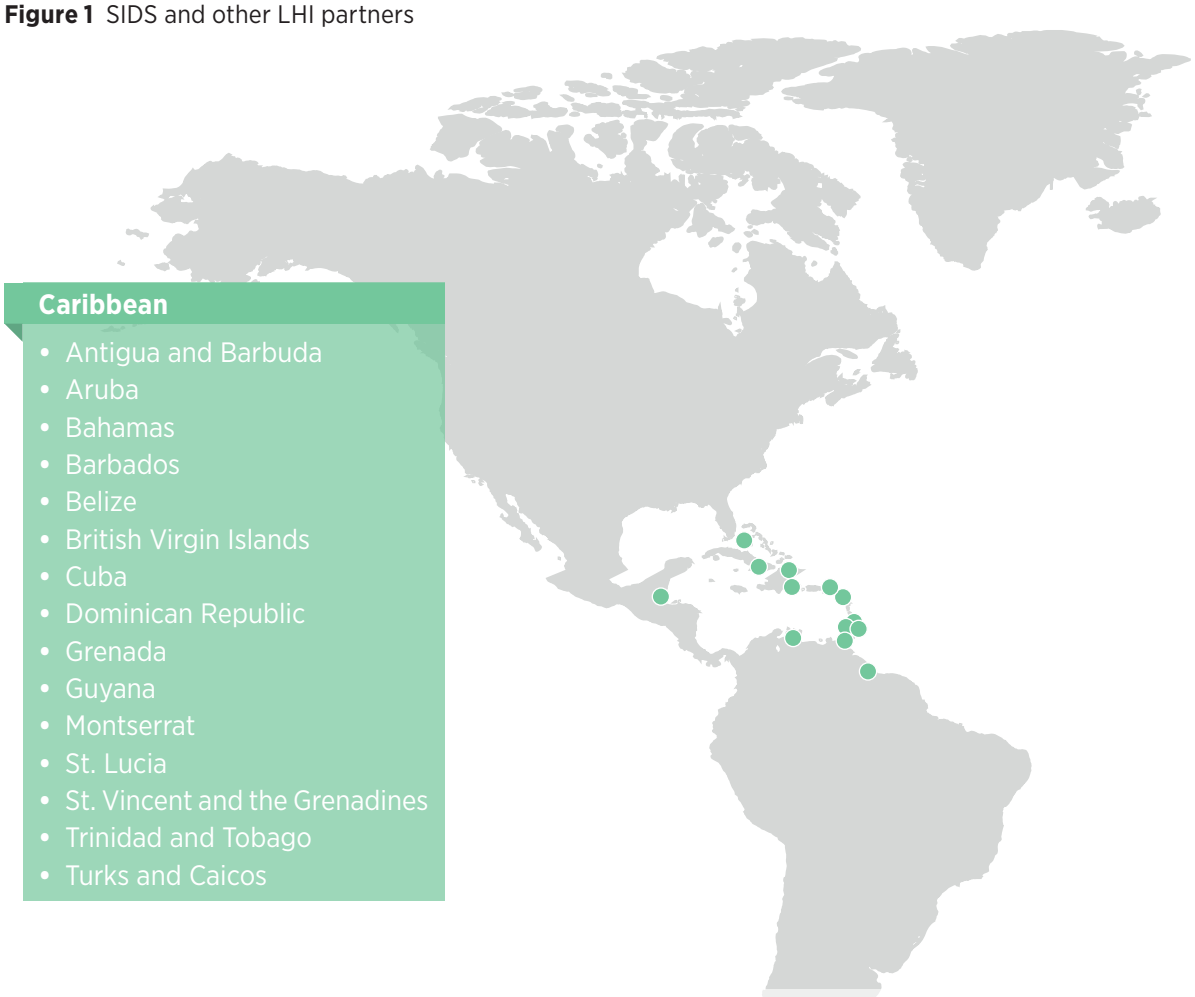
SIDS IRENA LIGHTHOUSES

SMALL ISLAND DEVELOPING STATES AND OTHER PARTNERS IN THE LIGHTHOUSES INITIATIVE

The Initiative brings together 36 SIDS from the Caribbean, the Pacific, and the Atlantic, Indian Ocean and South China Sea (AIS) regions, as well as 22 other partners including regional and international organisations, development partners, private companies, research institutes and non-profit organisations. Three new partners joined the initiative in 2018: the Organisation of Eastern Caribbean States, Solar Head of State, and the Pacific Islands Development Forum.

The International Renewable Energy Agency (IRENA), as the Initiative's co-ordinator, acts to facilitate and enhance dialogue at all levels, including through cooperation with other SIDS-related initiatives.

Figure 1 SIDS and other LHI partners



Caribbean

- Antigua and Barbuda
- Aruba
- Bahamas
- Barbados
- Belize
- British Virgin Islands
- Cuba
- Dominican Republic
- Grenada
- Guyana
- Montserrat
- St. Lucia
- St. Vincent and the Grenadines
- Trinidad and Tobago
- Turks and Caicos

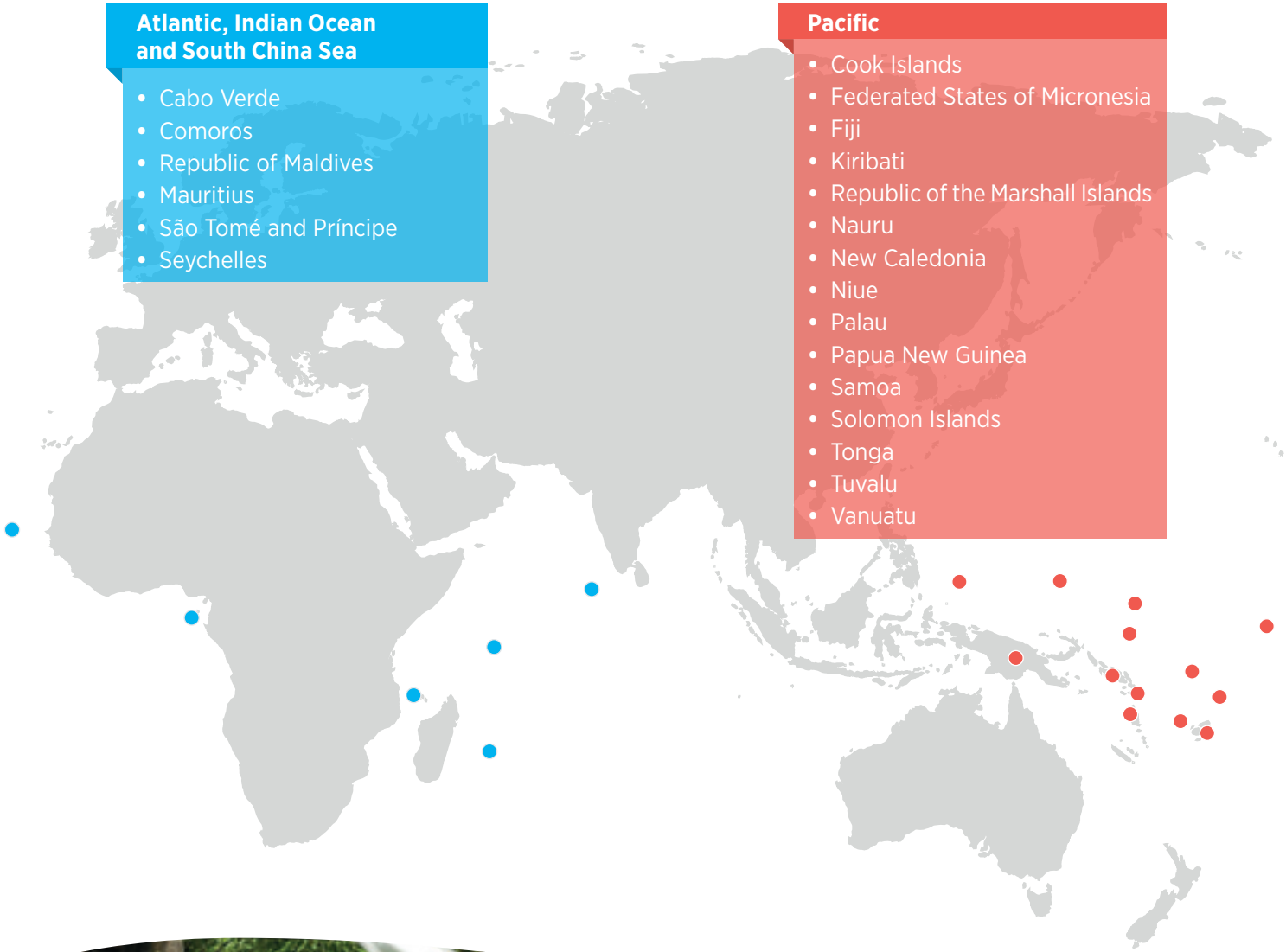
Other partners

France, Japan, Germany, Italy, New Zealand, Kingdom of Norway, United Arab Emirates, United States of America, Association of the Overseas Countries and Territories of the European Union, Clean Energy Solutions Center, Clinton Climate Initiative, ENEL, European Union, Indian Ocean Commission, International Renewable Energy Agency, Organisation of Eastern Caribbean States (OECS), Pacific Islands Development Forum, Rocky Mountain Institute - Carbon War Room, Solar Head of State, Sustainable Energy for All (SEforALL), United Nations Development Programme, World Bank

Joining the Initiative

The SIDS Lighthouses Initiative 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 the deployment of renewable energy on islands.

For more information see: **www.irena.org/islands**; or contact: **islands@irena.org**.



SIDS LIGHTHOUSES INITIATIVE: EVOLUTION SINCE 2014

Since the launch of the Initiative in 2014, the renewable energy uptake in SIDS has been impressive. The bold vision of SIDS leaders, together with technology evolution, cost reductions and the support of a wide range of partners, have made renewables an affordable and reliable energy option for small islands.

The total installed capacity of renewables in the LHI's 36 SIDS partners accounted for about 2.75 GW by the end of 2017, of which more than 400 megawatts (MW) were installed since 2014, according to IRENA data. Those new installations included more than 250 MW of solar photovoltaics (PV) and of 50 MW of wind (see Figures 2, 3, and 4). Meanwhile, over USD 500 million was mobilised for renewable energy investments in SIDS during the same period.

Notably, this means the initial LHI targets for capacity installation and funding mobilisation by 2020 have been exceeded, three years ahead of schedule.

Another key LHI objective is to ensure that participating SIDS develop renewable energy roadmaps. In general, SIDS have been proactive in developing policies and action plans to adopt renewables. Almost all SIDS partners in the LHI have included renewable energy as an important component in their energy strategies or national policy frameworks.

Figure 2 Total renewable energy installed capacity in SIDS partners

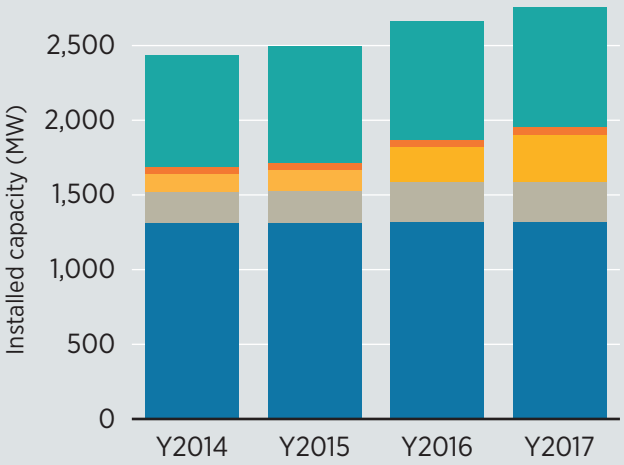
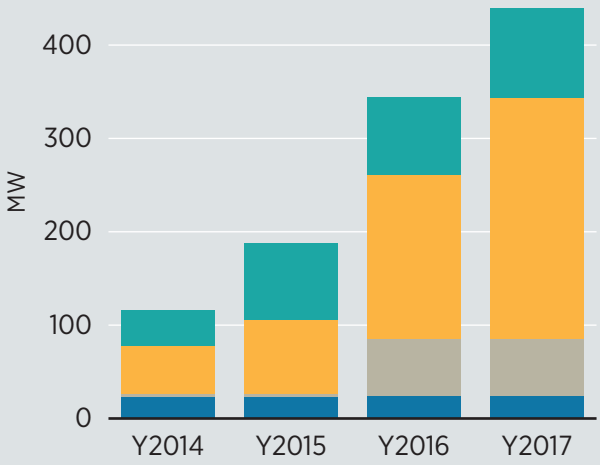


Figure 3 New cumulative renewable energy installations (starting year 2014)



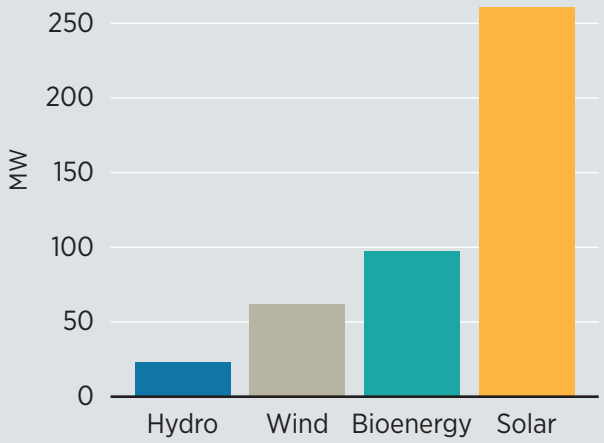
Source: IRENA Resource Database

In particular, 23 of the SIDS in the LHI have developed specific renewable energy roadmaps or action plans to achieve sustainable energy goals.

In recent years, SIDS partnering in the Initiative have gained access to:

- **Policy, regulatory and technical advisory services** for renewable energy roadmaps, assessments and grid stability analyses, as well as project planning, identification, structuring and execution.
- **Capacity building** for local policy makers, utilities, private sector, financing institutions and other relevant actors.
- **Funding for early-stage transactions and project finance**, aiming to attract private investments in renewable energy projects.
- A platform to share **information, knowledge, lessons learned and good practices**.

Figure 4 New renewable energy installations by technology (2014 - 2017)



The infographic illustrates progress made by SIDS partners of the Lighthouses Initiative based on data compiled by IRENA.

Installed Capacity Data Source

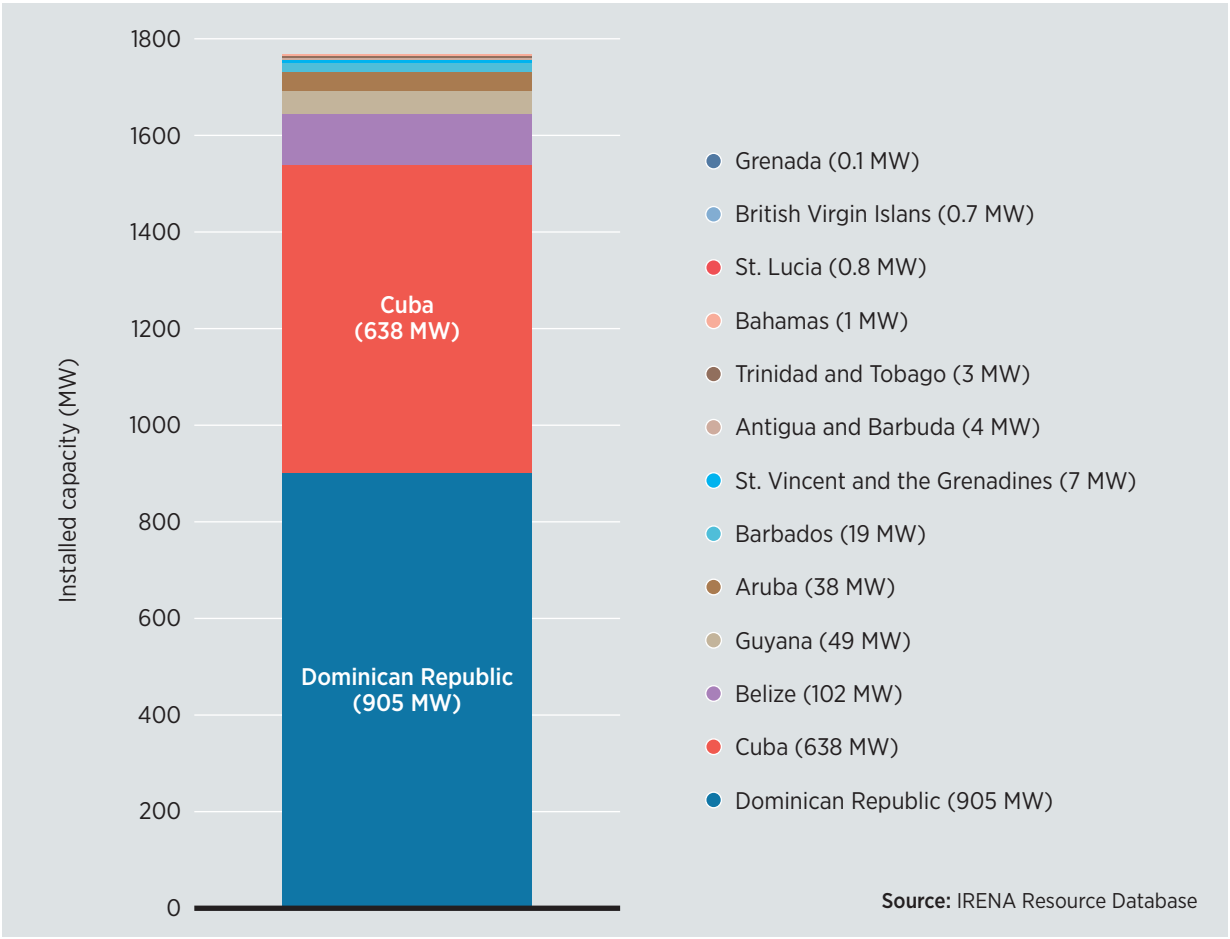
RESOURCE
YOUR SOURCE FOR RENEWABLE ENERGY INFORMATION

REGIONAL DEVELOPMENT IN THE CARIBBEAN

The Caribbean region is home to islands that are among the most severely affected by natural disasters and climate change. Several of the 15[1] Caribbean partners in the LHI are also heavily reliant on fossil fuels for their energy needs, making them vulnerable to external factors such as oil price fluctuations. Caribbean SIDS have identified energy system resilience and renewable energy deployment as key goals in their energy transition. In this context, the Member States of the Caribbean Community (CARICOM) have set a regional target of 47% renewable energy contribution to total electricity generation by 2027.

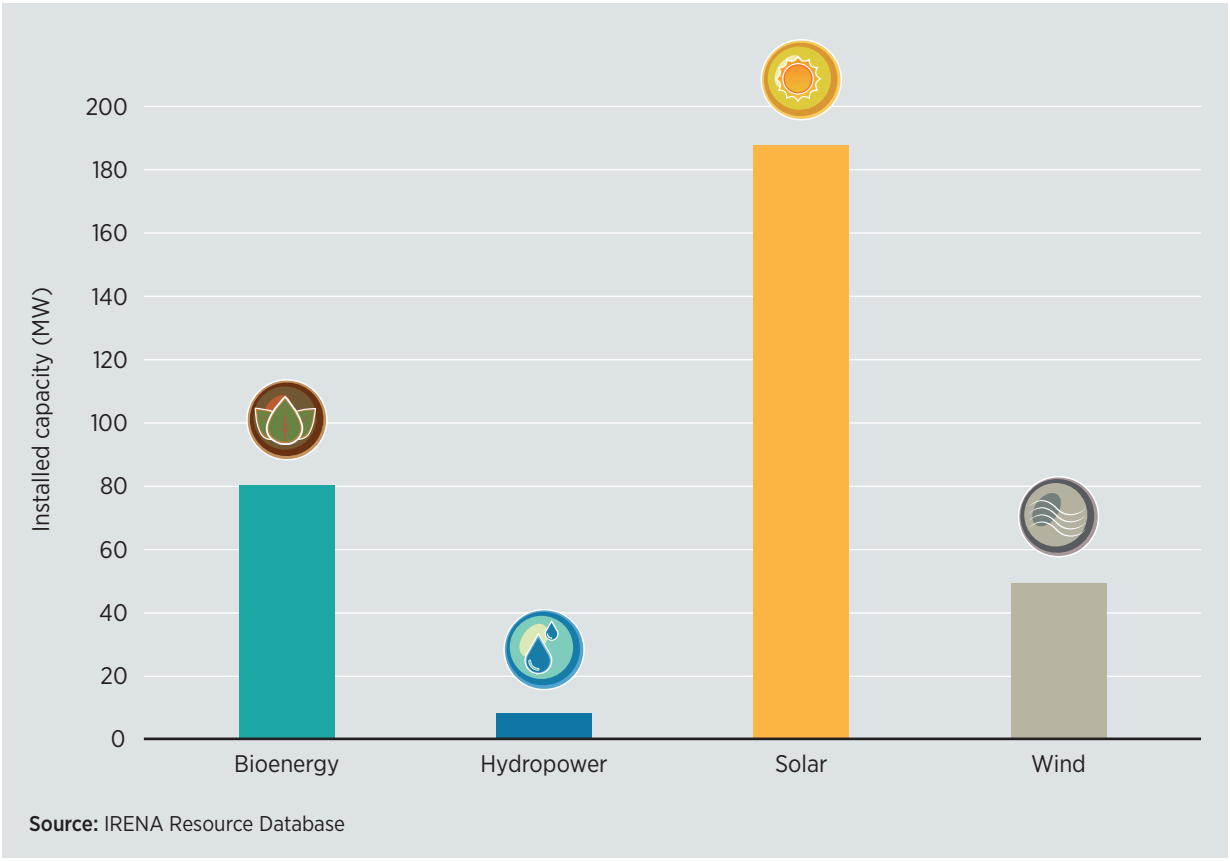
In the period from 2014 to 2017, solar PV has grown significantly among the SIDS partners of LHI in the region, with 180 MW of new capacity having been installed, mostly in the Dominican Republic, Cuba and Barbados. In the same period, growth was also observed in installed biopower capacity, particularly in the Dominican Republic (28 MW) and Cuba (26 MW) – where most of the total installed capacity is concentrated – but also in Belize (16 MW). Wind power has also experienced growth in this period, with new capacity installed in the Dominican Republic. So far there are no geothermal projects operating in LHI partner Caribbean SIDS; however, a geothermal project is being developed in Saint Vincent and the Grenadines, and exploration is on-going in other eastern Caribbean SIDS partners in the Initiative (see Figures 5, 6, and 7).

Figure 5 Total renewable energy installed capacity in the Caribbean partners of the LHI, 2017



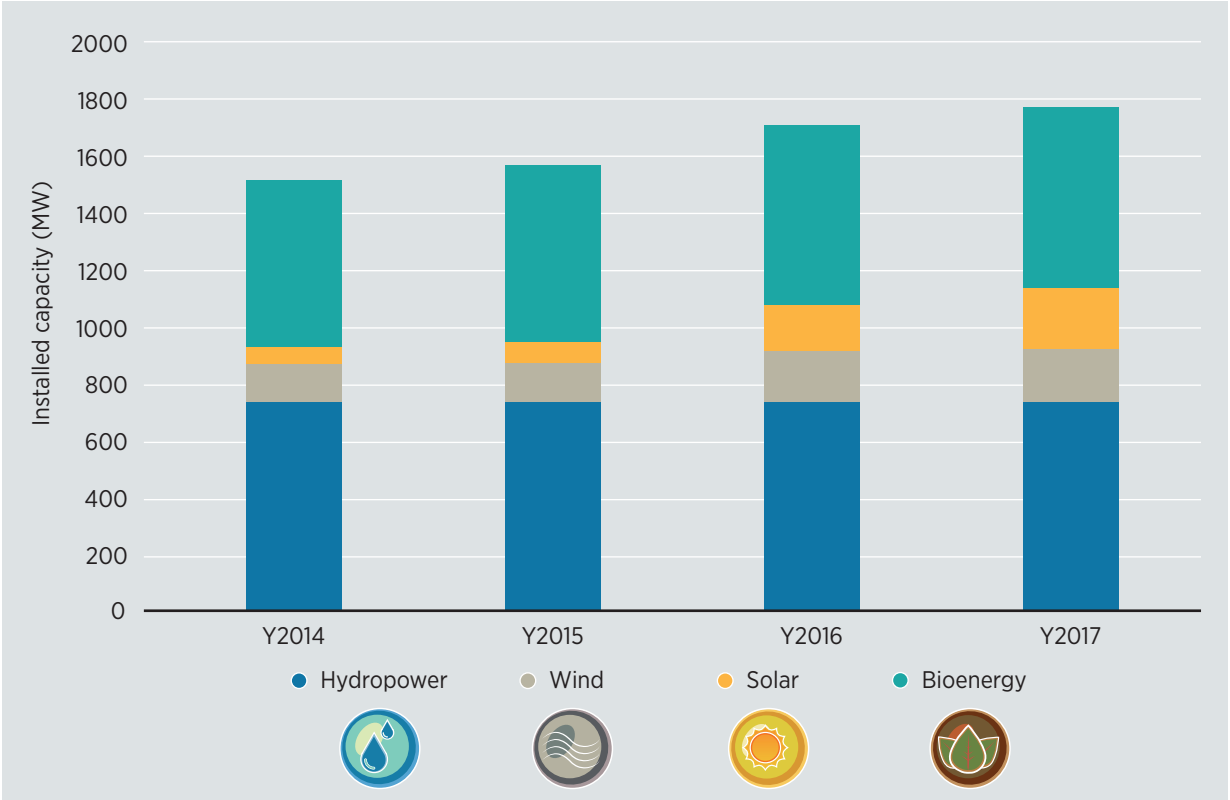
1 Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, British Virgin Islands, Cuba, Dominican Republic, Grenada, Guyana, Montserrat, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, and Turks and Caicos.

Figure 6 New renewable energy installed capacity by technology in the Caribbean partners of the LHI (2014-2017)



Source: IRENA Resource Database

Figure 7 Total renewable energy installed capacity in the Caribbean partners of the LHI

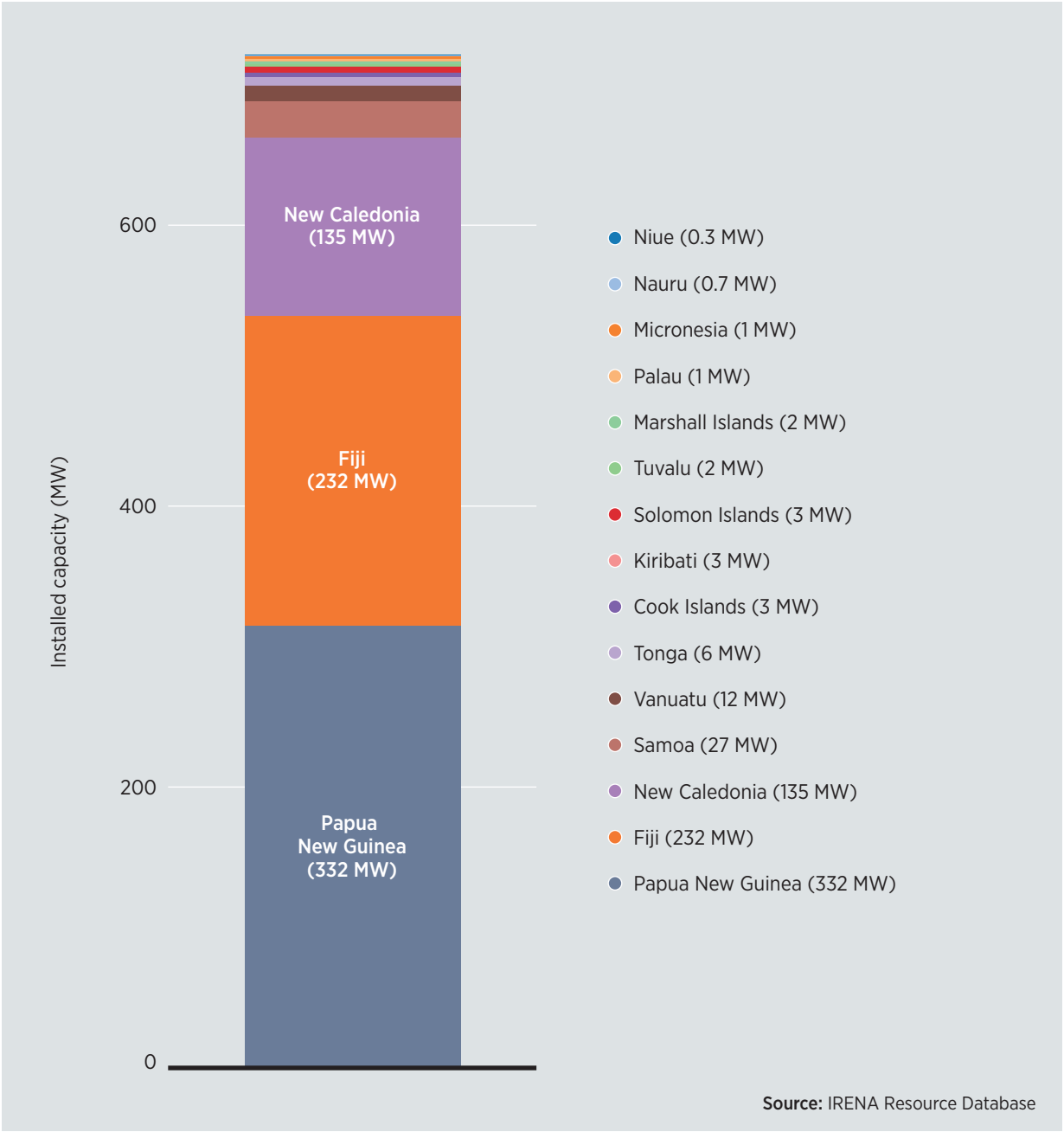


Source: IRENA Resource Database

REGIONAL DEVELOPMENT IN THE PACIFIC

The Pacific island countries and territories – where energy security and access to sustainable and affordable energy are top priorities – have some of the most ambitious renewable electricity targets in the world today. At present, the main source of renewable energy utilised in the power sector of the 15 Pacific partners of LHI[2] is hydropower, but there has also been significant deployment of bioenergy and solar PV in recent years. From 2014 to 2017, around 18 MW of hydropower was installed in Papua New Guinea, some 30 MW of biopower in Fiji and 55 MW of solar PV across the region, with notable growth in Samoa and New Caledonia (see Figures 8, 9, 10).

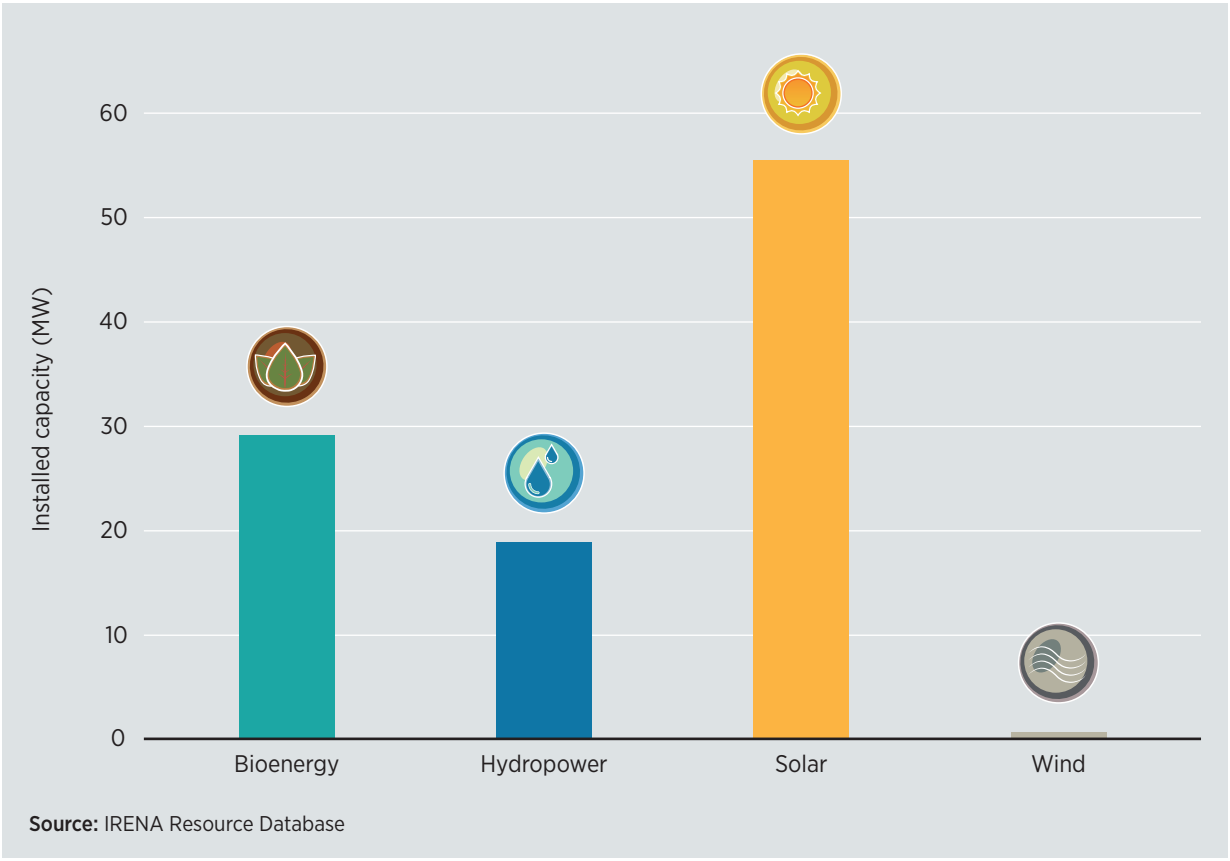
Figure 8 Total renewable energy installed capacity in the Pacific partners of the LHI, 2017



Source: IRENA Resource Database

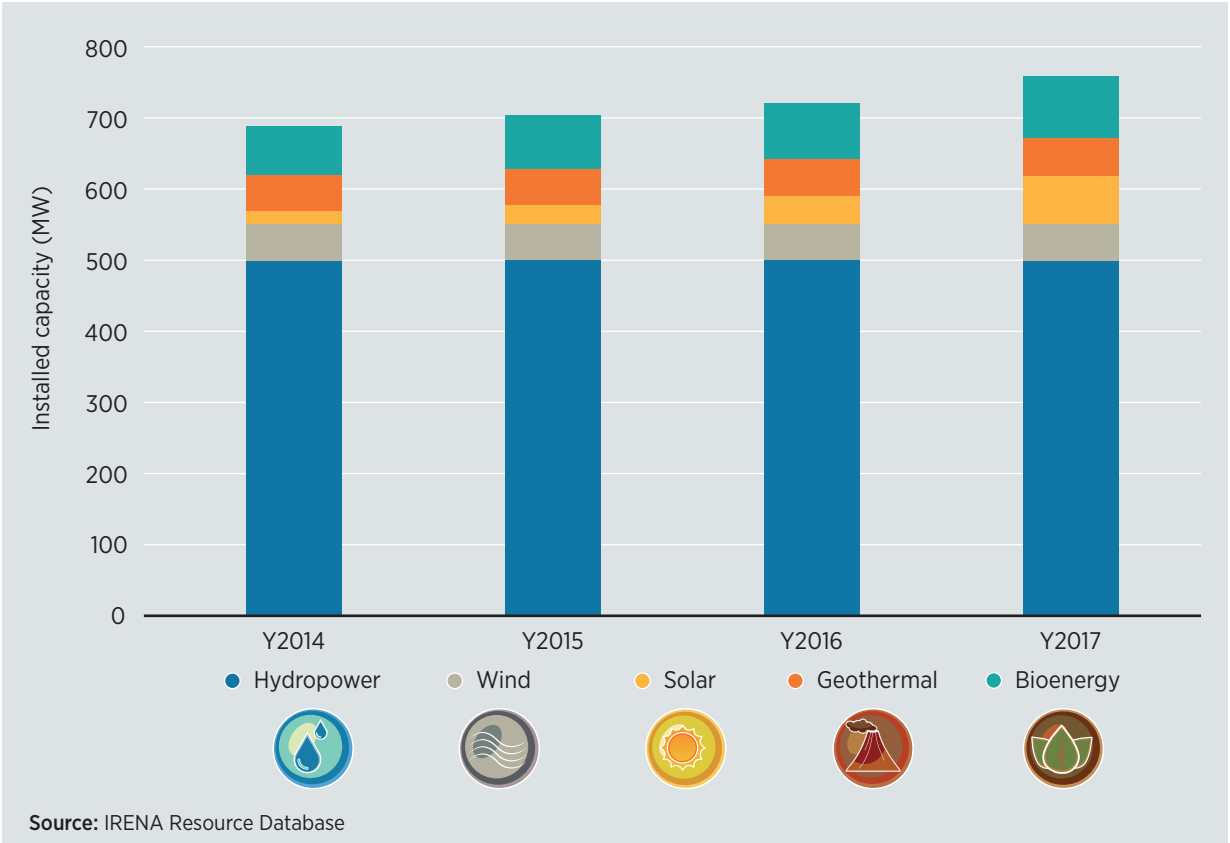
2 Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, New Caledonia, Niue, Palau, Papua New Guinea, Samoa, Republic of the Marshall Islands, Solomon Islands, Tonga, Tuvalu and Vanuatu.

Figure 9 New renewable energy installed capacity by technology in the Pacific partners of the LHI (2014-2017)



Source: IRENA Resource Database

Figure 10 Total renewable energy installed capacity in the Pacific partners of the LHI



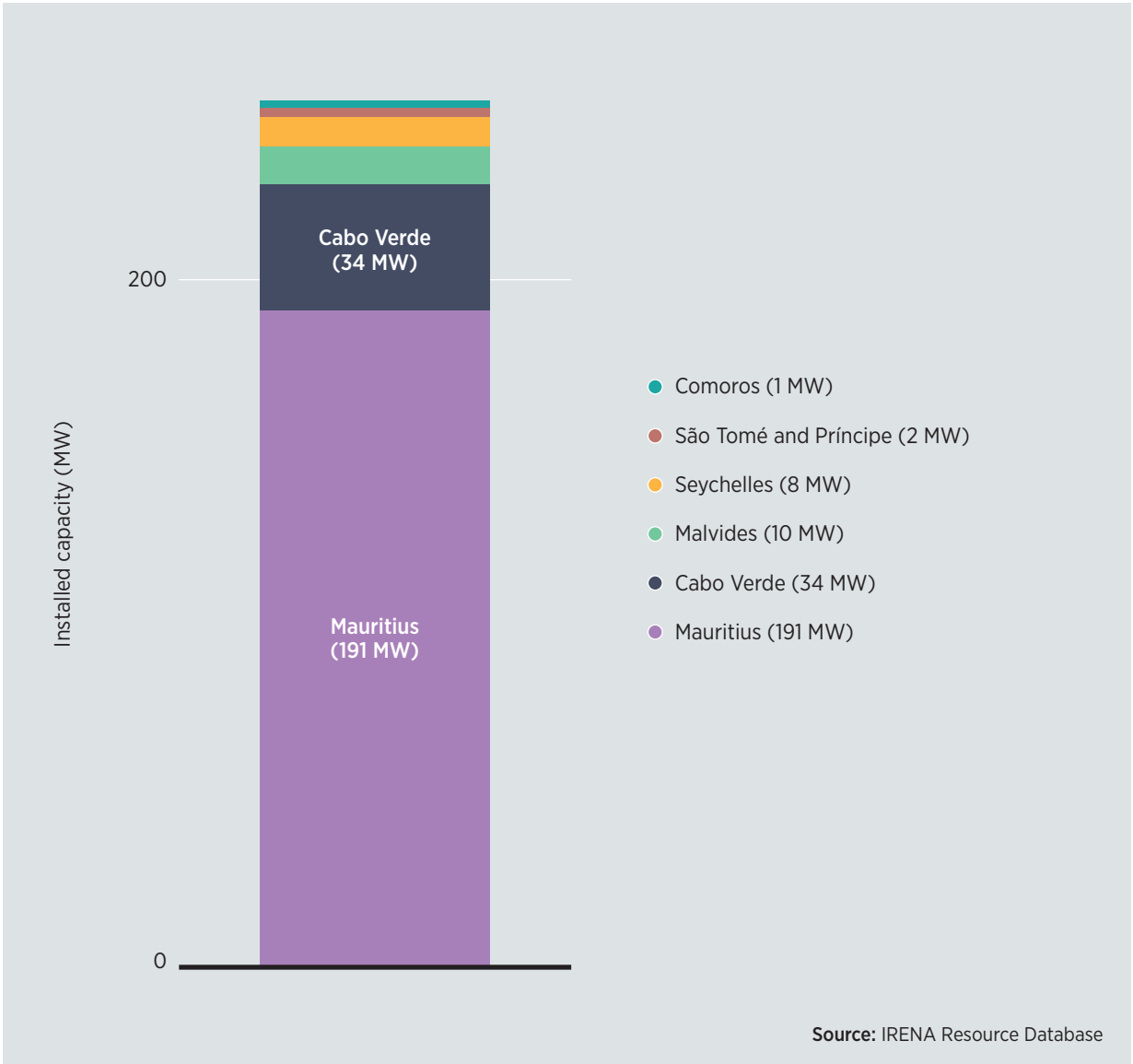
Source: IRENA Resource Database

REGIONAL DEVELOPMENT IN THE ATLANTIC, INDIAN OCEAN AND SOUTH CHINA SEA (AIS) REGION

Each of the six SIDS LHI partners from the Atlantic, Indian, Ocean, and South China Sea region[3] is unique in terms of geography, energy sector development, and resource potential. Nevertheless, transitioning to a sustainable energy future is a common priority across the islands. Mauritius is the country with the highest installed renewable energy capacity and accounts for nearly all of the biopower and hydropower installed in the AIS region, while Cabo Verde has the highest wind energy deployment.

In the period from 2014 to 2017, among the SIDS partners of LHI in the region, solar power has seen significant growth with around 37 MW of newly installed capacity in Mauritius (26 MW), the Maldives (8 MW) and the Seychelles (2 MW). Newly installed biopower and wind capacity was also observed, both exclusively in Mauritius (see Figures 11, 12, 13).

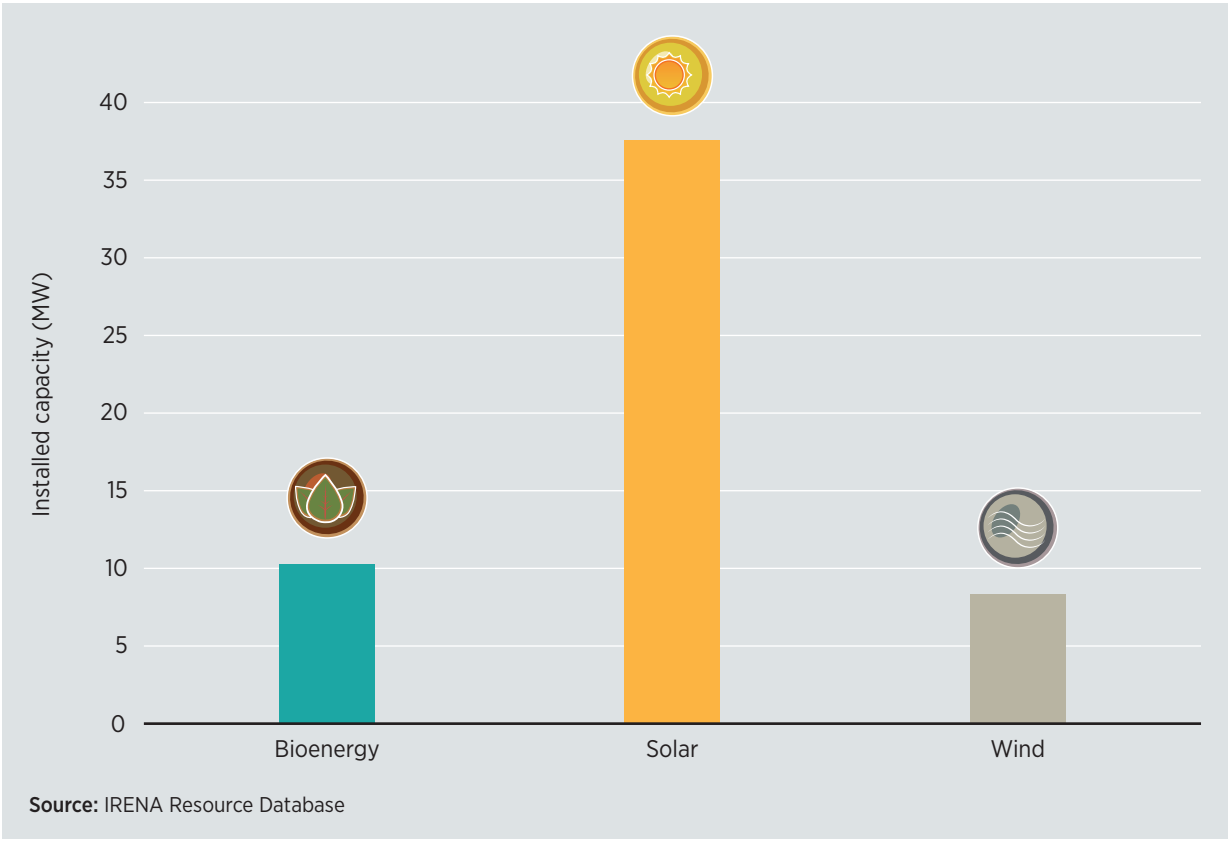
Figure 11 Total renewable energy installed capacity in the AIS partners of the LHI, 2017



Source: IRENA Resource Database

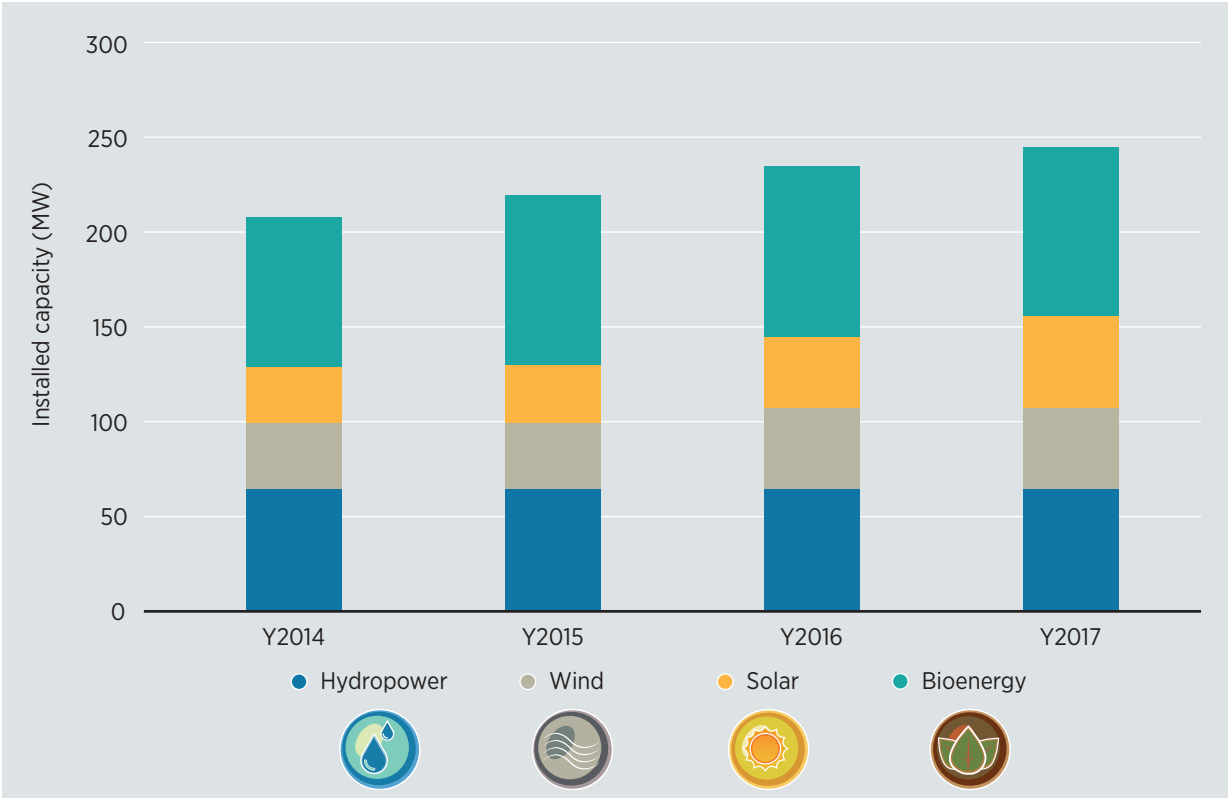
3 Cabo Verde, Comoros, the Maldives, Mauritius, São Tomé and Príncipe, Seychelles.

Figure 12 New renewable energy installed capacity by technology in the AIS partners of the LHI (2014-2017)



Source: IRENA Resource Database

Figure 13 Total renewable energy installed capacity in the AIS partners of the LHI



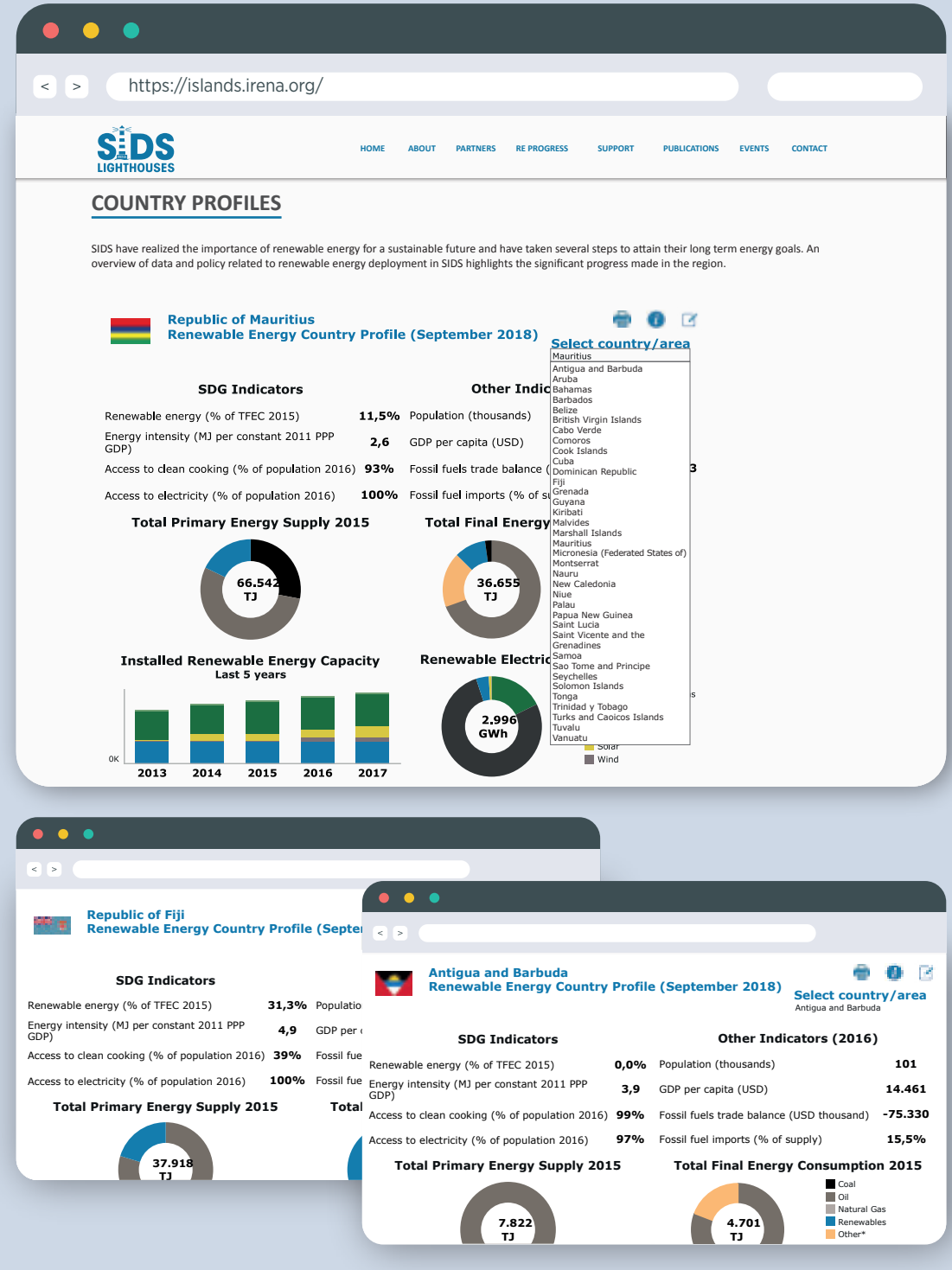
Source: IRENA Resource Database

Box SIDS LHI knowledge-sharing platform

In 2018 IRENA launched a dedicated version of the LHI website as part of the knowledge sharing platform: **www.irena.org/islands**

The SIDS LHI website features tools, studies, videos, key events and a wealth of information on the energy transformation in SIDS.

The website includes a 'Country Profiles' section, which is under development and will provide an overview of key indicators, renewable energy developments and recent initiatives/programmes in each of the SIDS partners.



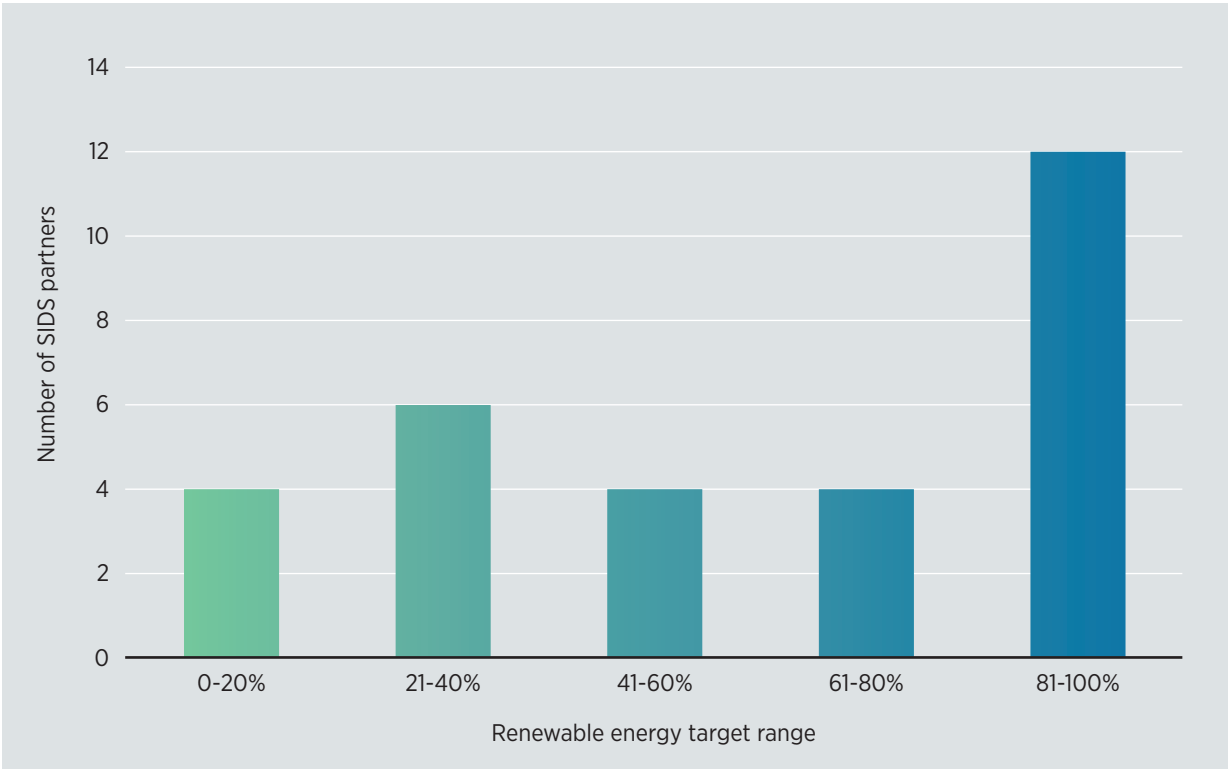
TOWARDS A NEW PHASE IN THE ENERGY TRANSFORMATION OF SIDS: MAXIMISING IMPACTS

As noted above, the initial LHI targets for 2020 have been met and exceeded ahead of schedule. However, renewables still only account for approximately 10% of total installed capacity in the power sectors of SIDS and most of their potential remains untapped. Further efforts are therefore required to accelerate the energy transformation in SIDS.

The political commitment to renewables among SIDS remains unwavering. Almost all SIDS have set indicative national renewable energy targets. Twelve of the LHI SIDS partners have set significant targets, aiming for more than 80% renewable energy penetration in the power sector, among which 10 have set a target of 100% renewable energy (see Figure 14).

Taking into consideration the commitments of SIDS and the evolution of their energy context, IRENA undertook a consultation with LHI partners to identify priority areas in the next phase of the Initiative (LHI 2.0). This process included the organisation of technical and high-level meetings, such as the SIDS Energy Day and High-Level Dialogue held in December 2017 at COP23 in Bonn, Germany, and the High-Level Meeting on Scaling up Renewable Energy Deployment in SIDS, held in January 2018 within the framework of the Eighth Session of the IRENA Assembly.

Figure 14 Range of national renewable energy targets in the power sector of SIDS partners of the LHI

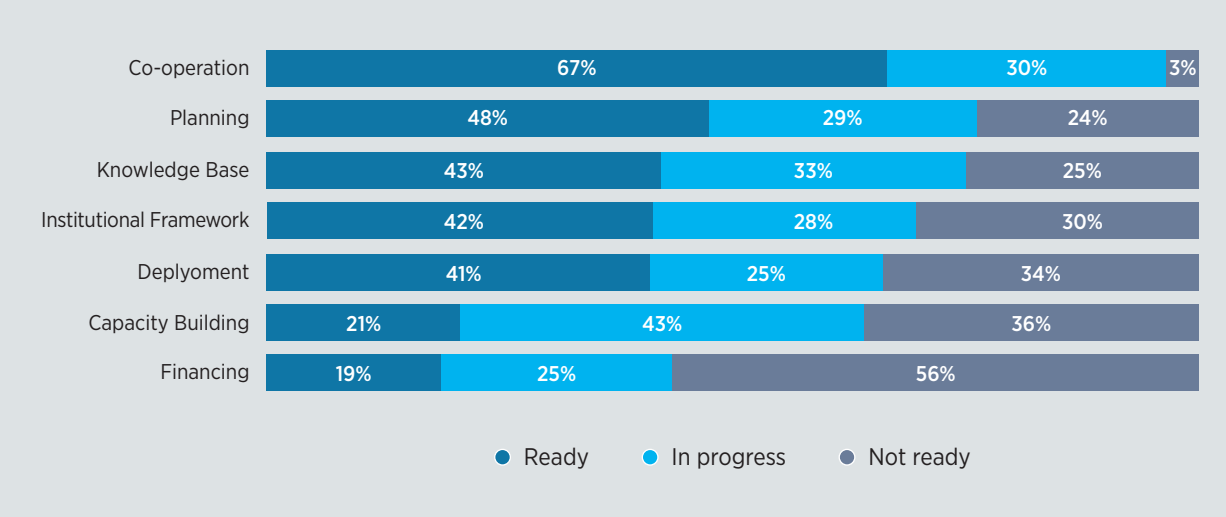


High-Level Meeting on Scaling up the Renewable Energy Deployment in SIDS
8th Session of IRENA Assembly, Abu Dhabi, 12 January 2018

In this context, emerging and persistent challenges faced by SIDS were highlighted, including the following:

- **Heavy dependency on fossil fuels.** While progress towards greater use of renewable energy is observed in the power sector, other end-use sectors remain heavily reliant on imported fossil fuels – especially the transport sector.
- **High electricity tariffs,** especially in the Pacific, where the average domestic electricity rates are significantly high compared to other regions.
- **Natural disasters, supply disruptions and inadequate infrastructure.** Most SIDS are in regions that are prone to natural disasters such as hurricanes and earthquakes, which can severely impact the national economy and cause supply disruptions.
- **Limited access to affordable finance.** As revealed by the results of the Quickscan analysis (see Figure 15), a major issue in SIDS is access to affordable finance to support renewable energy projects or invest in necessary upgrades to aging generation, transmission and distribution infrastructure. In several cases, local equity and government funding are insufficient to achieve the level of renewable energy deployment envisioned and often the framework to attract foreign investment into renewables is either not in place or is ineffective.
- **Weak institutional framework and limited capacity,** for example to plan and operate systems with a high share of variable renewables such as solar PV and wind.
- **Limited access to energy and modern technology** in some SIDS and significant related challenges in terms of health services, water and food security.

Figure 15 Quickscan results by element for 20 SIDS



Source: SIDS Lighthouses Quickscan Interim Report, IRENA, 2017[4].

During the consultation phase undertaken in preparation of LHI 2.0, consensus emerged around some key areas of action; these were captured in a discussion paper prepared by IRENA and shared for feedback with LHI partners in August 2018. Feedback received from LHI partners was taken into account during the identification of priority areas and targets for the next phase of the Initiative.

Figure 16 Extracts from the discussion paper "SIDS Lighthouses Initiative: State of play and way forward".

4 Report available at: http://www.irena.org/publications/2017/Nov/SIDS-Lighthouses-quickscan-Interim-report

SIDS LIGHTHOUSES INITIATIVE 2.0: PRIORITY AREAS

Following the process of consultation with LHI partners (see previous section), SIDS and other partners of the Initiative gathered at the High-Level Roundtable "Increasing Ambition to Accelerate Energy Transformation in Small Island Developing States" on 28 September 2018, organised on the side lines of the United Nations General Assembly in New York to define priority areas and launch the next phase of the Initiative, LHI 2.0.

The action areas of the next phase of the Initiative endorsed in New York are as follows:

- Support SIDS in reviewing and implementing NDCs, extending technical assistance and capacity building where needed.
- 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.
- Promote all renewable sources, including geothermal and ocean energy, and step up work to integrate solar PV and wind power.
- Support the development of bankable projects, fostering access to finance and closer co-operation with the private sector.
- Strengthen institutional and human capacity development in all segments of the renewable energy value chain.
- Expand focus beyond power generation to include transportation and other end-use sectors.
- Leverage synergies between renewables and energy efficiency.
- Reinforce links between renewables and non-energy sectors – including agriculture, food, health and water – to foster broad socio-economic development, as well as raising awareness about job creation, gender equality and women's empowerment through renewable energy development.
- Link renewable energy uptake to climate resilience and more effective disaster recovery.
- Enhance collection and dissemination of data and statistics, supporting informed decision-making and effective monitoring.
- Reinforce and expand partner engagement, leveraging synergies with existing SIDS initiatives and other IRENA co-ordinated platforms, such as the Global Geothermal Alliance, the International Off-Grid Renewable Energy Conference and the Coalition for Action.
- Boost renewable power deployment, aiming for a total target of five gigawatts (GW) of installed capacity in SIDS by 2023.

SIDS LHI 2.0 launched at the High-Level Roundtable
"Increasing Ambition Accelerate Energy Transformation in Small Island Developing States"
28 September 2018 – United Nations General Assembly

IRENA TOOLS FOR SIDS LIGHTHOUSES PARTNERS

Renewables Readiness Assessment

The Renewables Readiness Assessment (RRA) is a country-led, comprehensive tool for holistic evaluations and recommendations for action to accelerate renewable energy deployment.

Sustainable Energy Marketplace

The Sustainable Energy Marketplace is a virtual platform that gathers project developers, financiers, service and technology suppliers to work together to realise projects related to renewable energy. The Marketplace provides visibility to projects and facilitates investment opportunities.

IRENA Project Navigator

The IRENA Project Navigator is an online platform providing comprehensive, easily accessible, and practical information, tools and guidance to assist in the development of bankable renewable energy projects. The Project Navigator has introduced a component to assist project developers in Small Island Developing States (SIDS). Within this islands module, the Project Navigator will help islands assess and address project development issues, in order to enable stronger, economically sustainable development and smart integration of renewables.

IRENA/ADFD Project Facility

IRENA and the Abu Dhabi Fund for Development (ADFD) have collaborated to create a joint Project Facility to finance transformative and replicable renewable energy projects in developing countries. The facility involves IRENA selecting and recommending promising renewable energy projects in developing countries. ADFD offers concessional loans to projects ranging between USD 5 million and USD 15 million, with the loan amount for each project not exceeding half of the estimated project cost. ADFD is providing USD 350 million over seven annual cycles.

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.

IRENA ACTIVITIES WITH ISLANDS

National energy roadmaps

IRENA actively supports islands in their transition to a renewable energy future through the development of national energy roadmaps. These roadmaps provide clear pathways covering the technical, economic and policy elements that enable the large-scale, sustainable deployment of renewables.

Roadmaps are a result of co-operation between IRENA, national governments and key stakeholders. They feature analysis detailing transformation of current energy usage to least-cost energy systems with a significant contribution from renewables.

Roadmap analysis is centred on identifying renewable energy options for power generation. The analysis can also examine the potential for renewables in the heating, cooling and transportation sectors.

Grid integration studies

IRENA's grid integration work supports policymakers and public utilities from Small Island Developing States address and overcome technical constraints associated with the operation of electricity grids with high shares of variable renewables, such as solar and wind energy.

The work focuses on:

- Analysis of grid stability and grid operation for the integration of higher shares of renewable energy, particularly upon request from IRENA Member States;
- Development of grid integration assessment methodologies as the basis for IRENA country support;
- Provision of access to software tools, models and guides for grid integration studies, with a focus on small isolated systems;
- Training and technical workshops on grid operation and expansion planning for small isolated systems hosting high shares of renewable energy resources.

Site appraisal programme

IRENA's site appraisals simulate the financial viability of wind or solar projects at specific sites. The wind or solar resource potential and the possible costs, financing and revenue associated with the specific site are assessed. The appraisal generates scenarios of financial performance based on the confidence determined in the resource data or the power purchase agreement model. It uses hourly high-resolution wind and solar time series datasets within an IRENA custom-built model and can be applied to any location worldwide.

SIDS Lighthouses Initiative partners can apply for site appraisals.

Quickscans

The quickscan process allows islands to quickly assess their readiness to deploy renewable energy in the power sector. The quickscan is a government-led process, supported by analysis from IRENA or other partners of the Initiative. At the core of quickscan is a targeted questionnaire on seven elements that are critical to a successful transition to renewables.

The SIDS Lighthouses Initiative has been made possible with the generous support of France, Germany, Japan, the Kingdom of the Netherlands, the Kingdom of Norway, New Zealand and the United Arab Emirates.

About IRENA

The International Renewable Energy Agency (IRENA) is an intergovernmental organisation that supports countries in their transition to a sustainable energy future, and serves as the principal platform for international cooperation, a centre of excellence and a repository of policy, technology, resource and financial knowledge on renewable energy. 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.

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