

RENEWABLE ENERGY TARGETS IN SMALL ISLAND DEVELOPING STATES

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KEY MESSAGES

Similar to global trends, renewable energy targets in national policy documents (national policies, plans, roadmaps or laws) and targets in Nationally Determined Contributions (NDCs) are not always in sync in small island developing states (SIDS).¹

While targets may be updated in the NDC, this update may not always be reflected in national policy documents – which are more binding at the national level than NDCs. Similarly, a country may have targets in national policy documents, but these may not be indicated as part of its NDC, which represents a commitment made to the international community. This makes it difficult to compare the two targets and derive any meaningful conclusions.

- In cases where renewable energy targets in national policy documents predate the NDCs by several years (e.g. eight years in Grenada's case), the differences in targeted capacity may be significant. This may be due to the two targets being set in very different contexts. As such, for countries that have not updated their NDCs and national policy documents in tandem, and where the time gap between when they were published is relatively large, comparing the two may not produce meaningful results.
- Similarly, in countries where renewable power targets in NDCs predate those in national policy documents, the targets may be set in very different contexts. Again, in this case comparing the two may not produce any meaningful conclusions, although this may emphasise the fact that renewable energy deployment in SIDS is mostly driven by objectives beyond climate.

For countries that have updated targets in both their NDCs and national policy documents, and where the time gap between them is relatively short, the comparison is more meaningful and some trends can be identified, giving insights on 1) the level of ambition of nationally binding targets in country plans compared with those in NDCs; 2) the importance of international collaboration for deploying renewables and achieving targets; and 3) the drivers for renewable energy deployment beyond climate.

Collectively, the renewable energy targets set in national policy documents are more ambitious than the targets set in NDCs.

If all national targets were achieved, total renewable power capacity in SIDS would reach 13 gigawatts (GW) by 2030, which is 1.5 GW higher than the targeted capacity in NDCs (conditional and unconditional combined). Achieving these targets would require renewable power capacity to more than double compared with 2021 levels. While this makes up a small portion of the renewable energy deployment required globally to reach the 1.5°C Scenario, it would have a transformational impact in many SIDS, notably for their socio-economic development, energy security and independence. However, the level of ambition varies between countries.

The international community plays an instrumental role in scaling up renewable energy in SIDs and unleashing its multifaceted benefits.

More than half of the collective renewable power targeted capacity in NDCs in SIDS is conditional on international support in the form of financing, technical assistance, technology transfer, capacity building and other forms of support based on each country's national context.

Since 2009, commitments for energy-related development aid to SIDS have been rising and shifting towards renewables, particularly solar, although non-renewables such as oil-fired plants continue to be funded. But disbursement rates remain low, suggesting implementation problems. Furthermore, energy-related aid is unevenly flowing between SIDS as the allocations made to individual countries have had little correlation with their income levels or energy access gaps. Moreover, improvements in access to electricity have been slow in those countries where the gap is largest (Atteridge and Savvidou, 2019).

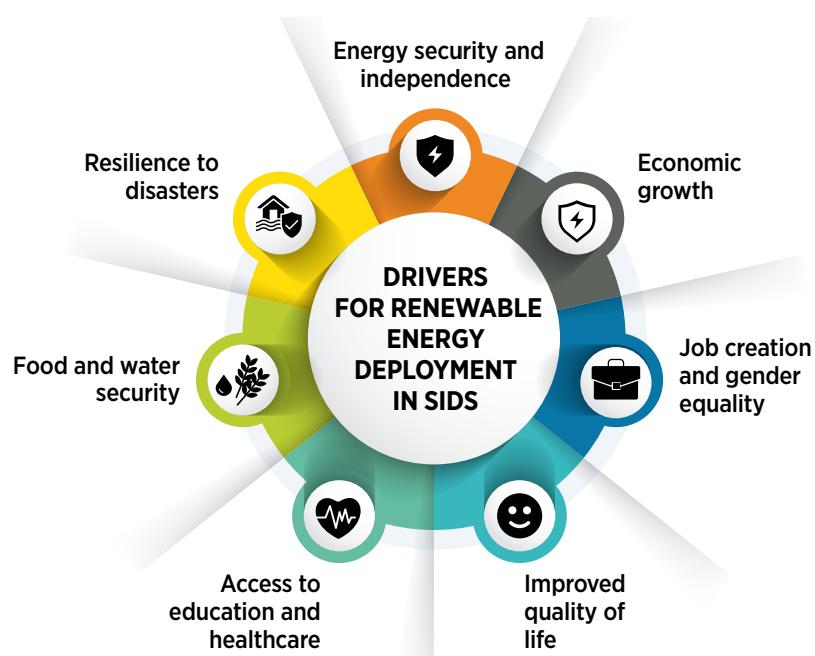
¹ This paper analyses all 40 SIDS that are Party to the Paris Agreement. The complete list of SIDS can be found in: (UN, n.d.).

The International Renewable Energy Agency (IRENA) is committed to fostering engagement and strengthening co-ordinated efforts with SIDS and development partners to support the acceleration of their energy transition. IRENA, in partnership with the United Nations Development Programme (UNDP), the NDC Partnership and other partners, is supporting 18 SIDS² in their NDC enhancement and implementation including, but not limited to: the development of energy management methodology for greenhouse gas (GHG) emissions; target tracking; roadmaps for the electrification of the transport sector and emerging technologies such as green hydrogen and ocean energy; rooftop solar simulation; energy monitoring, reporting and verification; mitigation scenarios; project facilitation; and access to finance (IRENA, 2022a).

Renewable energy deployment is driven by policy objectives beyond climate (e.g. socio-economic development, energy security and independence).

Some countries have set targets in their national policy documents that are equal to those in NDCs and are not conditional on any external support (e.g. Bahamas, Bahrain, Mauritius and Singapore).³ This shows international support is not a prerequisite for achieving these commitments, although it should be noted that all countries in this category are high-income countries as per the World Bank's income classification for countries. Commitment to renewable energy deployment can be driven by objectives beyond climate, such as reliable energy supply, food and water security, among other objectives (Figure 1).

Figure 1 Drivers for renewable energy deployment beyond climate



Some SIDS have made unconditional commitments in their NDCs without pronouncing a target in their national policy documents. Examples include Saint Vincent and the Grenadines, Suriname and Tuvalu. These commitments should be made more operational by reflecting them in national policy.

Other countries have made commitments but rely on support from the international community. These fall under several categories:

- Countries that have not made any binding commitments in their national policy documents but as per their NDCs, they are committed to deploying renewables should international support be provided. These include countries such as Haiti, Nauru, Saint Kitts and Nevis, São Tomé and Príncipe, and Timor-Leste.⁴

² Antigua and Barbuda, Belize, Cuba, Dominica, the Dominican Republic, Fiji, Grenada, Mauritius, Palau, Papua New Guinea, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, São Tomé and Príncipe, Seychelles, Solomon Islands, Tonga, and Trinidad and Tobago.

³ These countries are categorised as high-income countries as per the World Bank Group classifications (except for Marshall Islands).

⁴ Haiti and Timor-Leste are classified as lower-middle-income countries as per the World Bank Group classifications, while the rest are classified as high-income countries.

- Countries that have set national targets in policy documents but have more ambitious targets in their NDCs that are conditional on international support. This may mean that while renewable energy is a high priority, these countries could deploy even more renewable energy if the appropriate financial, technical, technological and other forms of assistance were made available. These include Belize, the Dominican Republic and Guinea-Bissau.
- Countries that have set targets in their national policy documents that are equal to the conditional targets set in the NDCs. This includes countries such as Dominica, Palau, Saint Lucia, Samoa, Seychelles and Vanuatu. This could mean that while renewable energy is a national priority, these countries may be looking to fund their objectives by securing climate financing from external sources.
- Some countries have made national commitments that are more ambitious than their conditional targets in NDCs. Similar to the preceding category, these countries may be looking to secure climate financing to fund at least part of their targeted capacity. Alternatively, it could mean that the national targets are aspirational. Countries in this category include Barbados, Cook Islands, Grenada, Papua New Guinea and Tonga.
- Countries that have set both conditional and unconditional targets in their NDCs, as well as made national commitments, can be broken down into two categories:
 - » The national target is between unconditional and conditional; this means that there is a strong commitment that is unconditional, but the country is willing to do more should further support be available.
 - » The national target is equal to the sum of conditional and unconditional NDC targets. This could mean countries are looking to secure climate financing to fund at least a part of their targeted renewable energy deployment. Examples include Guyana and Niue.

Finally, there are countries that have not set any targets in either their national policy documents or their NDCs. These include Comoros and Micronesia.

NDCS IN SIDS UPDATED AS OF MID-OCTOBER 2022

By mid-October 2022, 193 Parties had ratified the Paris Agreement and 194 had submitted NDCs.⁵ Of the 166 Parties that submitted new or updated NDCs, only 99 Parties representing 81% of global GHG emissions submitted enhanced ambitions.⁶ Of the remaining Parties that submitted new or updated NDCs in 2022, 67 Parties (accounting for a further 14% of global emissions in 2019) submitted NDCs with either the same emission reduction targets, increased emissions compared to their first NDCs, or emission reduction targets that are not comparable with their initial NDCs (IRENA, 2022b).

Although SIDS make up a small portion of the world's mitigation potential, they are increasingly capitalising on their renewable energy resources to mitigate and adapt to their climate-induced vulnerabilities while ensuring energy security and sustainable socio-economic growth.

Overall, of the 40 SIDS that have ratified the Paris Agreement, all have submitted an NDC to date. Around 29 SIDS have submitted new, updated or second NDCs since September 2020.⁷ From this, a total of 18 SIDS have increased ambition in terms of their GHG reduction targets (Climate Watch, 2022).⁸ Overall, 32 SIDS have a quantifiable renewable energy target in their NDCs.

⁵ As of 16 October 2022, Eritrea had not ratified the Paris Agreement but had submitted an NDC.

⁶ These countries revised their emission targets upwards compared to targets submitted previously.

⁷ Antigua and Barbuda, Bahrain, Barbados, Belize, Cabo Verde, Comoros, Cuba, Dominican Republic, Fiji, Grenada, Guinea-Bissau, Haiti, Jamaica, Maldives, Marshall Islands, Mauritius, Nauru, Papua New Guinea, Saint Kitts and Nevis, Saint Lucia, Samoa, São Tomé and Príncipe, Seychelles, Singapore, Solomon Islands, Suriname, Tonga, Vanuatu.

⁸ Barbados, Cabo Verde, Comoros, the Dominican Republic, Fiji, Grenada, Guinea-Bissau, Haiti, Jamaica, Marshall Islands, Mauritius, Papua New Guinea, Saint Kitts and Nevis, Saint Lucia, Samoa, Seychelles, Singapore, Tonga.

Almost all of the SIDS with energy targets have focused their targets on the power sector (30), while only two have set specific targets in end uses such as transport and heating/cooling, and three have set their targets as a percentage of the whole energy mix. Some SIDS have included measures for sector coupling, e.g. across energy and agriculture.

Many of the SIDS have committed to 100% renewables in their electricity mix by or before 2030. Although climate is a major driver for renewables deployment in these countries, increased ambition is also driven by energy security and other socio-economic benefits, which are adversely affected by importing fossil fuels. However, the majority of these targets remain conditional on international support in the form of financing, technology transfer and technical assistance.

The following section quantifies SIDS' renewable energy targets as per their NDCs. Unconditional and conditional contributions are separated where applicable. Annex 1 includes detailed descriptions of renewable energy contributions in SIDS, along with other selected targets,⁹ as stated in their NDCs. Finally, Annex 2 compares quantified renewable power targets in NDCs with those in national plans and policies.

QUANTIFIED RENEWABLE ELECTRICITY CONTRIBUTIONS IN NDCS

Table 1 presents a quantified estimate of the power sector-related renewable energy targets in NDCs of the SIDS in terms of capacity in megawatts – conditional and unconditional.¹⁰ Although renewable energy targets in the power sector – in both NDCs and national energy plans – are typically expressed in terms of fixed capacity (in megawatts), in many countries they may be cited as a percentage of the electricity mix (e.g. 45% renewable energy share in electricity generation), and in some cases they can be a combination of both.

In SIDS, 33 Parties have a power target, of which 8 are fixed (capacity-based in terms of megawatts), 14 are percentage-based, and another 8 are a combination of the two. In cases where targets are expressed in terms of fixed capacity, they are taken as is. In case the target is expressed as a share of a mix, the total electricity generation is first calculated based on a ten-year historical compound annual growth rate (CAGR),¹¹ and the overall renewable energy generation in the target year is obtained by multiplying the share with the overall electricity generation. Next, the technology-specific share in the renewable electricity mix is estimated based on the share of technology-specific capacity additions over the last five years. Finally, the megawatt equivalent of the target is derived using capacity factor data obtained from IRENA's costs database (IRENA, 2022c). The detailed methodology is presented in Annex 1.

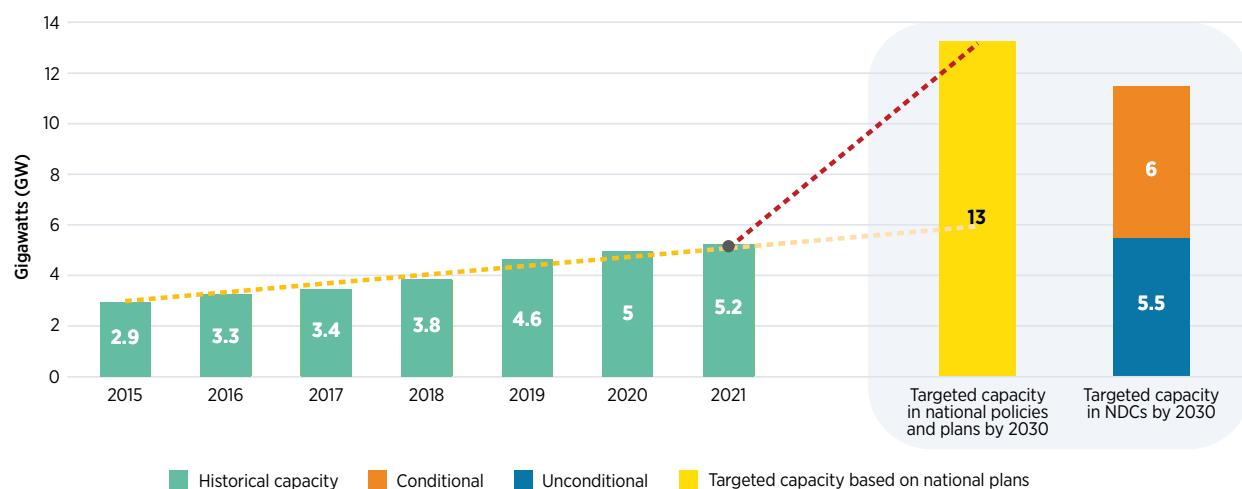
Currently, the SIDS that are Parties to the Paris Agreement account for around 5.2 GW of installed capacity (IRENA, 2022d). If SIDS continue based on historical trends, their total installed capacity is expected to reach less than 6 GW by 2030. However, these countries have committed to reach 13 GW of renewable power capacity by 2030 as per their national energy plans (Figure 1).

⁹ Emissions targets are included only if there is a renewable energy-specific component, e.g. Marshall Islands.

¹⁰ Since most renewable energy targets focus on the power sector, this analysis focuses on quantifying those.

¹¹ Unless this information is available in official policy documents of the country being analysed.

Figure 2 SIDS cumulative renewable power installed capacity, historical trends and targeted capacity based on national plans and NDCs, by 2030



Note: For the NDCs, about 200 MW of conditional capacity and 254 MW of unconditional capacity is targeted for 2031-2040 and was not included in the chart.

Moreover, their NDCs shows that more than half of the deployment is conditional on international assistance: SIDS have committed to reaching 11.5 GW renewable power installed capacity by 2030. The unconditional targets total 5.5 GW while the conditional targets are estimated to be equivalent to 6 GW (Table 1).

This means developed countries will need to provide substantial international support in the form of financial and technical assistance, capacity building and technology transfer to help SIDS achieve their renewable energy targets.

Table 1 Quantified contributions based on conditional and unconditional renewable energy targets in NDCs

COUNTRY	RE POWER TARGET IN NATIONAL ENERGY PLAN (MW) BY 2030	RE POWER TARGET IN NDC (MW)	RE POWER TARGET IN NDC - UNCONDITIONAL (MW)	RE POWER TARGET IN NDC - CONDITIONAL (MW)	TARGET YEAR IN NDC	ELECTRICITY ACCESS RATE IN 2020 (%)	RE SHARE IN 2021 (%)
Antigua and Barbuda	483	270	0	270	2030	100	16.9
Bahamas	475	475	475	0	2030	100	0.3
Bahrain	461	710	710	0	2035	100	0.1
Barbados	625	606	0	606	2030	100	15.8
Belize	75	120	0	120	2030	97.1	52.8
Cabo Verde	252	615	235	380	Unconditional by 2030 conditional by 2040	94.2	20.1
Comoros	None	None	None	None		86.7	6.3
Cook Islands	22	25	4	21	2020	NA	20.6
Cuba	2144	2144	836	1308	2030	100	19.1
Dominica	35	35	0	35	2025	100	24.8
Dominican Republic	795	977	0	977	2030	100	26.7
Fiji	395	399	133	266	2030	100	56.1
Grenada	92	15	0	15	2030	93.6	6.2
Guinea-Bissau	72	90	0	90	2030	33.3	4
Guyana	321	462	26	436	2025	92.5	14.8
Haiti	None	199.5	37.5	162	2030	46.9	17.1
Jamaica	1038	None	None	None		100	17.5
Kiribati	9	5.6	2.1	3.5	2025	92	30.4
Maldives	None	None	None	None		100	5.8
Marshall Islands	49	69	69	0	2030	99.2	5.3
Mauritius	863	863	863	0	2030	99.7	28.7
Federated States of Micronesia	None	None	None	None		82.9	12.3
Nauru	10	6	0	6	2030	100	11.1
Niue	3	2.9	1.1	1.8	Unconditional by 2020 conditional by 2025	NA	31.1
Palau	24	24	0	24	2025	100	5.2
Papua New Guinea	2116	860.1	0	860.1	2030	60.4	30.9
Saint Kitts and Nevis	None	68.8	35.7	33.1	2030	100	5.8
Saint Lucia	72	72	0	72	2025	100	4.3
Saint Vincent and the Grenadines	None	15	15	0	2025	100	13.9
Samoa	35	35	0	35	2025	100	47.9
São Tomé and Príncipe	None	49	0	49	2030	76.6	5.6
Seychelles	11	11	0	11	2030	100	15.5
Singapore	2000	2000	2000	0	2030	100	5.4
Solomon Islands	48	68.6	22.8	45.8	2030	73.3	5.4
Suriname	None	209	209	0	2030	98.2	33.2
Timor-Leste	None	352	0	352	2030	96.1	0.4
Tonga	46	31	0	31	2030	100	30
Trinidad and Tobago	601	None	None	None		100	0.2
Tuvalu	6	6	6	0	2020	99.7	42.4
Vanuatu	47	47	0	47	2030	67.3	33.9
Total	13 231	11 938 (by 2040) 11 484 (by 2030)	5 680 (by 2040) 5 480 (by 2030)	6 257 (by 2040) 6 003 (by 2030)			

Sources: World Bank (2022), IRENA (2022d).

Note: For further details on these targets, please refer to Annex 1 & 2.

ANNEX 1 – DESCRIPTIONS OF RENEWABLE ENERGY CONTRIBUTIONS, ALONG WITH OTHER TARGETS, IN NDCS

Table A1 below includes the descriptions of renewable energy contributions in SIDS, along with other selected targets,¹² as stated in their NDCs. Unconditional and conditional contributions are separated where applicable. Further details on the quantification of these targets are provided in Annex 2.

Table A1 Description of renewable energy contributions, along with other targets, in NDCs

SIDS	DESCRIPTION OF SELECTED TARGETS IN NDCS FOCUSING ON RENEWABLE ENERGY	SUBMISSION DATE	LINK TO THE NDC DOCUMENT
Antigua and Barbuda	<p>Conditional:</p> <p>Electricity 86% renewable energy generation from local resources in the electricity sector by 2030.</p> <ul style="list-style-type: none"> • 100 MW of renewable energy generation capacity available to the grid by 2030. • 50 MW of renewable energy generation capacity owned by farmers who can sell electricity to off-takers by 2030. • 100 MW of renewable energy generation capacity owned by social investment entities by 2030. • 20 MW of wind-powered energy generation by 2030. <p>Transport</p> <ul style="list-style-type: none"> • 100% of government vehicles will be electric vehicles (EVs) by 2035. • 100% of all new vehicle sales to be EVs by 2030. <p>Adaptation</p> <ul style="list-style-type: none"> • 100% of the water supply infrastructure powered by their own grid-interactive renewable energy sources by 2030. • 100% of education, health, food security and emergency shelter facilities powered by their own grid-interactive renewable energy sources by 2030. • 30 000 homes or 50% of pre 2020 homes to have back-up renewable energy systems for at least four to six hours of energy by 2030. <p>Gender</p> <ul style="list-style-type: none"> • 100% of female-headed households have all barriers removed to access back-up renewable energy generation and storage systems (<i>i.e.</i> 20 000 homes). • 20% increase in the number of women-led businesses implementing renewable energy and adaptation interventions <p>Just transition 100% of the affected parts of the national workforce are trained to use new mitigation technologies for a low-GHG-emissions transition by 2030.</p>	02/09/2021	Updated first NDC
Bahamas*	<p>Unconditional:</p> <p>30% renewable electricity by 2030.</p>	31/10/2016	First NDC
Bahrain	<p>Unconditional:</p> <p>Renewables will cover 5% of peak capacity in 2025 and 10% in 2035.</p>	18/10/2021	Updated first NDC

*Updated NDC in preparation as of July 2022.

¹² Emissions targets are only included if there is a renewable energy-specific component, e.g. Marshall Islands.

Barbados	<p>Conditional:</p> <p>Electricity</p> <ul style="list-style-type: none"> • 95% share of renewable energy in the electricity mix by 2030. <p>Transport</p> <ul style="list-style-type: none"> • 100% electric or alternatively fuelled vehicles in the passenger fleet by 2030. <p>Others</p> <p>The mitigation ambition of 70% reduction in GHG emissions, economy-wide, by 2030 will be complemented by, among other things, the following strategies and plans:</p> <ul style="list-style-type: none"> • Support for research and development of renewable energy and energy storage technologies appropriate for SIDS, in particular ocean energy in line with the national strategy to develop its blue economy. • A deliberate focus on using distributed generation (e.g. household solar photovoltaics [PV]) to provide modern energy access and build resilience (adaptation co benefits) for low-income households, with an initial target of retrofitting 3 000 low-income homes with solar PV by 2030 under the Roofs to Reefs Programme. 	30/07/2021	Updated first NDC
Belize	<p>Conditional:</p> <p>Electricity</p> <ul style="list-style-type: none"> • 75% gross generation of electricity from renewable energy sources by 2030 through the implementation of hydropower, solar, wind and biomass, including in the tourism sector. • Install 40 MW utility-scale solar power by 2025. <p>Transport</p> <ul style="list-style-type: none"> • Deployment of 77 hybrid and electric buses by 2030 (17 by 2025). 	01/09/2021	Updated first NDC
Cabo Verde	<p>Unconditional:</p> <p>Electricity</p> <ul style="list-style-type: none"> • 30% renewable energy share in the electricity supply in 2025 and up to 50% in 2030. <p>Transport</p> <ul style="list-style-type: none"> • Electrify at least 25% of Cabo Verde's land-borne transport fleet (new vehicles) by 2030 by resorting to renewable energy sources. <p>Conditional:</p> <p>Electricity</p> <ul style="list-style-type: none"> • 100% renewable energy share in the electricity supply in 2040. • Increase wind energy capacity by installing 10 MW wind farm for Santiago by 2022 and 60 MW by 2030. • Increase solar PV energy by installing an additional 150 MW by 2030. • Install a waste-to-energy biogas landfill in Santiago by 2025 and construction of eight biogas plants across islands by 2030. <p>Transport</p> <ul style="list-style-type: none"> • By 2050, fully replace all residual thermal vehicles (gasoline/diesel) with EVs. • By 2025, establish the procurement rules for the acquisition of 100% EVs by institutional entities and have at least 50% of EVs in the new acquisition of urban collective transport. • By 2030, the national public recharge infrastructure is fully implemented. • By 2030, the public administration's vehicle fleet is fully electrified. <p>Gender</p> <ul style="list-style-type: none"> • Operationalise the Action Plan for Gender and Energy by 2030, support the emergence of local businesses and promote economic opportunities for women particularly in the field of renewable energy to represent at least 20% of the workforce in 2030. 	02/04/2021	Updated first NDC
Comoros	Mentioned renewable energy (including PV and geothermal) to produce electricity but no specific targets.	05/11/2021	Updated first NDC

Cook Islands	<p>Unconditional: 38% GHG emissions reductions from electricity by 2020.</p> <p>Conditional: 100% renewable electricity by 2020.</p>	01/09/2016	First NDC
Cuba	<p>Conditional:</p> <p>Others</p> <ul style="list-style-type: none"> The installation of 833 333 units of solar heaters (1 million square meters in the collection area) in the residential and industrial sectors. The installation of 5 000 solar pumping systems in 15 livestock farms. Increase the use of biogas for electricity and heat production in the swine (pig) sector and install 18 534 biodigesters of different types in the 2020 30 period. <p>Combination of both conditional and unconditional:</p> <p>Electricity</p> <ul style="list-style-type: none"> Increase to 24% of electricity generation based on renewable energy sources (RES) in the Cuban electricity matrix by 2030 (sugar cane biomass - 14%; wind + solar PV + water - 10%). The main actions include the installation of a 2144 MW power capacity connected to the grid up to the year 2030 based on RES. Total cost estimated for the implementation of the contribution is USD 7 723 million. The financing is to be attained from two sources: <p>Unconditional: USD 3 010 million mainly from the state budget.</p> <p>Conditional: USD 4 713 million through long-term credits to cover the importation of the technology.</p> <p>Transport</p> <ul style="list-style-type: none"> Introduction of more than 55 000 EVs and the installation of around 25 000 recharge stations by 2030. The estimated implementation cost for this contribution is USD 1479 million. Two main financing sources are considered: <p>Unconditional: USD 218 million mainly from the state budget.</p> <p>Conditional: USD 1261 million through long-term credits to cover the importation of the technology.</p> 	17/09/2020	Updated first NDC
Dominica	<p>Conditional: 100% renewable energy usage by 2030, principally from the harnessing of geothermal resources. 15MW geothermal already planned or due to be commissioned.</p>	04/07/2022	Updated NDC
Dominican Republic	<p>Conditional:</p> <p>Electricity</p> <ul style="list-style-type: none"> Installation of 477 MW of wind power by 2030 at an estimated cost of USD 715.5 million. Installation of 479 MW of solar PV power by 2030 at an estimated cost of USD 407.15 million. Installation of 21 MW of power in small and medium-scale hydroelectric plants by 2030 at an estimated cost of USD 31.5 million. <p>Transport</p> <ul style="list-style-type: none"> Displacement of 220 000 units of the private vehicles fleet by 75% EVs and 25% hybrids by 2030 with recharging from renewable sources at an estimated cost of USD 5 million. Transformation of 300 diesel buses for 100% electric units by 2030 with recharging from renewable sources at an estimated cost of USD 90 million. 	29/12/2020	Updated first NDC
Fiji	<p>Combination of conditional and unconditional:</p> <p>Electricity</p> <ul style="list-style-type: none"> 100% renewable energy power generation (grid connected) by 2030. Unconditional targets are one-third of the total and conditional targets are two-thirds of the total. 	31/12/2020	Updated first NDC
Grenada	<p>Conditional: Incorporation of 15 MW of renewable energy to the existing feeder line network by 2030.</p>	01/12/2020	Second NDC

Guinea-Bissau	<p>Conditional:</p> <p>Electricity</p> <p>NDC scenario (not a commitment <i>per se</i>).</p> <ul style="list-style-type: none"> • Increase the share of renewable energies in the electricity mix to 58% by 2030, 40% of which would come from hydroelectricity and the rest from solar PV and wind power. • Increase the installed renewable energy capacity to around 90 MW by 2030. 	12/10/2021	Updated first NDC
Guyana	<p>Unconditional:</p> <p>Electricity</p> <ul style="list-style-type: none"> • 26 MW of wind power and the electrification of six townships with renewable energy mini-grids. <p>Conditional:</p> <p>Electricity</p> <ul style="list-style-type: none"> • 100% renewable electricity by 2025, and the development of the Amaila Falls Hydropower project (165 MW). 	20/05/2016	First NDC
Haiti	<p>Unconditional:</p> <ul style="list-style-type: none"> • Hydroelectricity – 1MW (36 units). • Off-grid mini hydro – 1MW (0.5 units). • Solar/diesel mini-grid – 40 kilowatts (kW) from solar (20 units). • 1000 LED solar lights – (20 units). • Solar PV home systems – 500 watts (W) (15 units). <p>Conditional:</p> <ul style="list-style-type: none"> • Hydroelectricity – 1MW (32 units). • Off-grid micro hydro – 1MW (20 units). • Solar/diesel mini-grid – 40 kW from solar - (30 units). • Solar PV (small isolated grid) – 2 MW (20 units). • 1000 solar water heaters, residential level (10 units). • 1000 solar LED lights (100 units). • Solar street lights – 0.05 MW (5 units). • PV solar home systems – 500 W (20 units). • Onshore wind turbines with storage – 1MW (50 units). 	01/06/2022	Updated first NDC
Jamaica	Mentioned the production of biogas using animal waste and increasing the use of biodigesters, but no specific targets.	01/07/2020	Updated first NDC
Kiribati	<p>Unconditional:</p> <ul style="list-style-type: none"> • 1.3 MW of grid-connected solar PV by 2025. • Off-grid solar PV equivalent to GHG reductions of 1100 tonnes of CO₂ equivalent (CO₂-eq) (0.8 MW) by 2025. <p>Conditional:</p> <ul style="list-style-type: none"> • 1.15 MW of solar PV. • Biodiesel (coconut oil) for electricity generation and transport by 2025. • 3 900 solar home systems. • 12 community systems for solar water desalination. 	21/09/2016	First NDC
Maldives	<p>Conditional</p> <p>Increase the installed the renewable energy share to 15% of the energy mix, which includes the public and private sectors.</p>	28/12/2020	Updated first NDC
Marshall Islands	<p>Unconditional:</p> <p>Reducing GHG emissions by at least 45% below 2010 levels by 2030.</p> <p>Electricity</p> <ul style="list-style-type: none"> • Additional 29.9 kilotonnes (kt) CO₂-eq through solar compared with 2025. • Additional 1.5 kt CO₂-eq through wind compared with 2025. • Additional 3.7 kt CO₂-eq through coconut oil compared with 2025. 	31/12/2020	Second NDC
Mauritius	60% of energy needs to be produced from green sources by 2030.	05/10/2021	Updated first NDC
Micronesia (Federated States of)	No specific renewable energy targets are included; it is stated that the NDC builds upon existing renewable energy and transport targets and policies.	15/09/2016	First NDC

Nauru	Conditional: 6 MW solar PV farm with 5 MW/2.5 MW battery capacity to achieve renewable energy making up 50% of Nauru's power generation.	14/10/2021	Updated first NDC
Niue	Unconditional: <ul style="list-style-type: none">• 38% renewable electricity by 2020. Conditional: <ul style="list-style-type: none">• 80% renewable electricity by 2025.• 1.8 MW of solar PV.	28/10/2016	First NDC
Palau	Conditional: <ul style="list-style-type: none">• 5 MW of solar PV.• 10 MW of solar PV for the water sector.	22/04/2016	First NDC
Papua New Guinea	Conditional: Increasing levels of renewables in the energy mix for on-grid connection through increasing the share of installed capacity of renewable energy from 30% in 2015 to 78% in 2030. <ul style="list-style-type: none">• Installation of 16.05 MW of solar PV + energy storage system by 2030 at an estimated cost of USD 86.67 million.• Installation of 19.95 MW of hydropower by 2030 at an estimated cost of USD 68.70 million.	16/12/2020	Second NDC
Saint Kitts and Nevis	Combination of both conditional and unconditional: Electricity 100% renewable energy in electricity generation – the main actions include the installation of a 68.8 MW of renewable energy capacity by 2030. The total cost estimated for the implementation of the contribution is USD 281 million. Unconditional: Installation of 35.7 MW of solar PV by 2023 at an estimated cost of USD 70 million. Conditional: Installation of 6.6 MW of wind power, 25 MW of geothermal power, 1.5 MW of solar PV by 2030 at an estimated cost of USD 211 million. Conditional: Heating 5% reduction in power demand by introducing solar water heaters by 2030 at an estimated cost of USD 20 million. Transport Increasing the share of EVs in the vehicle fleet to at least 2% at an estimated cost of USD 15 million.	25/10/2021	Updated first NDC
Saint Lucia	Conditional: <ul style="list-style-type: none">• 35% renewable electricity by 2025.• 50% renewable electricity by 2030.	22/04/2016	First NDC
Saint Vincent and the Grenadines	Unconditional: Geothermal plant to generate over 50% of country's electricity.	29/06/2016	First NDC
Samoa	Conditional: Reach 100% renewable electricity generation by 2025.	30/07/2021	Second NDC
Sao Tome and Principe	Conditional: Increase in the use of renewable energy sources up to 49 MW, mainly from solar (32.4 MW), hydroelectric (14 MW) and biomass (2.5 MW).	30/07/2021	Updated first NDC
Seychelles	Conditional: Electricity Increase the renewable energy share in the electricity supply to 15% in 2030. Transport <ul style="list-style-type: none">• By 2030, 30% of large tourism businesses must have electric transport in their fleet.• By 2030, small and medium tourism businesses (omnibuses, taxis) must have 20% electric transport.	30/07/2021	Updated first NDC

Singapore	<p>Unconditional:</p> <p>Electricity At least 2 gigawatts peak (GWp) of solar PV by 2030. 2 GWp of solar PV would meet about 4% of Singapore's (2020) annual electricity needs and 10% of daily peak electricity demand today.</p>	31/03/2020	Updated first NDC
Solomon Islands	<p>Combination of both conditional and unconditional:</p> <p>Electricity The government is committed to the Renewable Energy Roadmap for Honiara to achieve 100% renewable energy by 2030 and achieving 100% accessibility by 2050.</p> <p>Unconditional: Installation of 15 MW of hydropower by 2024, 3.22 MW of solar PV by 2021 and 4.574 MW of off-grid solar-diesel hybrid systems by 2022.</p> <p>Conditional: Installation of 3.77 MW/USD 10.65 million of hydropower, 20-40 MW/USD 150 million of geothermal power, 1MW of solar PV/USD 4 million and 1MW/USD 6 million of off-grid solar-diesel hybrid systems by 2030.</p>	19/07/2021	Updated first NDC
Suriname	<p>Unconditional:</p> <p>Electricity Maintain a share of electricity from renewable sources above 35% by 2030.</p>	09/12/2019	Second NDC
Timor-Leste	<p>Conditional:</p> <p>Electricity 352 MW of renewables, including 252 MW of hydropower, 72 MW of wind, 22 MW of solar and 6 MW of biomass/waste sources.</p>	16/08/2017	First NDC
Tonga	<p>Conditional:</p> <p>70% of electricity generated from renewable sources by 2030 through combination of solar, wind and battery storage.</p>	09/12/2020	Second NDC
Trinidad and Tobago	No renewable energy targets were identified.**	22/02/2018	INDC
Tuvalu	<p>Unconditional:</p> <p>100% renewable electricity by 2020. The main action includes the installation of 6 MW of renewable energy capacity by 2020.</p>	22/04/2016	First NDC
Vanuatu	<p>Conditional:</p> <p>Electricity Close to 100% renewable energy in the electricity sector by 2030.</p> <p>Transport</p> <ul style="list-style-type: none"> Introduce EVs (e-buses) for public transportation (10% of total public buses); introduce electric cars (e-cars) in Vanuatu (10% of government fleet); and 1000 electric two-wheelers (e-bikes)/three-wheelers (e-rickshaw) by 2030. 20% biodiesel (biofuel) blending in diesel by 2030. <p>Other sectors</p> <ul style="list-style-type: none"> 65% renewable electricity use by rural tourism bungalows by 2030. Installation of 1000 biogas plants for commercial and residential use by 2030. 	22/03/2021	Updated first NDC

** Mitigation options were identified which underwent cost-benefit analyses and socio economic impact assessment and include policy instruments, knowledge and awareness approaches to elicit behavioural changes and direct technology intervention options such as clean technology, fuel switching and renewable energy and energy efficiency technologies.

Note: All NDC documents are retrieved from the NDC registry hosted by the UNFCCC.

Source: UNFCCC (2022), NDC registry.

ANNEX 2 – COMPARISON OF RENEWABLE ENERGY TARGETS IN NDCS WITH THOSE IN NATIONAL ENERGY PLANS

This section compares the renewable energy targets in NDCs with the renewable energy targets in other national policy documents such as national plans, policies, roadmaps or laws. As expected, there are some discrepancies between the two. This could be due to several reasons. For example, some of the NDC targets can be conditional on international support and therefore may be more ambitious. In other cases, the national energy policy that is in effect may predate the NDC by many years (and *vice versa*). This time lag between when different documents are updated can result in a difference in the targeted capacity. For example, a target of 80% renewable energy in the electricity mix by 2030 that was set in 2012 may be set under different demand growth assumptions to those that are applicable today.

ANTIGUA AND BARBUDA

- Targets in the NDC are conditional and are ambitious at 270 MW of renewable energy capacity by 2030 (up from 16 MW installed capacity in 2020). Renewable energy targets in national plans are estimated to total 36 MW. This shows that the country has good renewable energy potential, but realising this potential will require international support.

Antigua and Barbuda	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
	02/09/2021	Conditional: Electricity 86% renewable energy generation from local resources in the electricity sector by 2030. <ul style="list-style-type: none">100 MW of renewable energy generation capacity available to the grid by 2030.50 MW of renewable energy generation capacity owned by farmers who can sell electricity to off-takers by 2030.100 MW of renewable energy generation capacity owned by social investment entities by 2030.20 MW of wind-powered energy generation by 2030.	-	270
DATE		QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	2021	The national energy policy targets a 100% renewable energy in the electricity supply by 2030 (Government of Antigua and Barbuda, 2011; IRENA, 2021).	483*	

*As per IRENA's roadmap for Antigua and Barbuda – 100% (no hydrogen) scenario.

BAHAMAS

- Targets in both the first NDC and national plans are estimated to be at 475 MW (up from 1MW installed capacity in 2018) and are not conditional on any financial or technical support. As per the Bahamas NDC, the commitment towards renewable energy deployment is driven by benefits that go beyond climate to improved energy security (through reduced dependency on imported oil) and other economic and social benefits.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Bahamas	31/10/2016	Unconditional: 30% renewable electricity by 2030.	475	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	01/01/2013	The Bahamas national energy policy sets the target of increasing the percentage of renewables in the energy mix to 30% by 2030 (Government of Bahamas, 2013).	475	

BAHRAIN

- Targets in both the NDC and national plans are estimated to be at 710 MW, and are not conditional on any financial or technical support.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Bahrain	18/10/2021	Unconditional: Renewables will cover 5% of peak capacity in 2025 and 10% in 2035.	710	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	01/01/2017	Bahrain's National Renewable Energy Action Plan sets the target of increasing the percentage of renewables in the energy mix to 10% by 2035 (The Sustainable Energy Unit, 2017).	710	

BARBADOS

- Barbados's National Energy Policy sets a target of 100% share of renewable energy by 2030, which would see renewable energy capacity reach 625 MW. However, this target is probably set as an inspirational target, as a similar (slightly less ambitious) target estimated at 606 MW was set in the NDC, which is fully conditional on international support.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Barbados	30/07/2021	Conditional: 95% share of renewable energy in the electricity mix by 2030.	-	606
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	2019	Barbados's National Energy Policy sets the target of 100% share of renewable energy by the year 2030. This translates to 625 MW of renewable installed capacity (excluding 200 MW of storage), including 310 MW of solar, 91.2 MW of wind, and 15 MW of biomass and waste-to-energy (Government of Barbados, 2019).	625	

BELIZE

- Renewable energy targets in national plans total 75 MW of installed capacity. The targets in the NDC are higher at 120 MW, subject to receiving international support.

Belize	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
		UNCONDITIONAL MW	CONDITIONAL MW	
Belize	01/09/2021	Conditional: <ul style="list-style-type: none"> 75% gross generation of electricity from renewable energy sources by 2030 through the implementation of hydropower, solar, wind and biomass, including in the tourism sector. Install 40 MW utility-scale solar power by 2025. 	-	120
	27/06/2016	Barbados's National Energy Policy sets the target of 100% share of renewable energy by the year 2030. This translates to 625 MW of renewable installed capacity (excluding 200 MW of storage), including 310 MW of solar, 91.2 MW of wind, and 15 MW of biomass and waste-to-energy (Government of Barbados, 2019).	75	

CABO VERDE

- Estimations based on the NDC show that the country is targeting 235 MW of installed capacity by 2030 unconditionally. This is almost aligned with the target cited in Cabo Verde's Electricity Sector Master Plan, totalling 252 MW of renewable energy installed capacity.
- Conditional on international financial and technical support, the country would add another 380 MW of renewable energy capacity by 2040, thereby reaching a 100% renewable energy share in the electricity mix.

Cabo Verde	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
		UNCONDITIONAL MW	CONDITIONAL MW	
Cabo Verde	02/04/2021	Unconditional: <ul style="list-style-type: none"> 30% renewable energy share in the electricity supply in 2025 and up to 50% in 2030. Conditional: <ul style="list-style-type: none"> 100% renewable energy share in the electricity supply in 2040. Increase wind energy capacity by installing 10 MW wind farm for Santiago by 2022 and 60 MW by 2030. Increase solar PV energy by installing an additional 150 MW by 2030. Install a waste-to-energy biogas landfill in Santiago by 2025 and construction of eight biogas plants across islands by 2030. 	235 by 2030	380 by 2040
	15/12/2018	Cabo Verde's Electricity Sector Master Plan 2018-2040 sets the target of a 54% renewable energies penetration rate by 2030. This translates to 251.8 MW of renewable installed capacity, including 160.6 MW of solar and 91.2 MW of wind (Imprensa Nacional de Cabo Verde, 2019).	252	

COMOROS

- No specific renewable energy targets in either the NDC or national plans.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Comoros	05/11/2021	Conditional: Mentioned renewable energy (including PV and geothermal) to produce electricity but no specific targets.	-	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	-	No national renewable energy targets were identified.	-	

COOK ISLANDS

- Estimated targets in the NDC equal unconditional capacity of 4 MW by 2020, and 21 MW conditional on international financial and technical support.
- The NDC targets for 2020 were not realised with overall capacity in 2021 at 4.7 MW, mainly made up of solar PV. This signals the need for further international support.
- Targets in national plans amount to 22 MW of renewable energy installed capacity by 2030. It could mean that the targets set are inspirational and rely on international support.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Cook Islands	01/09/2016	Unconditional: 38% GHG emission reductions from electricity generation by 2020. Conditional: 100% renewable electricity by 2020.	4	21
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	15/01/2021	Cook Islands' Economic Development Strategy sets the target of increasing the percentage of electricity generation from renewable energy to 60% by 2030 (Government of the Cook Islands, 2021).	22	

CUBA

- As per Cuba's National Energy Policy, 2119 MW of renewable energy installed capacity by 2030 will be added. The NDC indicates a similar target estimated at 2144 MW, of which 836 MW is unconditional capacity while 1308 MW could be added based on international support.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Cuba	17/09/2020	Electricity <ul style="list-style-type: none"> Increase to 24% of electricity generation based on RES in the Cuban electricity matrix by 2030 (sugar cane biomass – 14%; wind + solar PV + water – 10%). The main actions include the installation of a 2144 MW power capacity connected to the grid up to the year 2030 based on RES. Total cost estimated for the implementation of the contribution is USD 7 723 million. The financing is to be attained from two sources: <p>Unconditional: USD 3 010 million mainly from the state budget.</p> <p>Conditional: USD 4 713 million through long-term credits to cover the importation of the technology.</p>	836	1308
		DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	
	01/06/2014	Cuba's energy policy set the goal of generating 24% of its power from renewable energy by 2030 (Government of Cuba, 2019).	2144	

DOMINICA

- The updated NDC includes conditional renewable energy targets reaching 35 MW of capacity. This is consistent with the targets laid out in Dominica's National Energy Policy of 100% renewable energy generation by 2030, which amounts to 35 MW.
- The updated NDC was submitted in July 2022, superseding the first NDC submitted in September 2016, which had a target of 16 MW of renewable installed capacity. This again goes to show that sometimes the discrepancy between national policy documents and NDCs can be due to a time lag.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Dominica	04/07/2022	Conditional: Dominica has set a target of 100% renewable energy usage by 2030, principally from the harnessing of geothermal resources. 15 MW geothermal already planned or due to be commissioned.	-	35
		DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	
	2019	Dominica's National Energy Policy sets the 100% renewable energy generation target by 2030 (Caribbean Centre for Renewable Energy & Energy Efficiency, 2020).	35	

DOMINICAN REPUBLIC

- Targets in the NDC are conditional and are more ambitious, amounting to 977 MW of renewable energy capacity, compared with the renewable energy targets in the Dominican Republic's Law 57-07 on Renewable Energy, which is estimated at 795 MW.
- This signals that the country needs further international support in the form of financial and technical assistance to realise its targets for renewable energy.

Dominican Republic	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
		Conditional:	UNCONDITIONAL MW	CONDITIONAL MW
	29/12/2020	Conditional: <ul style="list-style-type: none"> • Installation of 477 MW of wind power by 2030 at an estimated cost of USD 715.5 million. • Installation of 479 MW of solar PV power by 2030 at an estimated cost of USD 407.15 million. • Installation of 21 MW of power in small and medium-scale hydroelectric plants by 2030 at an estimated cost of USD 31.5 million. 	-	977
	07/05/2007	Dominican Republic's Law 57-07 on Renewable Energy (supported by the 2008 Renewable Energy Regulating Decree No. 202-08) sets the 25% renewable energy generation target by 2025 (Government of Dominican Republic, 2012).	795	

FIJI

- Targets in national plans and NDC are similar, aiming for a 100% share of renewables in power generation (grid connected).
- As per Fiji's Green Growth Framework, 395 MW of renewable energy installed capacity by 2030 will be added. The NDC cites a close target estimated at 399 MW, 133 MW unconditional while 266 MW could be added based on financial support.
- This signals that the country needs further international support in the form of financial and technical assistance to realise its targets for renewable energy.

Fiji	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
		Combination of both conditional and unconditional:	UNCONDITIONAL MW	CONDITIONAL MW
	31/12/2020	100% renewable energy power generation (grid connected) by 2030. Unconditional targets are one-third of the total and conditional targets are two-thirds of the total.	133	266
	01/08/2014	Fiji's Green Growth Framework targets renewable energy share in electricity generation to be around 99% by 2030 (Government of Fiji, 2014).	395	

GRENADA

- Grenada's NDC includes conditional targets amounting to 15 MW of renewable energy capacity whereas Grenada's Vision 2030 sets a 100% renewable energy generation target for 2030, which is estimated to be 92 MW. There is an eight-year lag between the two documents – the NDC was submitted in 2020 and Grenada's Vision 2030 was published in 2012.
- In any case, the NDC communicates that the country will need further international support to realise its renewable energy ambitions as set forth in its national plans.

Grenada	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	01/12/2020	Conditional: Incorporation of 15 MW of renewable energy to the existing feeder line network by 2030.	-	15
	2012	Grenada's Vision 2030 sets a 100% renewable energy target for both the electricity and transport sectors 2030 (Government of Grenada, 2012).	92	

GUINEA-BISSAU

- The NDC communicates a conditional target of 90 MW renewable energy capacity which is relatively more ambitious than the targets in Guinea-Bissau's National Plan of Action for Renewable Energy (PANER) totalling 72 MW.
- This signals that the country will need international support in the form of financial and technical assistance to realise its national renewable energy targets.

Guinea-Bissau	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	12/10/2021	Conditional: NDC scenario (not a commitment <i>per se</i>) <ul style="list-style-type: none"> • Increase the installed renewable energy capacity to around 90 MW by 2030. 	-	90
	15/10/2017	Guinea-Bissau's PANER plans to reach 72 MW of renewable energy by 2030, representing 52% of peak demand and 72% of total electricity demand. This includes an additional 53 MW of hydropower, 15 MW of solar PV, 2 MW of wind and 2 MW of bioenergy (Government of Guinea-Bissau, 2017).	72	

GUYANA

- Guyana's NDC sets a target of 462 MW by the year 2025, of which 26 MW will be achieved unconditionally while 436 MW will be achieved conditionally based on further international support.
- Guyana's Green State Development Strategy sets a target of 63% renewable energy generation by 2035, which is estimated to total to 475 MW. According to the NDC, about 92% of this capacity could be reached ten years earlier with international financial and technical support.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Guyana	20/05/2016	<p>Unconditional:</p> <ul style="list-style-type: none"> • 26 MW of wind power and the electrification of six townships with renewable energy mini-grids. <p>Conditional:</p> <ul style="list-style-type: none"> • 100% renewable electricity by 2025, and the development of the Amaila Falls Hydropower project (165 MW). 	26	436
	01/05/2019	DATE QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
		Guyana's Green State Development Strategy sets a target of 63% renewable energy generation by 2035 and 100% by 2040 (Government of Guyana, 2019).	470 MW (by 2035)	

HAITI

- The NDC cites an overall target of 199.5 MW, of which 162 MW is conditional on international support.
- No national renewable energy targets in national plans, policies or other documents were found.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Haiti	1/06/2022	<p>Unconditional:</p> <ul style="list-style-type: none"> • Hydroelectricity – 1MW (36 units). • Off-grid mini hydro – 1MW (0.5 units). • Solar/diesel mini-grid – 40 KW from solar (20 units). • 1000 LED solar lights – (20 units). • Solar PV home systems – 500 W (15 units). <p>Conditional:</p> <ul style="list-style-type: none"> • Hydroelectricity – 1MW (32 units). • Off-grid micro hydro – 1MW (20 units). • Solar/diesel mini-grid – 40 kW from solar (30 units). • Solar PV (small isolated grid) – 2 MW (20 units). • 1000 solar water heaters, residential level (10 units). • 1000 solar LED lights (100 units). • Solar street lights – 0.05 MW (5 units). • PV solar home systems – 500 W (20 units). • Onshore wind turbines with storage – 1MW (50 units). 	37.5	162
	01/01/2012	DATE QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
		No national renewable energy targets were identified (Government of Haiti, 2012).	-	

JAMAICA

- According to Jamaica's IRP, 1 587.6 MW are to be added by 2037. However, no renewable energy targets were identified in the latest NDC.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Jamaica	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	01/07/2020	No renewable energy targets were identified in the updated NDC.	-	
	21/02/2020	Jamaica's IRP sets out annual capacity additions from 2018 to 2037. By 2037, the following capacity additions are expected to be added to current levels: <ul style="list-style-type: none"> 1260 MW solar/wind. 74 MW hydro, waste-to-energy, biomass (Government of Jamaica, 2009). 	1587.6	

KIRIBATI

- As per the Kiribati Integrated Energy Roadmap (KIER), which is used as an implementation plan for the Kiribati National Energy Policy that was endorsed in 2009, the renewable energy target totals 9 MW. Renewable energy targets in the NDC amount to 5.6 MW, of which 3.5 MW is conditional on receiving international support. The targets based on the roadmap are more ambitious than the NDC's, which are already partially conditional. This means that the targets based on the KIER may need additional international support.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Kiribati	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	21/09/2016	Unconditional: <ul style="list-style-type: none"> 1.3 MW of grid-connected solar PV by 2025. Off-grid solar PV equivalent to GHG reductions of 1100 tonnes CO₂-eq (0.8 MW) by 2025. Conditional: <ul style="list-style-type: none"> 1.15 MW of solar PV. Biodiesel (coconut oil) for electricity generation and transport by 2025. 3 900 solar home systems. 12 community systems for solar water desalination. 	2.1	3.5
	05/2017	KIER serves as an implementation plan for the National Energy Policy that was endorsed in 2009. The goal for Tarawa is a 45% reduction in fossil fuel use by 2025. 23% of this goal will be achieved through deployment of renewable energy and 22% through improvements in energy efficiency. The goal for Kiritimati is a 60% reduction in fossil fuels by 2025. 40% is to be achieved through deployment of renewable energy and 20% through improvements in energy efficiency. The goal for the Outer Islands is a 60% reduction in fossil fuel use in all rural public infrastructure, including Southern Kiribati Hospital and ice plants (40% through deployment of renewable energy and 20% through improvements in energy efficiency) by 2025. The goal for rural public and private institutions (e.g. boarding schools, the Island Council, private amenities and households) is to meet of 100% electricity demand with renewable energy by 2025 (IRENA, 2017).	9	

MALDIVES

- No quantifiable targets are presented in either the NDC or any national policy documents.

Maldives	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
	28/12/2020	Conditional: Increase of electricity production by renewable energy with storage and grid stabilisation.	-	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	-	No national renewable energy targets were identified.	-	

MARSHALL ISLANDS

- The NDC cites an unconditional target estimated at 69 MW by 2030, while the Marshall Islands Electricity Roadmap sets a further target of “100% energy generated from renewable energy sources by 2050”, which translates to 130.1 MW of renewable installed capacity by 2050.
- The roadmap presents pathways for the sector to help achieve its 2030 NDC targets while further outlining longer-term pathways to achieve total decarbonisation of the electricity sector by 2050. The roadmap states that these steps will require significant international support and strong political leadership.

Marshall Islands	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
	31/12/2020	Unconditional: Reducing GHG emissions by at least 45% below 2010 levels by 2030. Electricity <ul style="list-style-type: none"> Additional 29.9 kt CO₂-eq through solar compared with 2025. Additional 1.5 kt CO₂-eq through wind compared with 2025. Additional 3.7 kt CO₂-eq through coconut oil compared with 2025. 	69	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	01/12/2018	Marshall Islands Electricity Roadmap sets the target of 100% energy generated from renewable energy sources by 2050. This translates to 130.1 MW of renewable installed capacity (excluding storage), including 80.6 MW of solar and 49.5 MW of wind (Government of the Marshall Islands, 2018).	130.1	

MAURITIUS

- The NDC expresses an unconditional target of 60% share of renewable energy by 2030, estimated to be equivalent to installed capacity of 863 MW.
- The Mauritius Renewable Energy Roadmap 2030 has been revised and sets a target in line with the NDC at a 60% share (up from 40% previously) of renewable energy generation by 2030.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Mauritius	05/10/2021	Unconditional: 60% of energy needs to be produced from green sources by 2030.	863	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	05/08/2019	Mauritius Renewable Energy Roadmap 2030 has been reviewed and sets a target in line with the NDC at 60% share of renewable energy generation by the year 2030 (Government of Mauritius, 2019).	863	

FEDERATED STATES OF MICRONESIA

- No quantifiable targets are presented.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Micronesia	15/09/2016	No specific renewable energy targets are included; it is stated that the NDC builds upon existing renewable energy and transport targets and policies.	-	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	-	No national renewable energy targets were identified (National Renewable Energy Laboratory, 2016).	-	

NAURU

- Nauru's NDC has a conditional target of 50% of Nauru's power generation coming from renewable sources by 2030 while also citing a solar PV target of 6 MW.
- Nauru's Energy Roadmap also cites a target of 50% grid electricity supplied from renewable energy sources by 2020, totalling 10 MW. By the end of 2020, Nauru's renewable energy capacity was only 2.1 MW.
- International support in the form of financing, technical assistance, and technology transfer can help Nauru achieve its renewable energy targets.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Nauru	14/10/2021	Conditional: <ul style="list-style-type: none"> 6 MW solar PV farm with 5 MW/2.5 MW battery capacity to achieve renewable energy making up 50% of Nauru's power generation. The NDC covers the period 1 January 2021 to 31 December 2030. 	-	6
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	01/01/2018	Nauru's Energy Roadmap targets 50% of grid electricity supplied from renewable energy sources by 2020 (Government of Nauru, 2018).	10	

NIUE

- Niue's Strategic Energy Road Map sets the target of 80% renewable energy generation by 2025 equivalent to an estimated 3 MW.
- The targets expressed in the NDC are estimated to total 2.9 MW. This includes 1.1 MW of unconditional capacity, and another 1.8 MW of conditional capacity to be achieved based on international support.

Niue	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Palau	28/10/2016	Conditional: <ul style="list-style-type: none"> • 80% renewable electricity by 2025. • 1.8 MW of solar PV. Unconditional: <ul style="list-style-type: none"> • 38% renewable electricity by 2020. 	1.1	1.8
		Niue's Strategic Energy Road Map sets the target of 80% renewable energy generation by 2025 (Government of Niue, 2015).	3	

PALAU

- Palau's Executive Order No. 403 (published in 2017) sets the target of 45% renewable energy generation by 2025, which is estimated at 24 MW. The NDC (submitted in April 2016) expresses the same target, all conditional.
- This signals that the country will need substantial international support to realise its national renewable energy plans.

Palau	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Palau	22/04/2016	Conditional: <ul style="list-style-type: none"> • 45% renewable energy target by 2025. • 5 MW of solar PV. • 10 MW of solar PV for the water sector. 	-	24
		Palau's Executive Order No. 403 sets the target of 45% renewable energy generation by 2025 (Government of Palau, 2017).	24	

PAPUA NEW GUINEA

- Papua New Guinea's National Energy Policy sets the target of 100% power from renewable sources by 2050, which includes 2116 MW of renewable energy capacity.
- The NDC communicated a target to increase on-grid installed capacity of renewable energy to 78% (from 30% today) on a conditional basis. This is estimated to be 887 MW.
- This signals that substantial international support may be required for Papua New Guinea to meet its renewable energy targets.

Papua New Guinea	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
		UNCONDITIONAL MW	CONDITIONAL MW	
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	16/12/2020	<p>Conditional: Increasing levels of renewables in the energy mix for on-grid connection through increasing the share of installed capacity of renewable energy from 30% in 2015 to 78% in 2030.</p> <ul style="list-style-type: none"> • Installation of 16.05 MW of solar PV + energy storage system by 2030 at an estimated cost of USD 86.67 million. • Installation of 19.95 MW of hydropower by 2030 at an estimated cost of USD 168.70 million. 	-	860.1
	2017	Papua New Guinea's National Energy Policy sets the target of 100% power from renewable sources by 2050. This includes 1906 MW of hydropower (mostly from the Purari Hydropower Project), 100 MW of solar by 2030, 100 MW of wind power by 2030, and 100 000 solar home systems by 2020 (Government of Papua New Guinea, 2017).		2116

SAINT KITTS AND NEVIS

- While no renewable energy targets were found in national policy documents, the NDC communicates an unconditional target of 35.7 MW by 2030 and a conditional target of 33.1MW by the same year.

Saint Kitts and Nevis	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
		UNCONDITIONAL MW	CONDITIONAL MW	
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	25/10/2021	<p>Combination of both conditional and unconditional: 100% renewable energy in electricity generation – the main actions include the installation of a 68.8 MW of renewable energy capacity by 2030. The total cost estimated for the implementation of the contribution is USD 281million.</p> <p>Unconditional: Installation of 35.7 MW of solar PV by 2023 at an estimated cost of USD 70 million.</p> <p>Conditional: Installation of 6.6 MW of wind power, 25 MW of geothermal power, 1.5 MW of solar PV by 2030 at an estimated cost of USD 211 million.</p>	35.7	33.1
	-	No national renewable energy targets were identified.		-

SAINT LUCIA

- Targets in both the NDC and national plans are estimated to be at 72 MW by 2025 and are not conditional on any financial or technical support. This could signal that the country aims to achieve its set targets driven by objectives beyond climate.

Saint Lucia	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
	22/04/2016	Conditional: <ul style="list-style-type: none">35% renewable electricity by 2025.50% renewable electricity by 2030.	UNCONDITIONAL MW	CONDITIONAL MW
			-	72 by 2025
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	2017	Saint Lucia's National Energy Transition Strategy sets the target of 35% of electricity generated by renewable sources by 2025 (Rocky Mountain Institute, 2017).	72	

SAINT VINCENT AND THE GRENADINES

- While no renewable energy targets were found in national policy documents, the NDC targets 15.7 MW of unconditional geothermal capacity by 2030.

Saint Vincent and the Grenadines	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
	29/06/2016	Unconditional: Geothermal plant to generate over 50% of country's electricity by 2025.*	UNCONDITIONAL MW	CONDITIONAL MW
			15	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	-	No national renewable energy targets were identified (IRENA, 2010).	-	

*No specific year is mentioned for this target, but the year is assumed to be 2025 based on emissions scenarios presented in the NDC.

SAMOA

- Targets in both the NDC and national plans are estimated to be at 35 MW, equivalent to 100% of electricity generation, and are not conditional on any financial or technical support.

Samoa	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
	30/07/2021	Conditional: Reach 100% renewable electricity generation by 2025.	UNCONDITIONAL MW	CONDITIONAL MW
			-	35
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	-	Samoa's Energy Sector Plan 2017-2022 sets the target of 100% electricity generation from renewable energy sources by 2025 (Government of Samoa, 2017).	35	

SÃO TOMÉ AND PRÍNCIPE

- While no renewable energy targets were found in national policy documents, the NDC targets 49 MW of conditional capacity by 2030.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
		UNCONDITIONAL MW	CONDITIONAL MW	
São Tomé and Príncipe	30/07/2021	Conditional: Increase in the use of RES up to 49 MW, mainly from solar (32.4 MW), hydroelectric (14 MW) and biomass (2.5 MW) by 2030.*	-	49
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	-	No national renewable energy targets were identified.	-	

*Although no specific year was mentioned for the renewable energy targets, the target year is assumed to be 2030 based on the target year specific for emission reduction targets.

SEYCHELLES

- Targets in both the NDC and national plans are estimated to be at 11 MW and are conditional on financial or technical support.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
		UNCONDITIONAL MW	CONDITIONAL MW	
Seychelles	30/07/2021	Conditional: Increasing the renewable energy share in the electricity supply to 15% in 2030.	-	11
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	01/01/2012	Seychelles' Sustainable Development Strategy sets the target of 15% renewable electricity by 2030. The strategy also includes technology-specific targets as follows: 6 MW of wind, 3.2 MW of solar PV, 0.75 MW of micro hydropower, five pilot biogas plants and 1000 solar home systems (Government of Seychelles, 2012).	11	

SINGAPORE

- Targets in both the NDC and national plans are estimated to be at 2000 GWp (peak) and are not conditional on any financial or technical support.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
		UNCONDITIONAL MW	CONDITIONAL MW	
Singapore	31/03/2020	Unconditional: Singapore aims to achieve at least 2 GWp of solar PV by 2030. 2 GWp of solar PV would meet about 4% of Singapore's current (2020) annual electricity needs and 10% of daily peak electricity demand today.	2 000	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	29/10/2019	Singapore's energy policy sets the target of deploying 2 GWp of solar by 2030 (Government of Singapore, 2019).	2 000	

SOLOMON ISLANDS

- The NDC communicates that the country will achieve 100% renewable energy by 2030.
- This includes 22.8 MW of renewable energy capacity to be achieved unconditionally which is equivalent to almost half of the target cited in the Solomon Island's National Energy Policy, totalling 48 MW of renewable energy installed capacity.
- Conditional on international financial and technical support, the country can add another 45.8 MW of renewable energy capacity by 2030, thereby reaching a 100% renewable energy share in the electricity mix.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Solomon Islands	19/07/2021	<p>Combination of both conditional and unconditional: The government is committed to the Renewable Energy Roadmap for Honiara to achieve 100% renewable energy by 2030.</p> <p>Unconditional: Installation of 15 MW of hydropower by 2024, 3.22 MW of solar PV by 2021 and 4.574 MW of off-grid solar-diesel hybrid systems by 2022.</p> <p>Conditional: Installation of 3.77 MW/USD 10.65 million of hydropower, 20 MW to 40 MW/USD 150 million of geothermal power, 1MW of solar PV/USD 4 million and 1MW/USD 6 million of off-grid solar-diesel hybrid systems by 2030.</p>	22.8	45.8
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	2014	The Solomon Islands National Energy Policy sets the target of 79% of power generation from renewables by 2030 (Government of Solomon Islands, 2014).	48	

SURINAME

- The NDC communicates an unconditional target which is estimated at 209 MW of renewable energy capacity. No renewable energy targets in national policy documents were found.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Suriname	09/12/2019	<p>Unconditional: Maintain a share of electricity from renewable sources above 35% by 2030.</p>	209	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	-	No national renewable energy targets were identified.	-	

TIMOR-LESTE

- The NDC communicates a target of 352 MW of renewable energy capacity by 2030, conditional on international support. No renewable energy targets in national policy documents were found.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Timor-Leste	09/12/2019	Conditional: 452 MW of renewables, including 352 MW of hydropower, 72 MW of wind, 22 MW of solar and 6 MW of biomass/waste sources.	209	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	-	No national renewable energy targets were identified but the government has announced a target to achieve 50% renewable energy use by 2030 (Government of Timor-Leste, 2011).	-	

TONGA

- Tonga's Climate Change Policy (published in 2016) sets the target of 100% of power generation from renewables by 2035, which is estimated to be equivalent to 63 MW.
- The NDC (communicated in December 2020) sets a conditional target of 70% renewable energy share in the generation mix by 2030, estimated to be equivalent to 31 MW by 2030.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Tonga	09/12/2019	Conditional: 70% of electricity generated from renewable sources by 2030 through combination of solar, wind and battery storage.	-	31
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	01/02/2016	Tonga's Climate Change Policy sets the target of 100% of power generation from renewables by 2035 (Government of Tonga, 2016).	63	

TRINIDAD AND TOBAGO

- No quantifiable targets are presented in either the NDCs or national policies and plans.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Trinidad and Tobago	-	None	-	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	-	Trinidad and Tobago's Vision 2030 set a goal to meet 10% of its energy demands from renewable energy by 2021 (Government of Trinidad and Tobago, 2016).	601	

TUVALU

- While no quantifiable targets are presented in national policies and plans, the NDC cites an unconditional target of 6 MW by 2020. Currently, renewable energy capacity comprises 2.3 MW of solar PV.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Tuvalu	22/04/2016	Unconditional: 100% renewable electricity by 2020; the main action includes the installation of 6 MW of renewable energy capacity by 2020.	6	-
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	-	Tuvalu's National Energy Policy sets the target of 100% of electricity from renewable sources by 2020 (Government of Tuvalu, 2009).	6	

VANUATU

- Both the NDC and Vanuatu's National Energy Road Map set the target of 100% of electricity from renewable sources by 2030. This is equivalent to 47 MW installed capacity by 2030.
- The target cited in the NDC is conditional – this signals that the country will need international support to realise its renewable energy ambitions as outlined in its National Energy Road Map.

	DATE	DESCRIPTION OF THE RENEWABLE ENERGY TARGET IN THE NDC	QUANTIFIED ESTIMATES	
			UNCONDITIONAL MW	CONDITIONAL MW
Vanuatu	22/03/2021	Conditional: Close to 100% renewable energy in the electricity sector by 2030.	-	47
	DATE	QUANTIFIED RENEWABLE ENERGY TARGET IN NATIONAL PLANS	QUANTIFIED ESTIMATES (MW)	
	01/06/2016	Vanuatu's National Energy Road Map sets the target of 100% of electricity from renewable sources by 2030. The updated roadmap includes an investment plan for the period 2016-21 with renewable energy capacity and costs per technology as follows: 8 MW of geothermal at a cost of USD 108 million; 3 MW of solar at a cost of USD 11 million; 1.8 MW of hydropower at a cost of USD 9.85 million; five solar pico-grids at a cost of USD 2.1 million; and USD 16.6 million to USD 17.1 million for off-grid solar, including mini-grids, solar lighting industrial centres and agro-processing power stations (Government of Vanuatu, 2016).	47	

ANNEX 2 – METHODOLOGY

All targets in the power sector are quantified in terms of capacity in megawatts. While renewable energy targets in the power sector – in both NDCs and national energy plans – are typically expressed in terms of fixed capacity (in megawatts), in many countries they may be cited as a percentage of the electricity mix (e.g. 45% renewable energy share in electricity generation), and in some cases they may be a combination of both.

In SIDS, 33 parties have a power target of which 8 are fixed (capacity based in terms of megawatts), 14 are share-based, and another 8 are a combination of the two.

The estimation method for these three cases is described below:

1. If a country expresses fixed targets in terms of megawatts, the target is taken as is.

If the target is expressed as a share (e.g. Country A plans to reach 68% share of renewable energy in the electricity generation mix by 2030), the following steps are followed:

a. Overall electricity generation is obtained (if unavailable in official national data) or approximated based on a ten-year historical CAGR.¹² Given that for some countries (e.g. many SIDS), baseline generation was very low, resulting in a very high growth rate that may not be realistic to project into the future, a growth rate of 1-2% is often assumed.

b. The overall renewable energy generation in the target year is obtained by multiplying the targeted share with the overall electricity generation.

c. Next, the technology-specific share in the renewable electricity mix is obtained (if unavailable in official national data) or estimated. The shares are assumed to equal the share of a technology-specific capacity addition in the overall renewable capacity added over the last five years. For example, for a technology such as solar, the capacity added between 2017 and 2021 is divided by the overall renewable capacity added during this period. This share is assumed to be the same as the “technology-specific share in the renewable electricity mix in the target year”. Note that some adjustments are inevitable to account for baseline capacity for technologies that have had no recent deployment (which is often the case for hydropower and bioenergy).

d. Once the technology-specific generation in target year is obtained, the following formula is used to calculate the megawatt equivalent of the target. Capacity factor data are obtained from IRENA’s costs database.

$$\text{Capacity (MW)} = \frac{\text{Actual Energy Generation (MWh*)}}{\text{Capacity Factor*Time (h)}}$$

* MWh = megawatt-hours

2. In cases where targets are expressed as both a share of electricity mix and fixed capacity, e.g. “Country A plans to reach 68% share of renewable energy share by 2030; specific measures include the addition of 30 MW of solar PV”, it is assessed whether the fixed capacity target will alone be enough to reach the targeted share. In case it will not be enough, the percentage-based target is estimated and adjusted based on the fixed capacity target.

Note: Certain assumptions and approximations are made to account for the gaps and ambiguities in available data. These are made on a country-by-country basis to reflect local conditions where possible.

Data on energy generation and renewable energy capacity can be found at IRENA’s website [here](#). Data on renewable energy costs can be found [here](#).

¹² Unless this information is available in official policy documents of the country being analysed.

REFERENCES

Atteridge, A. and G. Savvidou (2019), “Development aid for energy in Small Island Developing States”, *Energy, Sustainability and Society*, Vol. 9/1, p. 10, [www.doi.org/10.1186/s13705-019-0194-3](https://doi.org/10.1186/s13705-019-0194-3).

Caribbean Centre For Renewable Energy & Energy Efficiency (2020), “2020 energy report card: Dominica”, Caribbean Centre for Renewable Energy & Energy Efficiency, www.ccreee.org/wp-content/uploads/2021/12/CCREEE-ERC-DOMINICA-Feb-23.pdf.

Climate Watch (2022), *NDC Enhancement Tracker*, www.climatewatchdata.org/2020-ndc-tracker (accessed 10 August 2022).

Government of Antigua and Barbuda (2011), *National Energy Policy*, Government of Antigua and Barbuda, www.lse.ac.uk/GranthamInstitute/wp-content/uploads/laws/8481.pdf.

Government of Bahamas (2013), *The Bahamas National Energy Policy*, Government of Bahamas, www.thebahamasweekly.com/uploads/16/energypolicy.pdf.

Government of Barbados (2019), *Barbados National Energy Policy 2019-2030*, Government of Barbados, www.smartenergybarbados.com/wp-content/uploads/2021/03/BNEP-summary-b.pdf.

Government of Belize (2012), *Strategic Plan 2012 2017: Integrating Energy, Science And Technology into National Development Planning And Decision Making to Catalyze Sustainable Development*, Government of Belize, www.publicservice.gov.bz/jdownloads/Strategic%20Plans/MESTPU_Strategic_Plan_-_2012-2017.pdf.

Government of Cuba (2019), *Consejo de Estado (State Council)*, Government of Cuba, www.gacetaoficial.gob.cu/sites/default/files/goc-2019-o95.pdf.

Government of Dominican Republic (2012), *Ley Número 57-07: Sobre Incentivo Al Desarrollo de Fuentes Renovables de Energía y sus Regímenes Especiales* (Law Number 57-07: On Incentives for the Development of Renewable Energy Sources and their Special Regimes), Government of Dominican Republic, www.cne.gob.do/wp-content/uploads/2015/05/REGLAMENTO-LEY-57-07.pdf.

Government of Fiji (2014), *A Green Growth Framework for Fiji*, Government of Fiji, [www.policy.asiapacificenergy.org/sites/default/files/Green%20Growth%20Framework%20for%20Fiji_16%20Sept%202014_LowRes%20%284%29.pdf](http://asiapacificenergy.org/sites/default/files/Green%20Growth%20Framework%20for%20Fiji_16%20Sept%202014_LowRes%20%284%29.pdf).

Government of Grenada (2012), *Grenada Vision 2030*, Government of Grenada, www.climate-laws.org/geographies/grenada/policies/grenada-vision-2030.

Government of Guinea-Bissau (2017), *Plano de Ação Nacional No Sector das Energias Renováveis (Paner) da Guiné-Bissau Período (National Action Plan in the Renewable Energy Sector (Paner) of Guinea-Bissau Period) 2015 2030*, Government of Guinea-Bissau, www.ecowrex.org/system/files/web_plano_de_acao_nacional_optimized.pdf.

Government of Guyana (2019), *Green State Development Strategy: Vision 2040*, Government of Guyana, www.resourcedata.org/dataset/9aea81ee-41fb-4673-ac9b-8b2a5de50fa1/resource/3ee51a5b-b162-4fc4-a1e1-6aeee5d90b3f1/download/file2f3c79a6f21.pdf.

Government of Haiti (2012), *Avant-Projet de Politique Energétique de la République d’Haïti (Draft Energy Policy of the Republic of Haiti)*, Government of Haiti, www.bme.gouv.ht/energie/Declaration%20de%20politique%20energetique_ebauche9.pdf.

Government of Jamaica (2009), *Jamaica's National Energy Policy 2009-2030*, Government of Jamaica, www.mset.gov.jm/wp-content/uploads/2019/07/National-Energy-Policy_0.pdf.

Government of Mauritius (2019), *Renewable Energy Roadmap 2030 for the Electricity Sector*, Government of Mauritius, www.publicutilities.govmu.org/Documents/Ministry%20of%20Energy%20-%20RE%20ROADMAP%202030.pdf.

Government of Nauru (2018), *Nauru Energy Road Map 2018 to 2020 – A Pwiyeiy Bwio Light Up My Land*, Government of Nauru, www.prdrse4all.spc.int/sites/default/files/undp_nerm_report.pdf.

Government of Niue (2015), *Niue Strategic Energy Road Map 2015 2025*, Government of Niue, www.prdrse4all.spc.int/system/files/niue_strategic_energy_road_map_2015-2025_updated_3.pdf.

Government of Palau (2017), *Executive Order No 403: Establishing the Palau National Energy Committee to Monitor and Guide All National Renewable Energy Efforts*, Government of Palau, www.palauenergyoffice.com/wp-content/uploads/2017/09/Executive-Order-403_Establishing-the-Palau-National-Energy.pdf.

Government of Papua New Guinea (2017), *National Energy Policy 2017 2027*, Government of Papua New Guinea, www.prdrse4all.spc.int/sites/default/files/national_energy_policy_-_2017_-_2027.pdf.

Government of Samoa (2017), *Samoa Energy Sector Plan 2017 2022*, Government of Samoa, www.mof.gov.ws/wp-content/uploads/2022/08/Energy-Sector-Plan-2017-2022.pdf.

Government of Seychelles (2012), *Seychelles Sustainable Development Strategy 2012 2020*, Government of Seychelles, www.climate-laws.org/geographies/seychelles/policies/seychelles-sustainable-development-strategy-2012-2020.

Government of Singapore (2019), *Our Energy Policy in a Nutshell*, Government of Singapore, www.mse.gov.sg/policies/energy.

Government of Solomon Islands (2014), *Solomon Islands National Energy Policy and Strategic Plan*, Government of Solomon Islands, www.policy.asiapacificenergy.org/sites/default/files/volume1_solomon_islands_national_energy_policy.pdf.

Government of the Cook Islands (2021), *Cook Islands Economic Development Strategy 2030*, Government of the Cook Islands, www.mfem.gov.ck/images/ECON/1-EDS_Final_for-publication_Optimized.pdf.

Government of the Marshall Islands (2018), *Marshall Islands Electricity Roadmap*, Government of The Marshall islands, www.islands.irena.org/-/media/Files/IRENA/Sids/NavigatingourEnergyFutureMarshallIslandsElectricityRoadmapDecem.ashx.

Government of Timor-Leste (2011), *Timor-Leste Strategic Development Plan 2011 2030*, Government of Timor-Leste, www.cdn.who.int/media/docs/default-source/searo/timor-leste/home-national-strategic-development-plan-2011-2030.pdf?sfvrsn=b26c901f_2.

Government of Tonga (2016), *Tonga Climate Change Policy: A Resilient Tonga by 2035*, Government of Tonga, www.lse.ac.uk/GranthamInstitute/wp-content/uploads/laws/4353.pdf.

Government of Trinidad and Tobago (2016), *Vision 2030*, Government of Trinidad and Tobago, www.planning.gov.tt/sites/default/files/Vision%202030-%20The%20National%20Development%20Strategy%20of%20Trinidad%20and%20Tobago%202016-2030.pdf.

Government of Tuvalu (2009), *National Energy Policy*, Government of Tuvalu, www.climate-laws.org/geographies/tuvalu/policies/national-energy-policy-eeaa2642-a6a9-4eb2-a2d8-04d7ecb57765.

Government of Vanuatu (2016), *Updated Vanuatu National Energy Road Map 2016-2030*, Government of Vanuatu, www.policy.asiapacificenergy.org/sites/default/files/Updated%20Vanuatu%20National%20Energy%20Road%20Map%202016-2030.pdf.

IEA (International Energy Agency) (2017), *Belize National Sustainable Energy Strategy 2012-2033*, IEA, Paris, www.iea.org/policies/6319-belize-national-sustainable-energy-strategy-2012-2033.

Imprensa Nacional de Cabo Verde (2019), **Conselho de Ministros** (Cabo Verde National Press (2019), Council of Ministers), *Imprensa Nacional de Cabo Verde (Cabo Verde National Press)*, www.extwprlegs1.fao.org/docs/pdf/cvi185115.pdf.

IRENA (International Renewable Energy Agency) (2022a), *SIDS Lighthouse Initiative: Progress and way forward*, International Renewable Energy Agency (IRENA), Abu Dhabi, www.islands.irena.org/-/media/Files/IRENA/Agency/Publication/2022/Aug/IRENA_SIDS_LHI_Progress_Way_Foward_2022.ashx#:~:text=The%20SIDS%20Lighthouses%20Initiative%20is,the%20IRENA%2DAOSIS%20Energy%20Compact.

IRENA (2022b), *Renewable energy targets in 2022: A guide to design*, IRENA, Abu Dhabi, www.irena.org/Publications/2022/Nov/Renewable-energy-targets-in-2022.

IRENA (2022c), *Renewable Power Generation Costs in 2021*, IRENA, Abu Dhabi, www.irena.org/publications/2022/Jul/Renewable-Power-Generation-Costs-in-2021.

IRENA (2022d), *Renewable energy statistics*, IRENA, Abu Dhabi, www.irena.org/Data/Downloads/IRENASTAT (accessed 3 November 2022).

IRENA (2021), *Antigua and Barbuda: Renewable energy roadmap*, IRENA, Abu Dhabi, www.irena.org/publications/2021/March/Antigua-and-Barbuda-Renewable-Energy-Roadmap.

IRENA (2017), *Kiribati Integrated Energy Roadmap: 2017-2025*, IRENA, Abu Dhabi, www.policy.asiapacificenergy.org/sites/default/files/Kiribati%20Integrated%20Energy%20Roadmap-%202017-2025.pdf.

IRENA (2010), *Energy Action Plan for St. Vincent and The Grenadines: First Edition*, IRENA, Abu Dhabi, islands.irena.org/-/media/Files/IRENA/Sids/Publications/Saint-Vincent-and-the-Grenadines---Energy-Action-Plan-First-Edition.ashx?la=en&hash=30705C0C5E703442A2FD42676C9E6DD59117F313.

National Renewable Energy Laboratory (2016), “Federated States of Micronesia: Pursuing a sustainable and resilient energy future”, National Renewable Energy Laboratory, www.nrel.gov/docs/fy16osti/66692.pdf.

Rocky Mountain Institute (2017), *Saint Lucia National Energy Transition Strategy*, Rocky Mountain Institute, www4.unfccc.int/sites/PublicNAMA/_layouts/UN/FCCC/NAMA/Download.aspx?ListName=NAMA&Id=225&FileName=Saint%20Lucia%20NETS%20Final%20Report_%20Aug%209%202017.pdf.

The Sustainable Energy Unit (2017), *The Kingdom of Bahrain National Renewable Energy Action Plan*, Sustainable Energy Unit Kingdom of Bahrain, www.sea.gov.bh/wp-content/uploads/2018/04/02_NREAP-Full-Report.pdf.

UN (United Nations) (n.d.), “List of SIDS”, UN, www.un.org/ohrls/content/list-sids.

UNFCCC (United Nations Framework Convention on Climate Change) (2022), NDC Registry, UNFCCC, www.unfccc.int/NDREG.

World Bank (2022), “Access to electricity (% of population)”, www.data.worldbank.org/indicator/EG.ELC.ACCS.ZS (accessed 3 November 2022).



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