IRENA SUPPORT FOR CAPITAL MOBILIZATION FOR THE DEPLOYMENT OF RENEWABLE ENERGY IN SIDS

SIDS Global Business Network Forum 2018
Balaclava, Mauritius
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Contents

• SIDS Lighthouses Overview
• Support to Mobilize Funds
• Preliminary support
• Role of NDCs
• Capital mobilization
SIDS LIGHTHOUSES INITIATIVE WAS LAUNCHED ON 23 SEPTEMBER 2014 AT THE CLIMATE SUMMIT WITH 55 PARTNERS: 36 SIDS AND 19 DEVELOPMENT PARTNERS

CARIBBEAN:
1. Antigua and Barbuda
2. Aruba
3. Bahamas
4. Barbados
5. Belize
6. British Virgin Islands
7. Cuba
8. Dominican Republic
9. Grenada
10. Guyana
11. Montserrat
12. Saint Lucia
13. Saint Vincent and the Grenadines
14. Trinidad and Tobago
15. Turks and Caicos

AIMS:
1. Cape Verde
2. Comoros
3. Republic of Maldives
4. Mauritius
5. Sao Tome and Principe
6. Seychelles

PACIFIC:
1. Cook Islands
2. Federated States of Micronesia
3. Fiji
4. Kiribati
5. Republic of the Marshall Islands
6. Nauru
7. New Caledonia
8. Niue
9. Palau
10. Papua New Guinea
11. Samoa
12. Solomon Islands
13. Tonga
14. Tuvalu
15. Vanuatu

Other partners: European Union, France, Germany, Italy, Japan, New Zealand, Kingdom of Norway, United Arab Emirates, United States of America, Indian Ocean Commission, International Renewable Energy Agency (IRENA), Association of the Overseas Countries and Territories of the European Union, United Nations Development Programme, World Bank, Enel, Clean Energy Solutions Center, Clinton Climate Initiative, Rocky Mountain Institute—Carbon War Room, Sustainable Energy for All (GEF04LL)
SIDS Lighthouses initiative: Outline

- Partnership between Small Island Developing States (SIDS), IRENA and other development partners

- Strategic objective:
  - Enabling a sustainable energy transformation for people on the front line of climate change on small islands around the world
  - Enhancing energy independence and economic prosperity on SIDS

- Main elements:
  - Accelerated renewable energy deployment in the power sector
  - Well structured systems transitions
  - Information exchange between partners
  - Capacity building in SIDS

TARGETS by 2020:
- USD 500 million mobilized
- 100 MW of new solar PV
- 20 MW of new wind
- Significant quantities of other RE technologies
- All participating SIDS have RE roadmaps
The growth of RE in SIDS has been very impressive

From 2014 - 2017, more than 400 MW of RE has been added to the power sector across SIDS

The SIDS have exceeded Solar PV targets of 120 MW

Wind power installations have exceeded the 20 MW target.
Data on funding for RE in SIDS is a major challenge.

Based on partial data gathered for SIDS, more than 400 Million USD has been made available for developing RE in SIDS from 2014 to 2016.

The SIDS are on track to meet and even exceed the SIDS Lighthouses Initiative’s target of 500 Million USD.

The figures are based on publicly available data on RE projects in SIDS. This does not encompass all projects and RE funding in SIDS.
Support to mobilize funds - IRENA Tools

**Project concept**
- Site characterization
- Bankable project development guidelines

**Pre-feasibility**
- Assistance to financial closure and debt facility

**Deployment**
- Success stories
- Country profiles

**Investor ready**
- Evaluation, technical assistance

**Project pipelines**
- Corridors, SIDS LHI, RE Roadmaps, Readiness Assessments

**Feasibility**
- IRENA Tools support to mobilize funds
Preliminary support

• Quickscans
• Roadmaps
• Readiness Assessments
QUICKSCANS

- Rapid assessment of needs / high impact opportunities
- Covers all elements of energy transition
- IRENA communicating Quickscan findings to development partners and island community to increase impact
  - Interactive score chart on IRENA website: [http://islands.irena.org/Quickscans.aspx](http://islands.irena.org/Quickscans.aspx)
  - Identifying additional venues to showcase Quickscan results
- IRENA will conduct 2nd round of Quickscans
  - Cover all Lighthouses island partners
  - Provide tool for measuring progress since 1st Quickscan
Road Maps

Capacity expansion
Least-cost capacity expansion plan 2015-2030

Dispatching
Production cost modelling of 2014 and 2030 scenarios

Roadmap gives detailed insight on how renewables can reduce power sector costs.

Roadmap identifies options to support battery storage deployment.

Stored electricity can:
- Meet peak demand without the need to commit additional thermal generation units
- Meet demand when RE is not available

The key value proposition for batteries is to:
- Provide operating reserves to compensate for forecast errors, as well as for rapid changes in solar and wind output
- Support electricity system’s frequency and voltage

Requires investment

IRENA
International Renewable Energy Agency
**Road Maps**

**Capacity expansion**

REmap analysis identified the potential for RE in the energy mix by 2030.

**Dispatching**

VRE penetration and transmission bottlenecks estimated based on projected VRE generation and duration curves.

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**DOMINICAN REPUBLIC**

*IRENA*

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**Dominican Republic REmap 2030 analysis shows significant renewables capacity expansion is possible.**

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**REmap analysis provides insight on integrating higher shares of PV and wind.**

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*Not shown on map:
- 119 MW small hydro
- 1174 MW large hydro
- 6 MW biogas
- 102 MW off-grid solar systems*
Grid Integration Studies

Integration studies in association with energy authorities and network operators supporting evaluation of impacts and Operation & Expansion planning of the grid

Concluded Grid Studies
- Palau
- Samoa
- Antigua and Barbuda
- Cook Islands

Ongoing/Planned 2017-2018
- Vanuatu
- Fiji
- Dominican Republic
- Cuba

Reviews of technical reports
- Barbados

Exchange of Experience and Capacity Building
- Technical workshops and webinars with partners in the Caribbean and Pacific, technical guides and global access to software tools

The work has been supported by voluntary contributions from Norway, New Zealand and Germany.
Renewables Readiness Assessments

Objective:
• Comprehensive review of renewable energy development to improve understanding of the national energy sector
• Identification and analysis of key issues associated with the deployment of RE
• Present the opportunities for scaling up renewable energy development
• Discuss the specific issues to be addressed, and prepare specific policy recommendations
• Produce a portfolio of actionable initiatives to be developed

Status:
• Completed SIDS: Kiribati, Grenada, Fiji, RMI, Vanuatu, Antigua and Barbuda, Bahamas
Role of NDCs

UNFCCC Parties including renewable energy in their NDCs

Virtually all SIDS mention renewables in their NDCs and 85% of them include quantified renewable energy targets

Source: IRENA, 2017
New capacity installed by 2030 in SIDS as a result of NDC implementation, by technology

NDC-driven increases in renewable power installed capacity up to 2030 by technology

- Unspecified renewable energy: 51%
- Solar PV: 15%
- Wind: 12%
- Bioenergy: 13%
- Hydropower: 6%
- Geothermal: 2%
- Small hydropower: 1%
- Off-grid renewables: 0.2%
- Other: 3%

Source: IRENA, 2017
Renewable energy targets in SIDS NDCs show an ambitious growth for renewables in the power sector.

Growth in SIDS renewable power installed capacity as a result of NDC implementation

*NDC–driven growth in capacity between 2015 and 2030*

- In absolute terms:
  - 2014: 2.3 GW
  - 2030: 8.7 GW
  - Additional capacity installed as a result of NDC implementation: + 6.4 GW

- In relative terms:
  - SIDS: +279%
  - World: +76%

Renewable energy targets in SIDS NDCs show an ambitious growth for renewables in the power sector.
A number of SIDS have very ambitious plans seeking 100% renewable electricity

<table>
<thead>
<tr>
<th>Country</th>
<th>By 2020</th>
<th>2025</th>
<th>2030</th>
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<tbody>
<tr>
<td>Tuvalu</td>
<td></td>
<td>Cabo Verde</td>
<td>Fiji</td>
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<td>Cook Islands</td>
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<td>Papua New Guinea</td>
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<td>Samoa</td>
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<td>Vanuatu</td>
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</tbody>
</table>
USD 16 billion will be needed by 2030 to implement the renewable energy targets set out in SIDS NDCs, of which 75% for conditional targets.

Source: IRENA, 2017
Leveraging private investment to implement renewable energy targets in SIDS NDCs

Public finance should focus on crowding in private investment through the use of risk mitigation instruments and structured finance.

Public finance needed by 2030 for renewable energy targets in SIDS NDCs

- Total investment need: 16 USD billion
- Public finance needed to mobilise unconditional investment: 4 USD billion
- Public finance needed to mobilise conditional investment: 12 USD billion

Source: IRENA, 2017
Capital Mobilization

Project concept
Pre-feasibility
Investor ready
Deployment

Project pipelines
Corridors, SIDS LHI, RE Roadmaps, Readiness Assessments

Site characterization

www.irena.org/adfd
ITEM 1: The Global Atlas

» Largest initiative to assess renewable energy potential on a global scale.

» Creates high-resolution resource maps.

» Includes solar, wind, geothermal, bioenergy and ocean energy resources (expanding to encompass all renewable energy resources).
Global Atlas Site appraisal service demonstrated on wind sites in Comoros and Cape Verde

The Site Appraisal Service - The service is an innovative and cost effective approach to screen sites earmarked for solar and wind development in countries. This service efficiently expedites the development process and increases the likelihood of success with finding economically viable sites for further investments.

Technology configuration covered
- Wind
- Solar stand-alone (Utility scale)
- Solar and battery hybrid system
- Solar and diesel hybrid system

Work for SIDS:
- 2 wind sites for Cape Verde
- 4 wind sites for Comoros
- More sites in the pipeline: Nauru, Marshall Islands and Fiji

To request for site appraisals, please contact: GlobalAtlasServices@irena.org
The service entails...

Data Analysis, Power Simulation & Financial modelling

1. Wind data analysis – inter-annual variability, direction and frequency distribution

- Spatial resolution: 3 km
- Length [years]: 11.1
- Mean wind speed [m/s]: 5.1
- Max wind speed [m/s]: 18
- Min wind speed [m/s]: 0
- Inter‐annual variability: 3.42%
- Air density [kg/m3]: 1.159

2. Power simulation curve

Production estimates
- P25 (MWh/Year): 4,836
- P50 (MWh/Year): 4,161
- P90 (MWh/Year): 2,879

3. Financial model – cash flow model, NPV, IRR and Sensitivity analysis

Base scenario: P50, Tariff $200.6/MWh

- NPV net income before tax: 1,714,106
- IRR before tax: 11.44%
- NPV net income after tax: -15
- IRR after tax: 8.00%
- LCoE (per MWh): 165.08

Interpretation

Possible result interpretations

1. The site is economically feasible – within a given tariff range (in US cents/kWh)
2. The site is marginally feasible – only under certain conditions i.e. high current tariff and very low financing costs
3. Marginally feasible – only when pooled with several other economically feasible sites
4. Not economically feasible
IRENA Tools

- Project concept
- Pre-feasibility
- Deployment
- Investor ready
- Feasibility

**Project pipelines**
Corridors, SIDS LHI, RE Roadmaps, Readiness Assessments

- Site characterization
- Bankable project development guidelines

www.irena.org/adfd

IRENA Tools
ITEM 2: PROJECT NAVIGATOR

Objectives
» Increase the bankability of projects by:
  » Strengthening the project development base
  » Enhancing the quality of project proposals
  » Reducing costs and mitigating risks through improved planning and efficient use of funds
  » Facilitating effective implementation

Scope
» All renewable energy technologies
» Different financing types: grants, loans, equity
» Project sizes: from individual use to utility scale projects
» Global: all geographical regions
IRENA Tools

Project concept

Deployment
- Site characterization
- Project pipelines: Corridors, SIDS LHI, RE Roadmaps, Readiness Assessments
- Assistance to financial closure and debt facility

Pre-feasibility
- Bankable project development guidelines

Investor ready
- Evaluate, technical assistance

Feasibility
- www.irena.org/adfd

IRENA Tools

Sustainable Energy Marketplace

International Renewable Energy Agency
ITEM 3: Sustainable Energy Marketplace

A virtual marketplace connecting renewable energy project owners, financiers/investors, services providers and technology suppliers.

- Increased visibility for projects, financiers, advisors and service providers
- Access to development tools and templates
- Identification and screening of projects
- Access to market and regulatory information
- Promotion of investment opportunities
- Enabling foreign and local investments
- Access to market data
- Identification of potential clients, sales development
Sustainable Energy Marketplace

Regional hubs

- Sub-Saharan Africa
- MENA
- Latin America
- South-East Europe
- SIDS

Partnerships

1. Increase visibility of projects and financing opportunities
2. Encourage project initiation and development
3. Create a pipeline of viable and investor-ready projects
4. Boosts private investment in sustainable energy
5. Mobilize finance from private investors and public support programmes
Sustainable Energy Marketplace

- 150 RE and EE projects
- USD 7 billion investment opportunities
- 39 financing institutions
- 119 financial instruments
Sustainable Energy Marketplace

Marketplace.irena.org
IRENA Tools

- **Pre-feasibility**
  - Bankable project development guidelines
  - Site characterization

- **Feasibility**
  - Evaluate, technical assistance

- **Investor ready**
  - Assistance to financial closure and debt facility

- **Deployment**
  - Project pipelines: Corridors, SIDS LHI, RE Roadmaps, Readiness Assessments

- **Project concept**
  - www.irena.org/adfd

IRENA Tools

International Renewable Energy Agency

Sustainable Energy Marketplace

IRENA ADFFD PROJECT FACILITY
ITEM 4: IRENA ADFD PROJECT FACILITY

• Collaboration between IRENA and the Abu Dhabi Fund for Development.

• USD 350 million in concessional loans from ADFD over seven annual funding cycles to promising renewable energy projects in developing countries recommended by IRENA.
Funding offer

- **USD 50 million** available in each cycle.
- **USD 5-15 million** ADFD loans for each project, covering **up to 50%** of the project costs. Remainder must be co-financed.
- **1% or 2%** loan rates. **20 years** loan period including 5 years grace period.

Allocation so far to the fifth funding cycle: **USD 630 million** in total project costs of which:

- **USD 214 million** from ADFD
- **USD 420** from co-financing

**USD 136 million** to be allocated in remaining two cycles.

3.6 MW solar mini-grid project in Burkina Faso receiving USD 10 million selected in the third cycle.
Maldives

Small Scale Waste to Energy Project

- Implemented by Ministry of Environment and Energy
- 2MW capacity waste to energy plants
- USD 6million ADFD loan with co-finance from Government of Maldives.
Mauritius

10,000 Solar PV systems for Households in Mauritius

- Total of 10 MW of Solar PV to be installed on rooftops of 10,000 households
- Implemented by Central Electricity Board
- ADFD loan of USD 10 Million. Co-financed by Government of Mauritius through CEB.
Accessing funding

Call for proposals for 7th cycle will open **mid-Nov 2018** with a deadline of **mid-Feb 2019**. The application form is already open to work on online and save.

**Eligibility**

- Members of IRENA, Signatories of the IRENA Statute or States in Accession and developing countries in the “DAC List of ODA Recipients” from the OECD. Preference is given to IRENA members in the selection process.

- Renewable energy as defined in the Statute of IRENA: all forms of energy produced from renewable sources in a sustainable manner which include inter alia bioenergy, geothermal energy, hydropower, ocean energy, solar energy, and/or wind energy.

Government driven and can obtain a **Government Guarantee for the loan**

Economically and financially feasible

Positive development impacts
Process

First phase
- executive project summary stage
  - project applicants
  - panel of experts
  - advisory committee
  - submit
  - shortlist
  - select

Second phase
- full project proposal stage
  - project applicants
  - panel of experts
  - advisory committee
  - submit
  - shortlist
  - recommend

- final selection stage
  - ADFD

Mid-Nov 2018 – mid-Feb 2019

May 2019 – Jun 2019

End Dec 2019

www.irena.org/adfd
First phase of process

<table>
<thead>
<tr>
<th>Phase 1 Evaluation by experts (weighting 100%)</th>
<th>Technical merit (40%)</th>
<th>Economic/financial viability (30%)</th>
<th>Socio-economic &amp; environmental impacts (30%)</th>
</tr>
</thead>
</table>
| Executive Project Summary — applicants submit mid-Nov 2018 to mid-Feb 2019 | -Objectives
-Design
-Management | -Project cost
-Revenue sources
-Business plan | -Social, economic and environmental benefits
-Stakeholder engagement |
### Second phase of process

<table>
<thead>
<tr>
<th>Phase 2</th>
<th>Technical merit (40%)</th>
<th>Economic/financial viability (30%)</th>
<th>Socio-economic &amp; environmental impacts (30%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation by experts (weighting 100%)</td>
<td>- Detailed project design and output &lt;br&gt; - Resource assessment &lt;br&gt; - Implementation plan and operational arrangements &lt;br&gt; - Technical risk mitigation measures &lt;br&gt; - Organisational and management capabilities &lt;br&gt; - Monitoring and evaluation</td>
<td>- Full economic/financial feasibility study &lt;br&gt; - Co-finance agreements &lt;br&gt; - Economic/financial risks and mitigation options</td>
<td>- Stakeholder engagement &lt;br&gt; - Accessibility &lt;br&gt; - Affordability &lt;br&gt; - Job creation &lt;br&gt; - Energy security &lt;br&gt; - Environmental / health &lt;br&gt; - Other/ gender/ transformation/ replicability/ scalability/ innovation &lt;br&gt; - Risk mitigation</td>
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<tr>
<td>Full Project Proposal including &lt;br&gt; full feasibility study + &lt;br&gt; Government guarantee letter &lt;br&gt; – shortlisted applicants submit early May to end June 2019</td>
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How to apply - online

Accessible finance for renewable energy projects in developing countries

The International Renewable Energy Agency (IRENA) and the Abu Dhabi Fund for Development (ADFD) have collaborated on a joint Project Facility to support replicable, scalable and potentially transformative renewable energy projects in developing countries. ADFD committed USD 350 million in concessional loans, over seven annual funding cycles, to renewable energy projects recommended by IRENA.

7th cycle will open in mid-November 2018. Start working on your applications now!

Apply here

Background information on the Facility is available in English, French (Français), Spanish (Español) and Arabic (عربي).

“...The IRENA/ADFD Project Facility has identified path breaking renewable energy projects providing sustainable and..."
IRENA/ADFD - SELECTION SUMMARY

- 10 out of the 21 projects selected in five cycles are in Islands
- Island projects are in the Caribbean, Pacific, Africa and South Asia
- From 3rd Cycle onwards, Islands have comprised at least 50% of selected projects
IRENA/ADFD-FUNDING ALLOCATION TO ISLANDS

- USD 111 million of ADFD loans out of a total of USD 214 million allocated has been for Island projects
- Amount of funding from other sources over USD 365 million
- For instance GCF USD 86 million for the Solomon Islands project as co-funder
IRENA/ADFD – RENEWABLE ENERGY GENERATION CAPACITY

**Generation from Island projects**

- Generation from Island Projects: 72.6 MW (62%)
- Generation from other projects: 47.1 MW (38%)
IRENA/ADFD – SOCIO-ECONOMIC IMPACTS

<table>
<thead>
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<th>Impact</th>
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<tr>
<td>Access to renewable energy for 450,000 persons and gender empowerment</td>
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<td>Over 20 million litres of fresh water provided annually</td>
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<tr>
<td>More than 21 million liters per annum in avoided diesel imports</td>
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<tr>
<td>Over 2.5 million tCO2e avoided annually</td>
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<tr>
<td>Increased share of renewable energy in national energy mix</td>
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</table>

**Project specific examples**

- **Solomon Islands’ 20MW Hydropower Project** will serve 183,000 persons with renewable energy. Strong involvement of women in project decision-making.

- **Republic of Marshall Islands 4.6MW Solar PV hybrid with battery storage project**. Project will provide over 15 million litres of fresh water annually.

- **Mauritius 10MW Roof-Top Solar PV Project** (1KWh installations) will save the country close to 1 million litres of diesel imports annually. Saving of USD 28 million annually through replacement of diesel-based generation in Solomon Islands project.

- **Emission reductions of over 2.0 million tCO2e annually from the Solomon Islands Hydro Power Project**

- **The St. Vincent & the Grenadines geothermal project** will enable the country to generate 75% of its electricity from this renewable resource.
USD 16 billion will be needed by 2030 to implement the renewable energy targets set out in SIDS NDCs, of which 75% for conditional targets.

**Total investment needed by 2030 for renewable energy targets in NDCs**

Source: IRENA, 2017
Thank You

islands@irena.org