

# SIDS Lighthouses Initiative

## Progress and way forward







## 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 brief provides an overview of the progress achieved in the first five years of the Initiative and highlights key developments that paved the way for its new phase.



# 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 24 other partners including regional and international organisations, development partners, private companies, research institutes and non-profit organisations. Two new partners joined the initiative in 2019: Denmark and Caribbean Electric Utility Services Corporation (CARILEC).

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



Disclaimer: Boundaries and names shown on this map do not imply any official endorsement or acceptance by IRENA.

## 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](http://www.irena.org/islands); or contact: [islands@irena.org](mailto:islands@irena.org).

### Atlantic, Indian Ocean and South China Sea

- Cabo Verde
- Comoros
- Republic of Maldives
- Mauritius
- São Tomé and Príncipe
- Seychelles

### Pacific

- Cook Islands
- Micronesia (Federated States of)
- Fiji
- Kiribati
- Marshall Islands
- Nauru
- New Caledonia
- Niue
- Palau
- Papua New Guinea
- Samoa
- Solomon Islands
- Tonga
- Tuvalu
- Vanuatu

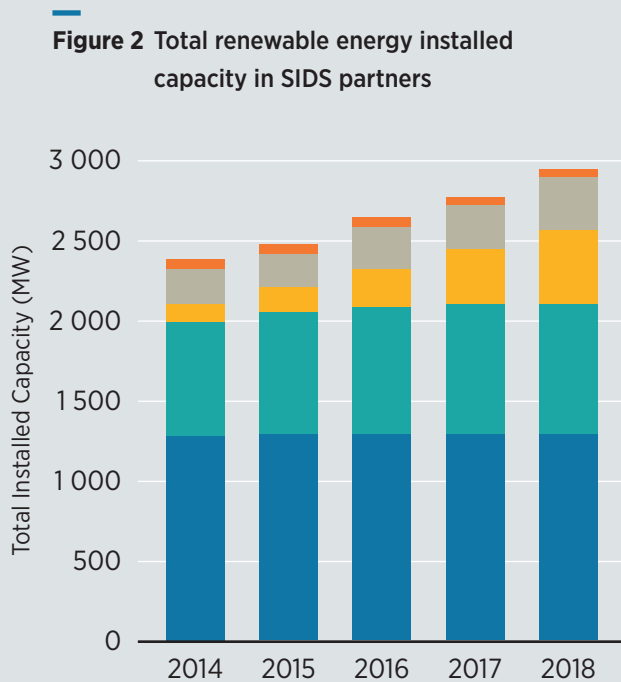


## SIDS Lighthouses Initiative: Evolution since 2014

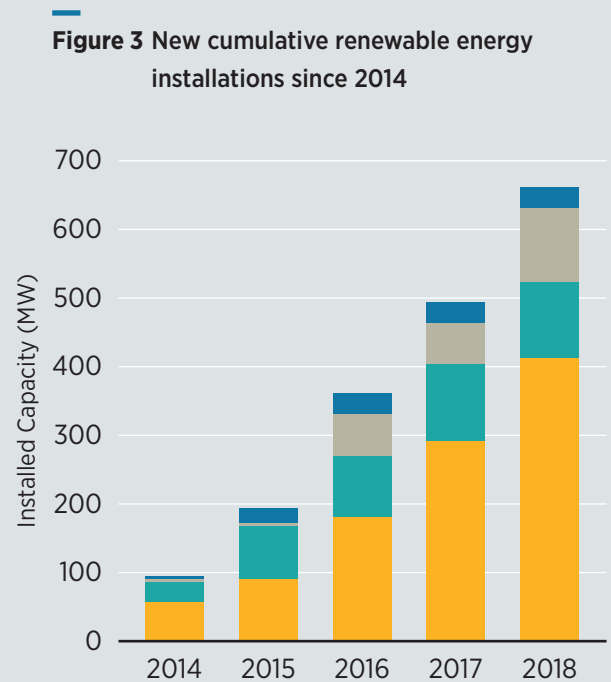
Since the launch of the Initiative in 2014, the renewable energy uptake in SIDS has been impressive. The bold vision of SIDS leaders, together with technology evolution, cost reductions and the support of a wide range of partners, have made renewables an affordable and reliable energy option for small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

According to IRENA data, the total installed capacity of renewables in the LHI's 36 SIDS partners accounted for about 2.95 gigawatts (GW) by the end of 2018, of which 660 megawatts (MW) were installed since 2014. Those new installations included more than 400 MW of solar photovoltaics (PV) and 100 MW of wind (see Figures 2, 3 and 4). This means the initial LHI targets for capacity installation by 2020 have been exceeded 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 national energy policy frameworks and strategies.



Source: IRENA statistics

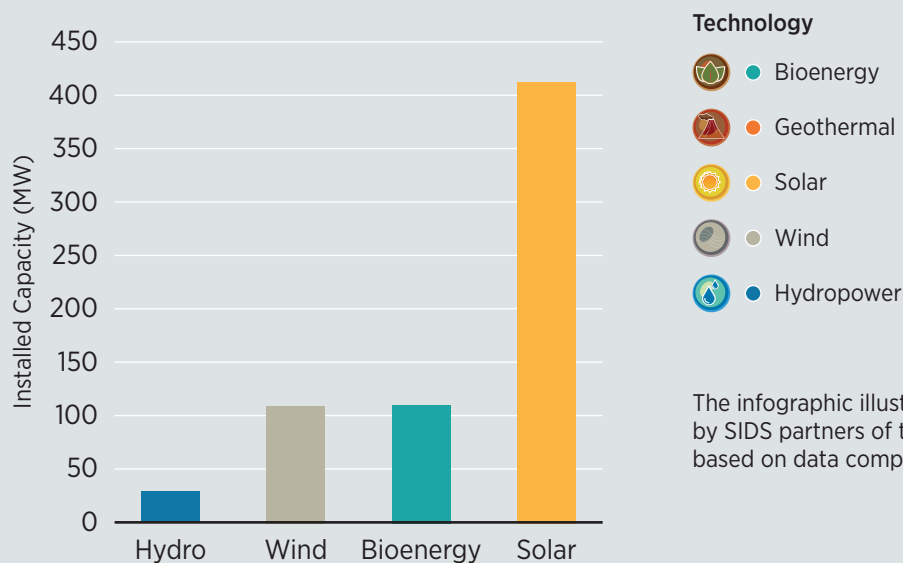


In particular, 23 of the SIDS in the LHI have developed specific renewable energy roadmaps or action plans to achieve sustainable energy goals.

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 - 2018)



Source: IRENA statistics

**Technology**

- Bioenergy
- Geothermal
- Solar
- Wind
- Hydropower

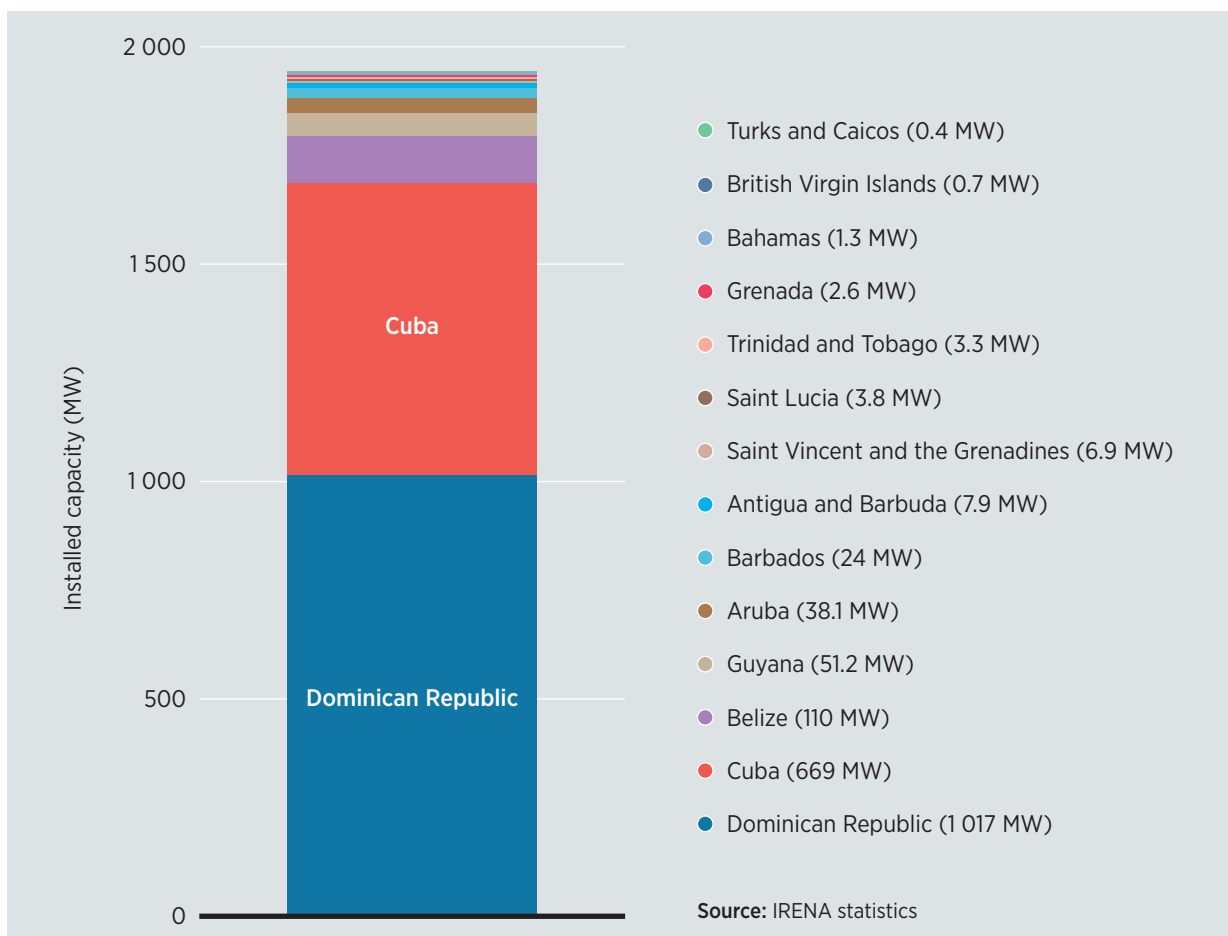
The infographic illustrates progress made by SIDS partners of the Lighthouses Initiative based on data compiled by IRENA

## 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 Caribbean island partners in the LHI rely heavily 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 2014-2018 period, solar PV has grown significantly among the SIDS LHI partners in the region, with 300 MW of new capacity installed, mostly in the Dominican Republic, Cuba and Barbados. In the same period, growth was observed in installed biopower capacity, particularly in the Dominican Republic (36 MW) and Belize (24 MW). Wind power has also experienced growth, with new capacity installed in the Dominican Republic during the period. So far no geothermal or ocean energy projects are operational in the LHI partners in the region. However, drilling for a geothermal project began in Saint Vincent and the Grenadines in May 2019, and exploration is on-going in other eastern Caribbean SIDS partners (see Figures 5, 6 and 7).

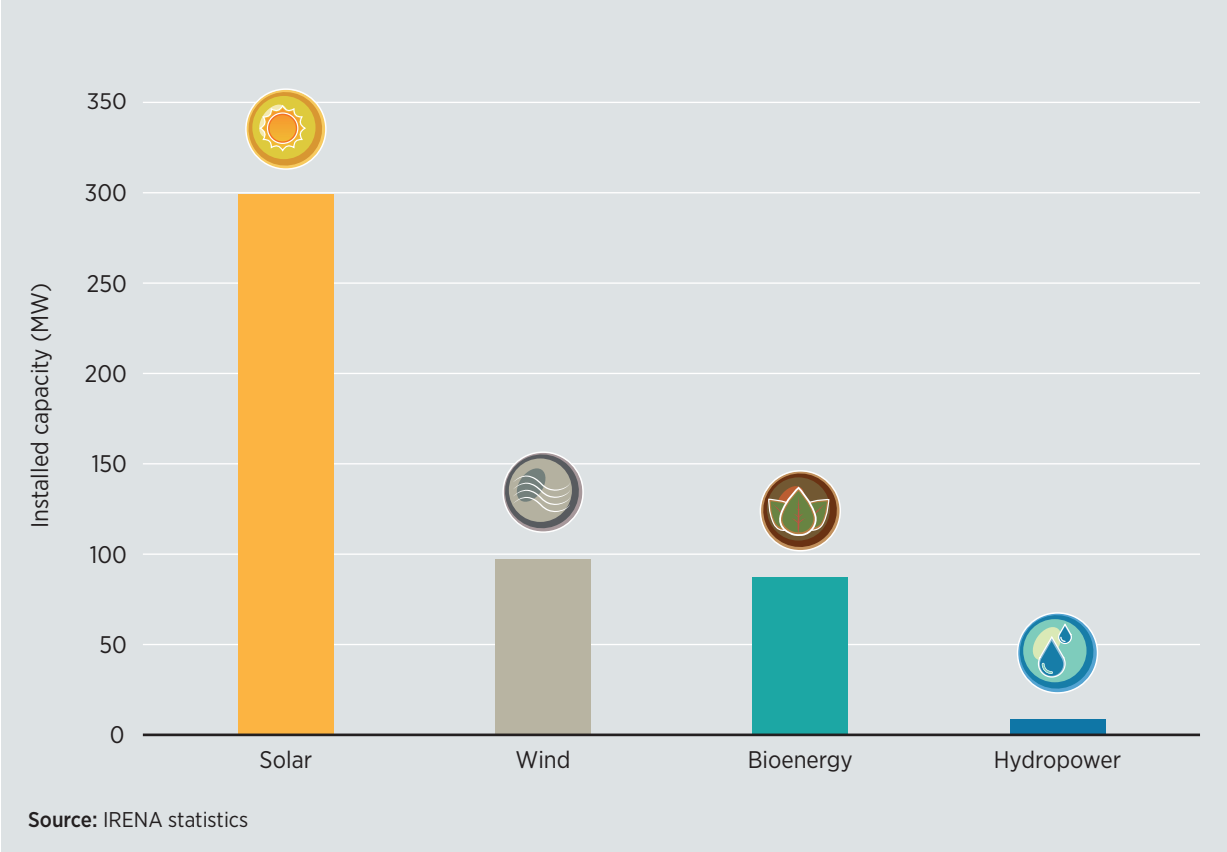
**Figure 5** Total renewable energy installed capacity in the Caribbean partners of the LHI, 2018



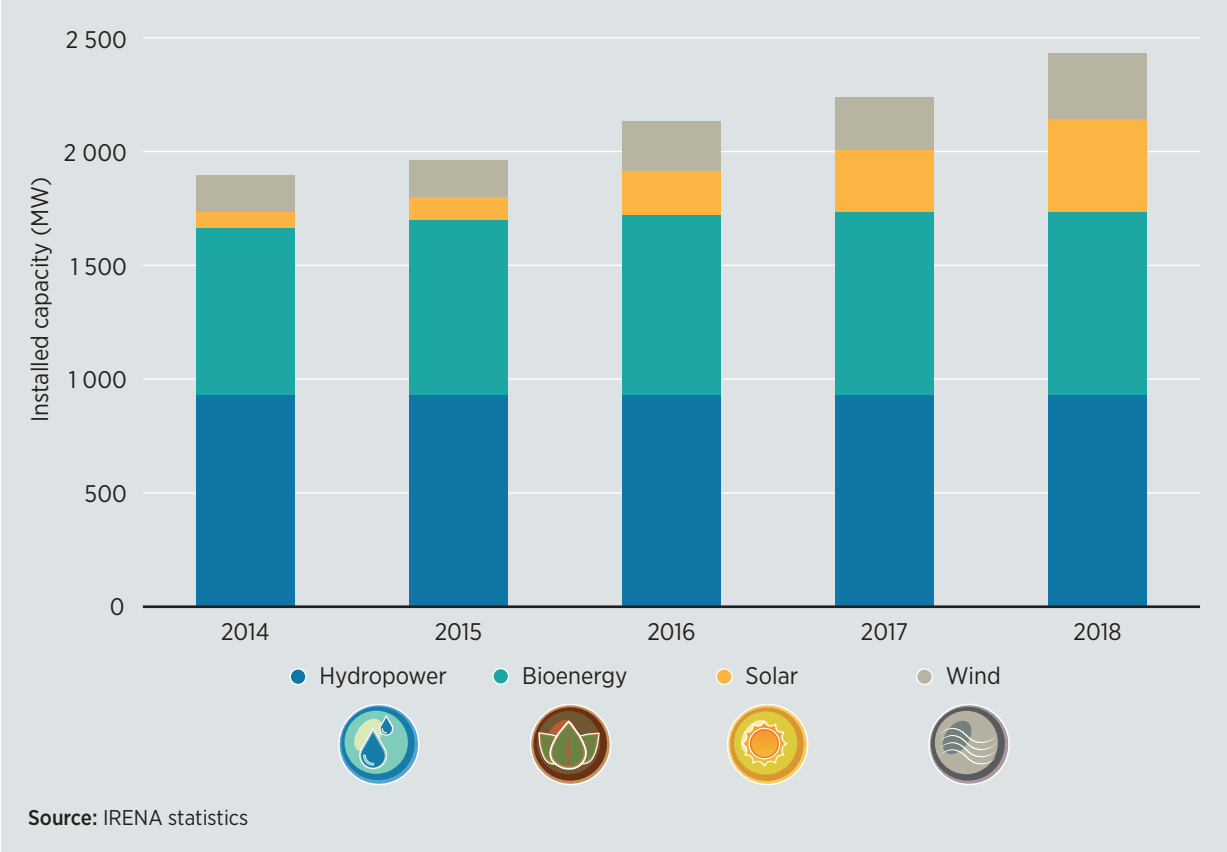
*1 Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, British Virgin Islands, Cuba, Dominican Republic, Grenada, Guyana, Montserrat, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, and Turks and Caicos.*



**Figure 6** New renewable energy installed capacity by technology in the Caribbean partners of the LHI (2014-2018)



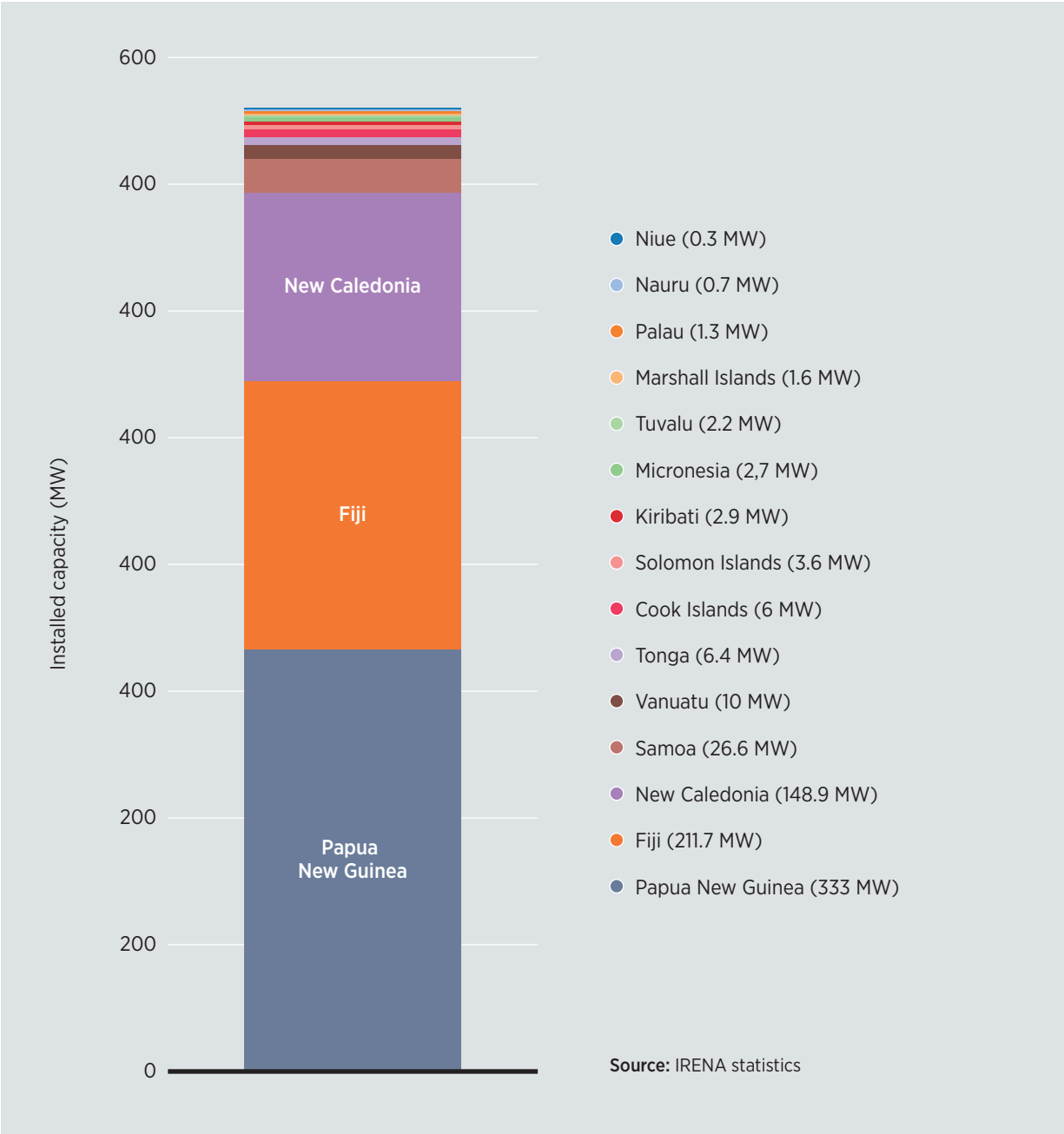
**Figure 7** Total renewable energy installed capacity in the Caribbean partners of the LHI



# REGIONAL DEVELOPMENT IN THE PACIFIC

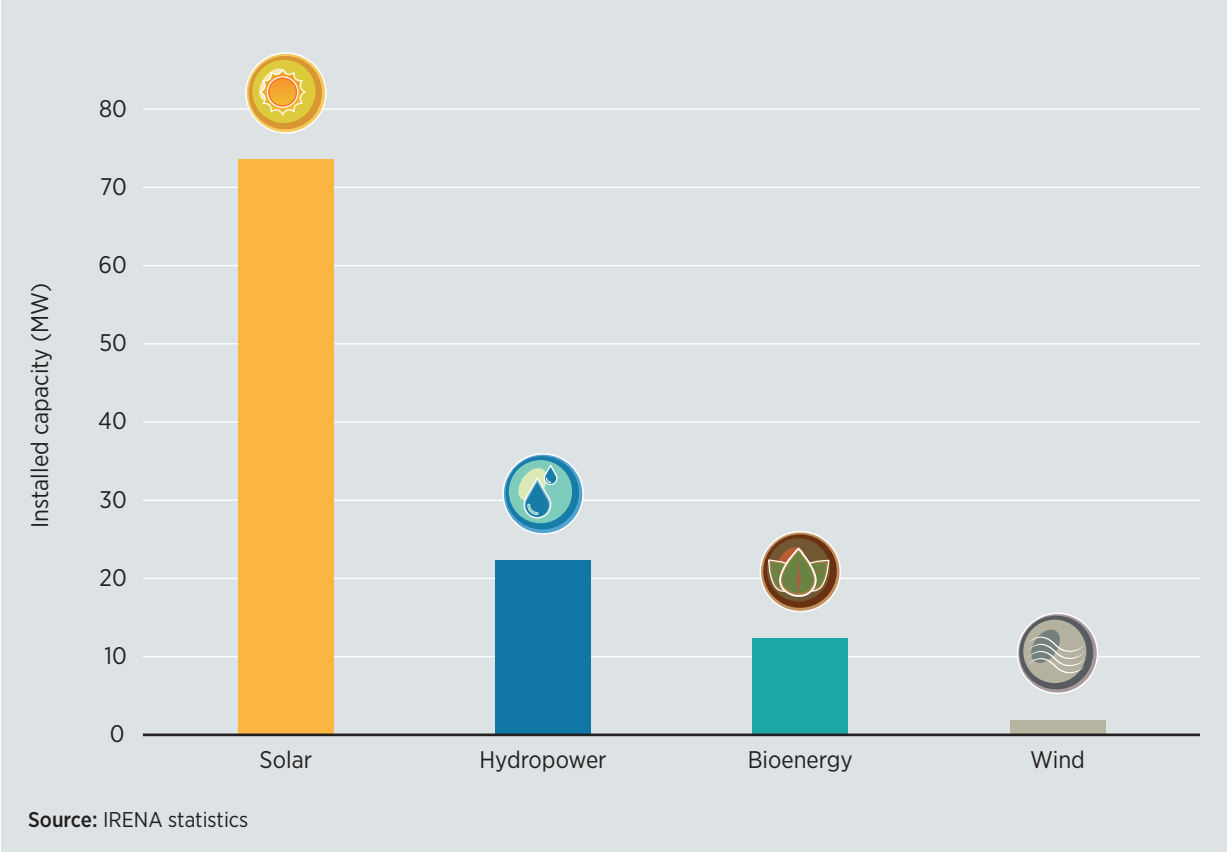
The Pacific island countries and territories – where energy security and access to sustainable and affordable energy are top priorities – have some of the most ambitious renewable electricity targets in the world today. At present, the main renewable source used in the power sector of the 15 SIDS partners of LHI in the Pacific is hydropower, but there has also been significant deployment of bioenergy and solar PV in recent years. In 2014-2018, around 18 MW of hydropower were installed in Papua New Guinea and 3.6 MW in Samoa, some 12 MW of biopower in Fiji and 73 MW of solar PV across the region, with notable growth in Samoa, New Caledonia, Fiji and Tonga (See Figures 8, 9 and 10).

**Figure 8** Total renewable energy installed capacity in the Pacific partners of the LHI, 2018

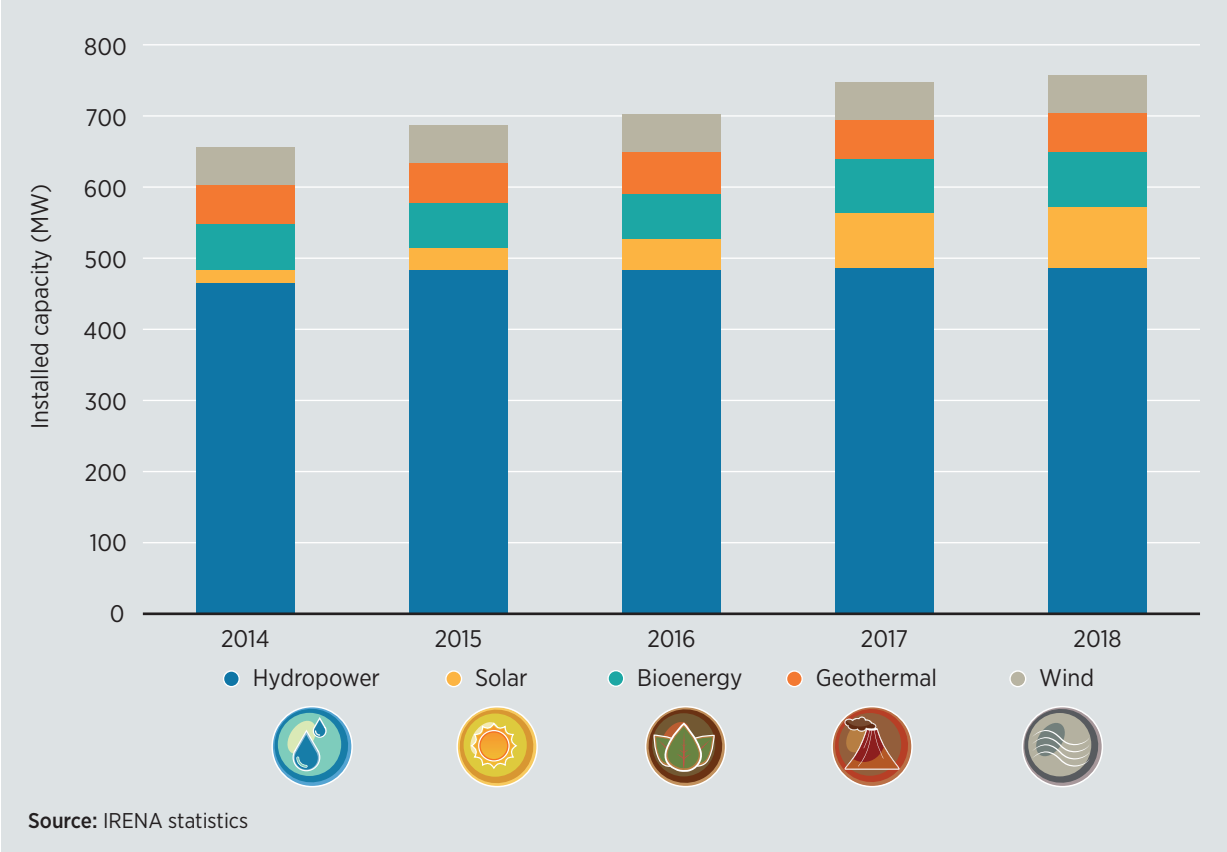


2 Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, New Caledonia, Niue, Palau, Papua New Guinea, Samoa, Republic of the Marshall Islands, Solomon Islands, Tonga, Tuvalu and Vanuatu.

**Figure 9** New renewable energy installed capacity by technology in the Pacific partners of the LHI (2014-2018)



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



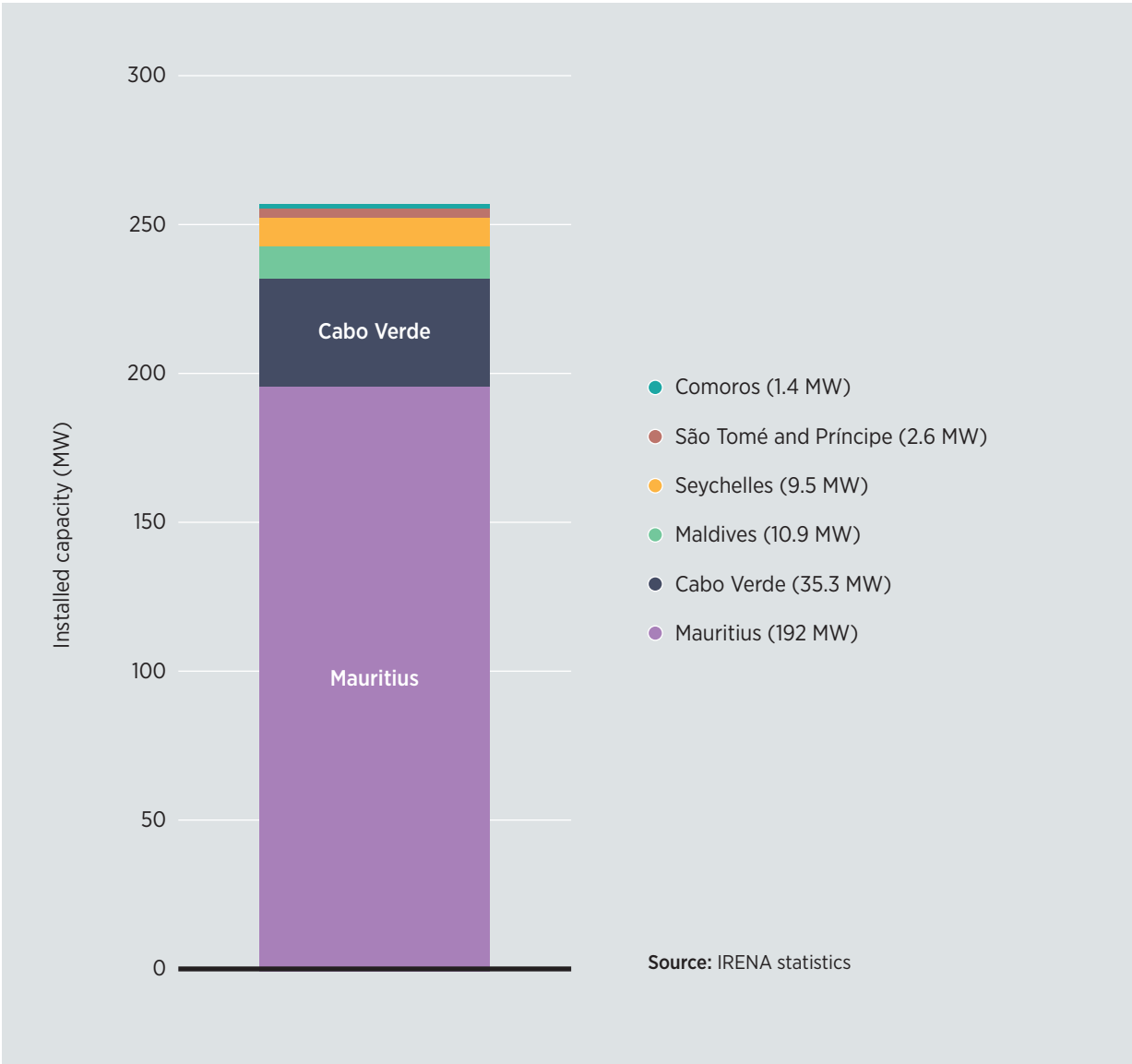


# REGIONAL DEVELOPMENT IN THE ATLANTIC, INDIAN OCEAN AND SOUTH CHINA SEA (AIS)

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

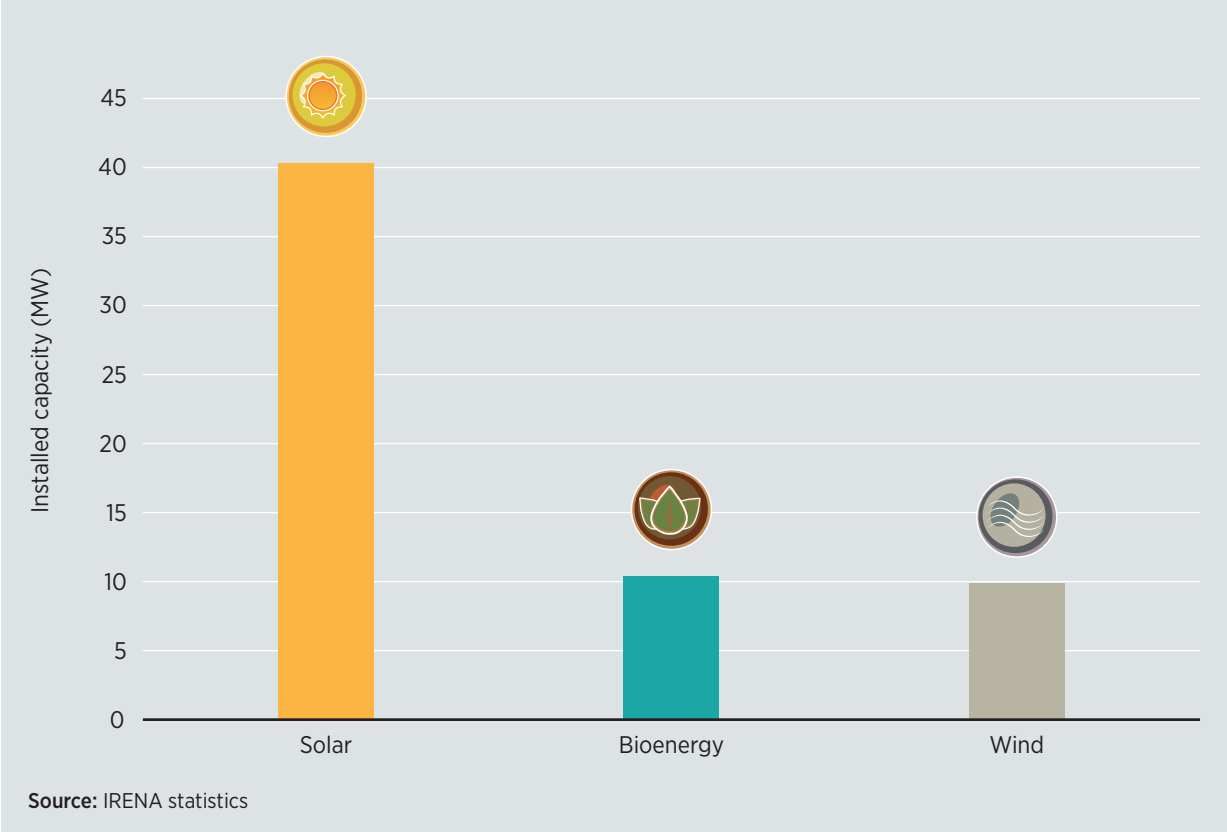
In the 2014-2018 period, solar power has seen significant growth among the SIDS LHI partners in the region, with around 40 MW of newly installed capacity: 27 MW in Mauritius; 7.7 MW in the Maldives; and 3.2 MW in the Seychelles. Newly installed biopower was installed exclusively in Mauritius, and new wind capacity added in Mauritius and Cabo Verde (See Figures 11, 12 and 13).

**Figure 11** Total renewable energy installed capacity in the AIS partners of the LHI, 2018

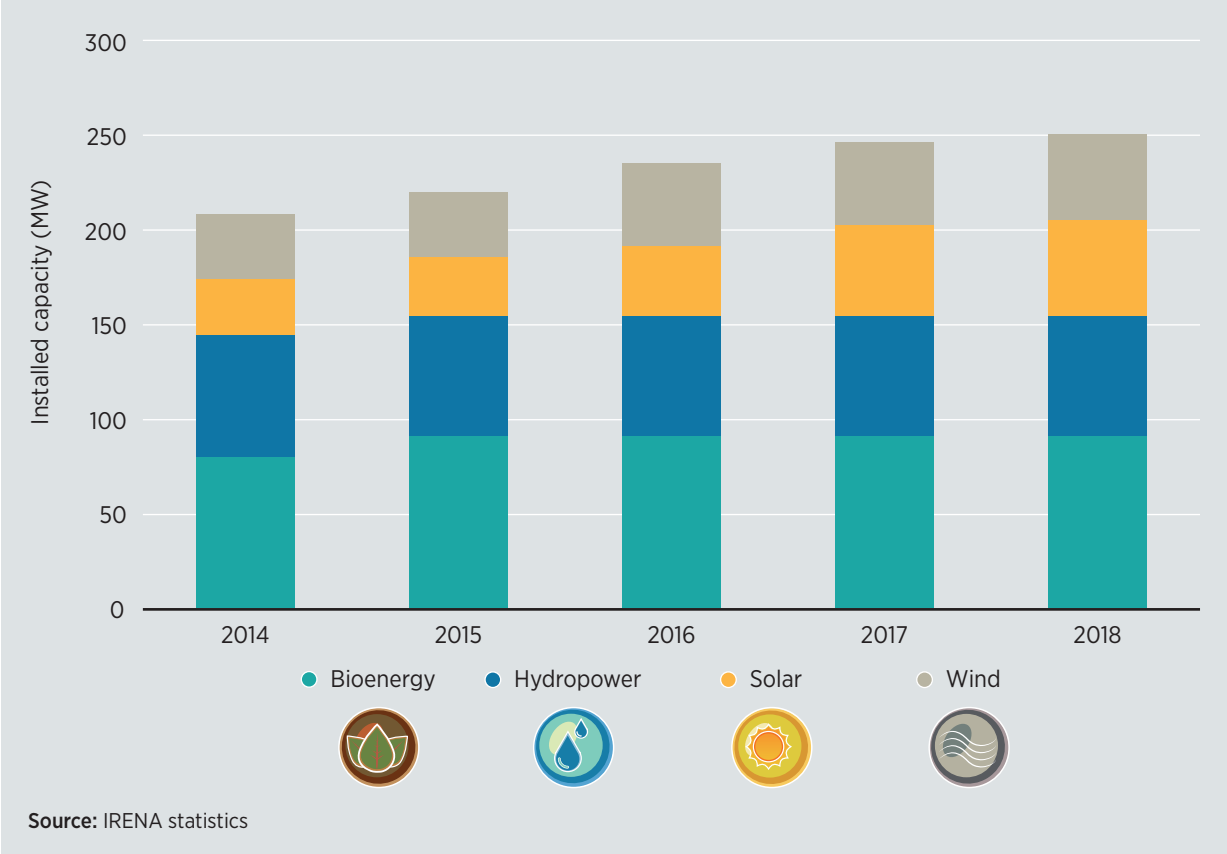


3 Cabo Verde, Comoros, the Maldives, Mauritius, São Tomé and Príncipe, Seychelles.

**Figure 12** New renewable energy installed capacity by technology in the AIS partners of the LHI (2014-2018)



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

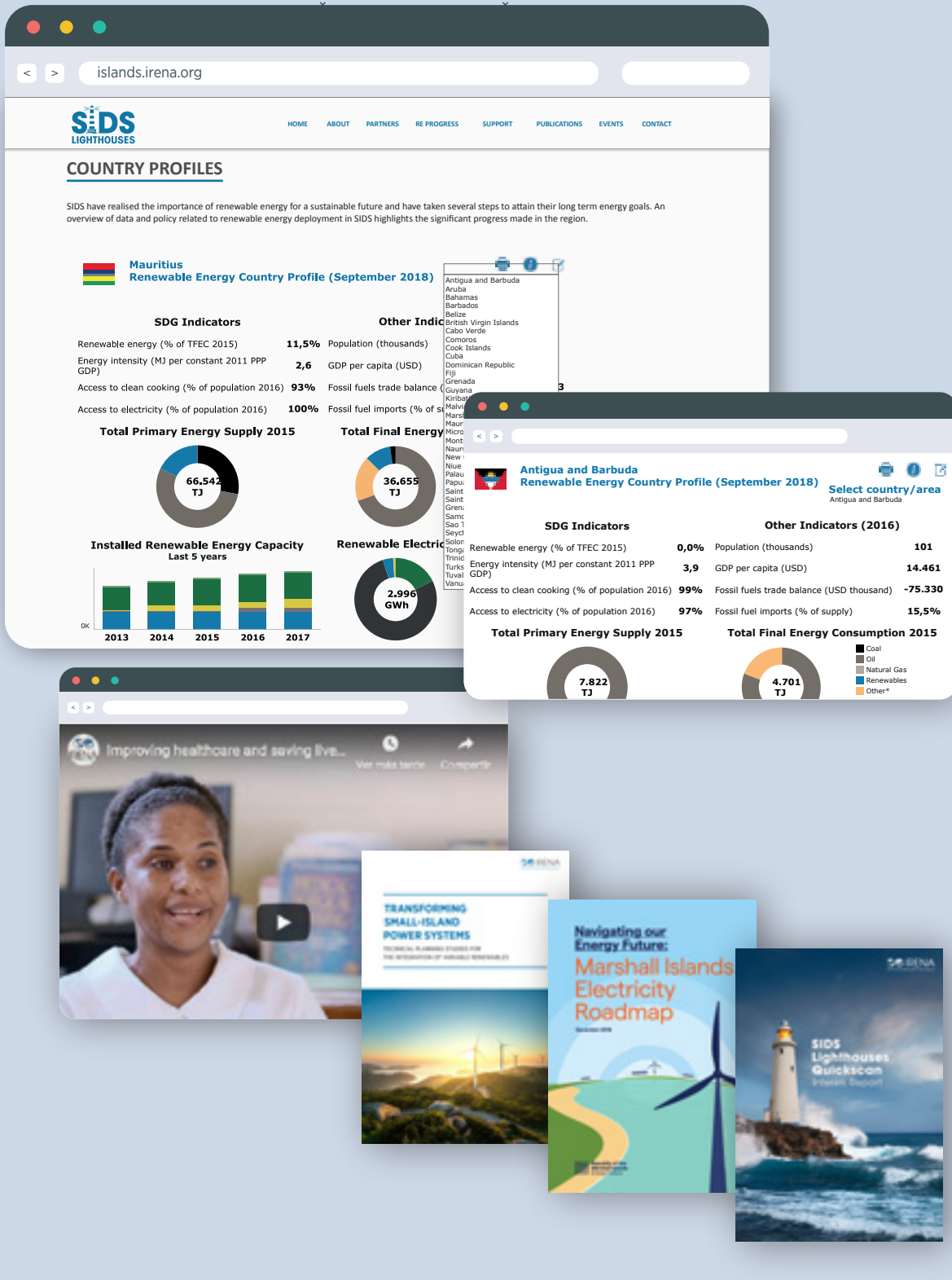


## Box SIDS LHI knowledge-sharing platform

IRENA launched a dedicated LHI website in 2018 as part of a knowledge-sharing platform: [www.irena.org/islands](http://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's Country Profiles section, currently under development, provides an overview of key indicators, renewable energy developments and recent initiatives/programmes in each of the Initiative's SIDS partners.







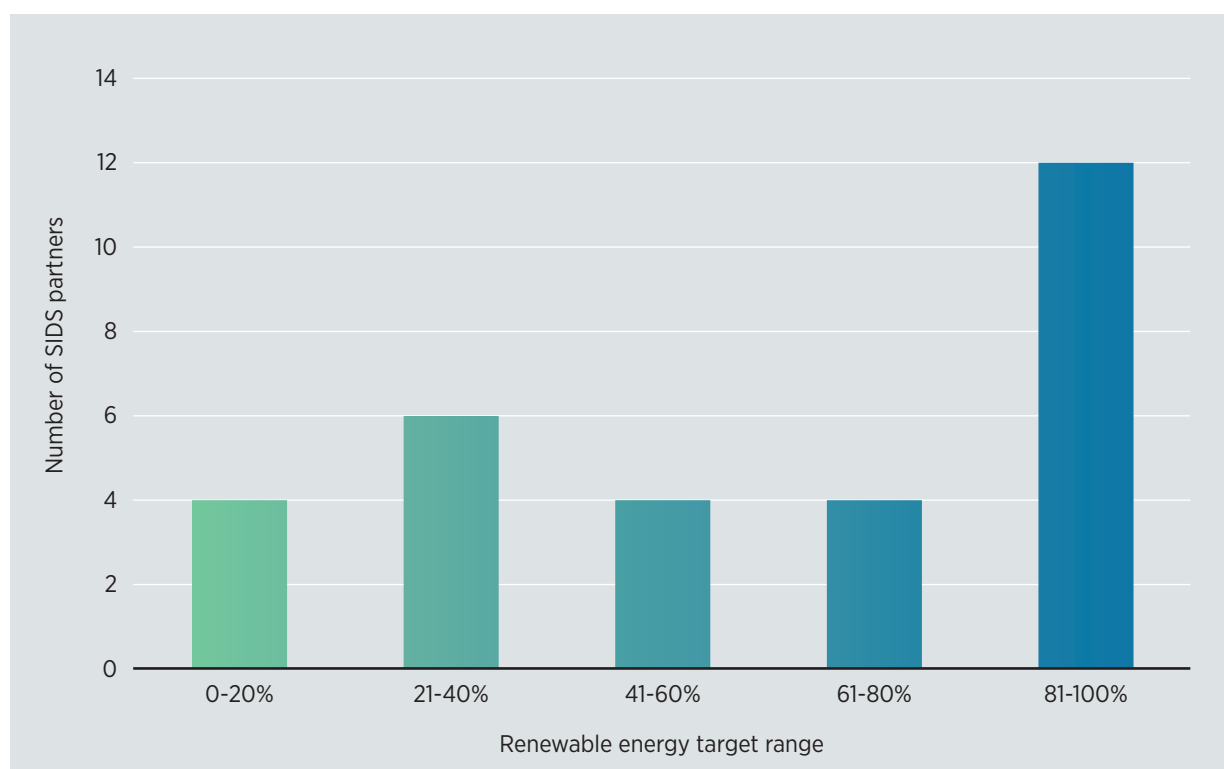
## A NEW PHASE IN THE ENERGY TRANSFORMATION OF SIDS: MAXIMISING IMPACT

The initial LHI targets for 2020 have been met and exceeded ahead of schedule. Yet renewable energy still only accounts for about 10% of total installed capacity in the power sector for SIDS, leaving most of their potential untapped. Further efforts are therefore necessary 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 LHI SIDS partners have set significant targets, aiming for more than 80% renewable energy penetration in the power sector, among which ten 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 for the new phase of the Initiative. 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 during 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





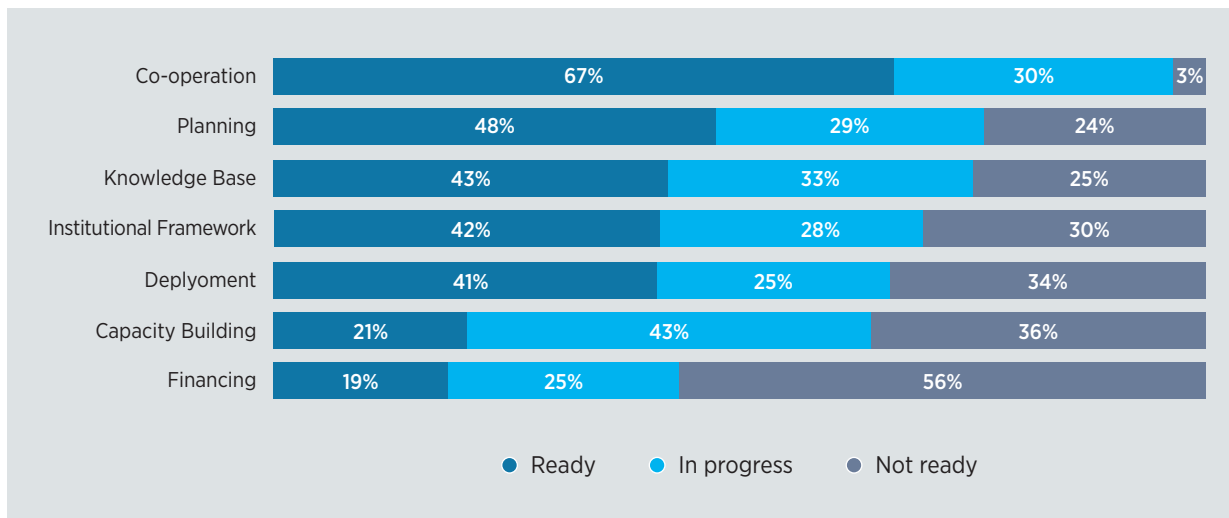


In this context, the following emerging and persistent challenges faced by SIDS were highlighted:

- **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.** This is especially the case in the Pacific, where average domestic electricity rates are significantly higher compared to other regions.
- **Natural disasters, supply disruptions and inadequate infrastructure.** Most SIDS are in regions prone to natural disasters like hurricanes and earthquakes, which can severely affect national economies and cause supply disruptions.
- **Limited access to affordable finance.** As revealed by the results of IRENA's Quicksan analysis (see Figure 15), a major issue in SIDS is access to affordable finance, whether to support renewable energy projects or invest in necessary upgrades to aging generation, transmission and distribution infrastructure. In some cases, local equity and government funding are insufficient to achieve the level of renewable energy deployment envisioned, while the framework to attract foreign investment into renewables is often either lacking or ineffective.
- **Weak institutional framework and limited capacity.** Institutions must be able 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.** Some SIDS lack adequate technology and face 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).<sup>4</sup>

During the consultation phase undertaken in preparation for the new phase of the Initiative, a 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** The discussion paper “SIDS Lighthouses Initiative: State of play and way forward”.



<sup>4</sup> Report available at: [www.irena.org/publications/2017/Nov/SIDS-Lighthouses-quickscan-Interim-report](http://www.irena.org/publications/2017/Nov/SIDS-Lighthouses-quickscan-Interim-report)

Following the process of consultation with LHI partners, 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 new phase of the Initiative.

Subsequently, the SIDS Ministerial meeting held in the framework of the Ninth Session of the IRENA Assembly in January 2019 discussed specific activities in the context of the LHI’s new priority areas, aiming to support accelerated transition towards an affordable, resilient, and renewables-based energy future for SIDS. During the meeting, participants highlighted that the new priority areas reflect aspirations for SIDS energy transformation, as well as the pressing challenges and key priorities for SIDS, including climate change, reviewing and implementing of NDCs, food and water security, attracting investments, creating employment and access to finance.



*SIDS Ministerial at 9th IRENA Assembly, Abu Dhabi, 10 January 2019*

## SIDS LIGHTHOUSES INITIATIVE: NEW PRIORITY AREAS

The action areas of the new phase of the Initiative endorsed in 2018 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 5 GW of installed capacity in SIDS by 2023.





*Cuba's Vice-Minister of Energy and Mines, Livan Arronte (right), H.E. Bader Almatrooshi, Ambassador of the United Arab Emirates to Cuba, Haiti, Jamaica and the Dominican Republic (center) and Francesco La Camera, Director-General of IRENA inaugurated a new 10 MW solar PV project in Cuba. The project was financed by the Abu Dhabi Fund for Development (ADFD) through the IRENA/ADFD Project Facility.*



## 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.

## RENEWABLES READINESS ASSESSMENT

## SUSTAINABLE ENERGY MARKETPLACE



# 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 Denmark, France, Germany, Japan, the Kingdom of the Netherlands, New Zealand, Norway 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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