Implementation of all of the elements of decision 1/CP.17
Matters related to paragraph 7

Submission by the Republic of Nauru on behalf of the Alliance of Small Island States (AOSIS)

The Republic of Nauru, on behalf of the Alliance of Small Island States (AOSIS), welcomes this opportunity to provide views in response to the Co-Chairs' requests. This submission builds on earlier AOSIS submissions under the Ad-hoc Working Group on the Durban Platform for Enhanced Action (ADP), particularly the submission dated 1 September 2013.

Part I of the submission is in response to the request under FCCC/ADP/2012/3, paragraph 22, for Information, views and proposals on the work of the ADP. This submission further elaborates on our 1 September 2013 proposal and views on further activities in 2014 to ensure that Workstream 2 (WS2) functions as effectively as possible.

Part II forms the AOSIS submission under decision 1/CP.19, paragraph 5(a) highlighting, the "Opportunities for actions with high mitigation potential, including those with adaptation and sustainable development co-benefits." This submission focuses on renewable energy and energy efficiency, and the barriers to the uptake of opportunities amongst the SIDS.

Part I: Information, views and proposals on the work of the ADP

1. Introduction

At COP17 in Durban, Parties noted with grave concern the significant gap between the aggregate effect of Parties' 2020 mitigation pledges and aggregate emissions pathways consistent with a likely chance of holding temperature rise to below 2°C or 1.5°C above pre-industrial levels. Parties decided to launch a Workplan on Enhancing Mitigation Ambition (WEMA) to identify pre-2020 mitigation potential and enhance mitigation action to close the pre-2020 ambition gap. In Durban, AOSIS and many other Parties consented to delaying implementation of the 2015 agreement to 2020, only if the WEMA was created to generate significant additional mitigation action before 2020.

According to the 2013 UNEP Gap Report, we are currently on track for 3°C to 5°C of warming during this century. Without early and significant increases in mitigation action before 2020, it will not be possible for Parties to limit the global mean temperature increase to well below 1.5°C or below 2°C. Early mitigation also makes economic sense, as the IEA has stated every $1 of delayed investment now would necessitate an investment of $4.30 on average post-2020 to compensate for the increased emissions resulting from that delay in taking mitigation action.

At COP19 in Warsaw, Parties decided to accelerate work under the WEMA by intensifying, from 2014 onwards, the technical examination of opportunities for actions with high mitigation potential, with a focus on the implementation of policies, practices and technologies that are substantial, scalable and replicable, in order to promote voluntary cooperation on concrete actions.

The WEMA can help to close the pre-2020 ambition gap by uncovering and/or examining areas with significant, cost-effective and scalable mitigation potential, understanding their adaptation and sustainable development co-benefits and, very importantly, identifying and finding ways to overcome barriers to their uptake. In this way, the WEMA is intended to accelerate concrete mitigation action in the short-term, and may help to inform similar efforts in other relevant fora. Action within the UNFCCC should capitalise on the strengths of the UNFCCC and lead to recommendations to Convention bodies (i.e. GCF, TEC, CTCN, as well as the GEF and AF) to accelerate implementation and help to overcome barriers to implementation.

The focus during the March Technical Expert Meetings (TEMs) on renewable energy and energy efficiency was a good start to uncovering mitigation opportunities. Energy accounts for the majority of global CO2 emissions and as such, renewable energy and energy efficiency represent a significant share of potential global emissions reductions in the pre-2020 period. Importantly, the deployment of renewable energy and energy efficiency projects have significant adaptation and resilience benefits, for both developed and developing countries, including lower energy prices, decreased reliance on external sources of energy and release of resources for adaptation. In June, Parties will begin to explore other mitigation opportunities. AOSIS looks forward to engaging constructively at the TEMs in June on land use and the urban environment.

As noted in the ADP Co-Chairs 'Reflections Note' of April 17, the March TEMs on renewable energy and energy efficiency "provided an initial opportunity for Parties to engage with each other and with partner organizations on how to unlock the mitigation potential of renewable energy and energy efficiency improvements." These initial TEMs were focused primarily on the first modality of WS2, the technical examination of opportunities, their benefits and barriers. As mandated in Warsaw, we must now move from the technical examination of opportunities to promoting cooperation on concrete actions, to help to close the pre-2020 emissions gap.

As many Parties suggested in March, additional time must be set aside in subsequent ADP sessions for more detailed and focussed discussions on how the UNFCCC process and Convention bodies can be used to overcome specific barriers, and to facilitate and accelerate concrete action to reduce GHG emissions in the short-term. There was considerable discussion at the March TEM that access to up-front capital was a significant barrier to accelerating the uptake of renewable energy, and that potential solutions included, for example, a global feed-in tariff.

Follow-on Technical Expert Meetings on renewable energy and energy efficiency are necessary and should involve stakeholders in public and private finance, and be organised with the goal of achieving an actionable policy outcomes. The necessary expertise and capacity to conduct these meetings is available from the UNFCCC Secretariat and other UNFCCC bodies, including the TEC or CTCN, as well as from external expert organizations, such as IRENA and the IEA.

There are a number of key political events in 2014, including the UN Secretary-General's Climate Summit, and COP20 in Lima, where action on the mitigation solutions from Workstream 2 can be undertaken to generate additional mitigation action in the short-term. Indeed, some of the concrete actions uncovered through the TEMs may complement and help to inform the 'Action Partnerships' launched recently at the Abu Dhabi Ascent with a view to delivering new ambition at the UNSG's Climate Summit in September. As UNDP Administrator Helen Clark summarized at the Ascent, "solutions exist, action is being taken, real commitments are being made, and there are broad and growing partnerships for the kinds of transformative actions which can drive human and sustainable development for all."

2. Structuring the TEMs and WEMA in 2014

The March TEMs successfully launched the technical process under the WEMA. As the ADP Co-Chairs 'Reflections note' records, "Parties have used the TEMs to accelerate domestic action and, with the support of international organizations, take forward policy options and tangible initiatives, including efforts to remove barriers to implementation and to scale up and accelerate the delivery of finance, technology and capacity-building support."

The March TEMs suggest that a number of adjustments would enhance the WEMA's efficiency and effectiveness. As we suggested at the beginning of this submission, each issue area (renewable energy, energy efficiency, etc.) should be defined more specifically and considered during at least two phases of TEMs in 2014: the first TEM phase focused on the examination of opportunities, benefits and barriers; and a second TEM phase on actionable policy solutions that utilise the UNFCCC process, Convention bodies and other expert organizations to overcome the most significant barriers. After the first TEM phase, work should be undertaken intersessionally by the Secretariat, a UNFCCC body, and/or an external expert organization to examine policy options, make recommendations on the most significant barriers to implementation, and to coordinate the second TEM phase.

Key to the success of the TEMs is their effective facilitation. Facilitators should be experts in their field and act in their individual capacity. Facilitators should be appointed and announced sufficiently in advance to allow preparation and work with the Secretariat to best shape the discussions and presentations in the TEMs.

TEMs need to be structured to allow for more time for interaction amongst the participants. First, there should be fewer presentations and more time for questions and sharing good practices by Parties. Second, the presentation should be focused strictly on the following key questions:

- Where are there unrealized mitigation opportunities in both developed and developing countries?
- What are the barriers that exist to further development of these mitigation opportunities?
- How can we use the UNFCCC process, Convention bodies and external expert organizations to overcome these barriers and take concrete action?

Participants should include not only experts from Parties and relevant national and sub-national ministries, but also international and intergovernmental organizations, civil society and the private sector. These participants are essential to catalysing action both inside and outside the UNFCCC.

Finally, capturing the discussions in written form is necessary to bring mitigation opportunities, benefits, barriers and solutions to the political level. Successive revisions to the technical paper, mandated in Warsaw, should include an executive 'Summary for Policymakers', easily digestible for all stakeholders, which highlights the key renewable energy and energy efficiency opportunities, key barriers and the most promising strategies to overcome these barriers. The remainder of the technical paper should serve as a menu of concrete opportunities to scale up mitigation opportunities in the very near term.

Looking ahead to the TEMs in October and December, AOSIS proposes electrification of vehicle fleets as possible future area of focus, since energy generation and transport are the main sources of emissions in many SIDS and elsewhere. Moreover, reducing emissions from the transport sector is one of the more difficult areas to overcome not just for SIDS but for many developed and developing countries.

Part II - Opportunities for actions with high mitigation potential, including those with adaptation and sustainable development co-benefits, particularly renewable energy and energy efficiency

This section, and the Appendixes outline some of the renewable energy and energy efficiency policies in the SIDS and highlights the current barriers to increased deployment of renewable energy and energy efficiency in the SIDS.

1. Renewable Energy and Energy Efficiency Policies in the SIDS

Despite being Non-Annex I countries with negligible emissions, SIDS are demonstrating leadership and political will by taking significant action on both renewable energy and energy efficiency.

SIDS are unique in that they are the only group of countries that could convert their power systems to be entirely green with relatively low investment. Their generation capacity is quite small, there is little sunk infrastructure in fossil fuel generation, and the current cost of electricity is so expensive that most forms of renewable energy are competitive, even without an on-going subsidy from a feed-in tariff.

a. Renewable Energy

Several AOSIS members have set strong targets for renewable energy generation. Vanuatu's National Energy Road Map sets a target of 40% renewable electricity generation by 2015 and 65% by 2020. Nauru aims to generate 50% of electricity demand from RE sources by 2020. Saint Vincent and the Grenadines are targeting 30% of projected total electricity output from RE sources by 2015 and 60% by 2020. Saint Lucia recently raised its RE target to 35% renewable electricity generation by 2020, and the Marshall Islands aim to generate 20% of electricity from domestic RE technologies by 2020.

Most SIDS include renewable energy policies and targets in their comprehensive national energy plans, promoting universal access to safe, reliable and sustainable electricity. Common policy instruments include feed-in tariffs and other fiscal incentives for renewable energy and small scale distributed generation. For example, Mauritius established a small-scale distributed generation (SSDG) feed in tariff and net metering scheme in 2010 to support deployment of 2MW of new SSDG electricity generation. Trinidad and Tobago is also collaborating with UNEP to develop a policy and legislative framework to govern RE feed-in tariffs. Seychelles is implementing a grid-connected rooftop photovoltaic (PV) systems project to increase the use of PV on selected main islands and smaller islands throughout the archipelago. Seychelles, like a number of other AOSIS members, also provides tax exemptions for imported renewable energy and energy efficient equipment.

Solar power is a key renewable resource for many small island states, and AOSIS members are promoting the roll out of grid-connected and distributed PV generation. Palau, for example, is seeking financing for PV installations, solar powered street lighting, and hybrid solar/diesel systems on outer islands. The Cook Islands are also seeking support for the roll out of PV mini-grids throughout the island chain and have made significant gains in PV deployment in 2014.

b. Energy Efficiency

Small island states have recognized the importance of energy efficiency in reducing energy use and associated costs, promoting energy security and reliability, and reducing carbon emissions. Most AOSIS members have set energy efficiency targets, strategies and programs (see Table 1 below).

For example, Singapore is positioning itself as a leader in green buildings, with special expertise in the tropics and sub-tropics, through development of its Green Mark certification program (described as the tropics' answer to the US-developed Leadership in Energy and Environmental Design (LEED) certification).[1] Singapore has set a target of having 80% of buildings Green Mark certified by 2030. Singapore has also introduced mandatory energy management practices for large energy users in the industry sector in April 2013.
A number of other AOSIS members have also set strong energy efficiency targets. Kiribati has set a target to reduce electricity generation through energy efficiency by 22 per cent by 2025. The Marshall Islands has committed to improved efficiency of energy use in 50% of households and businesses and 75% of government buildings by 2020, and a 20% efficiency improvement in transportation sector fuel use by 2020.

Thirteen Pacific island states are participating in the Pacific Appliance Labelling and Standard (PALS) Programme. The cabinets of the Cook Islands, Kiribati, Samoa, Tonga and Tuvalu have approved the drafting of national legislation and regulations "that ensure that major electricity consuming appliances such as refrigerators, freezers, air conditioners and lights meet a minimum level of legally enforceable performance standards and that energy rating labels are affixed to these products to inform consumers about the energy efficiency of these products before they are purchased".[2] A number of energy efficiency project proposals were also advanced at the 2013 Pacific Energy Summit, particularly projects to improve supply-side energy efficiency in Pacific island states through grid and generation upgrades.

Small island states in the Caribbean have partnered with the Inter-American Development Bank (IDB) on a variety of programs to promote energy efficiency. For example, Jamaica has partnered with IDB to produce substantial savings through the installation of highly-efficient and energy conservation equipment in public sector buildings. IDB's Caribbean Hotel Renewable Energy and Energy Efficiency Program is assisting the tourism sectors in Barbados, Jamaica, The Bahamas, Suriname, Trinidad and Tobago, Belize, Haiti, Dominican Republic and Guyana to become more energy efficient. Antigua and Barbuda and The Bahamas have also eliminated import tariffs and duties on renewable energy and energy efficiency equipment.

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[1] As at 1 September 2013, "Singapore has more than 1,650 Green Mark certified building projects totaling some 49 million square meters and accounting for 21 percent of total existing building floor space": Singapore Building and Construction Authority, *Singapore: Leading the way for green buildings in the tropics*, 14.

[2] Secretariat of the Pacific Community, "Pacific Island countries commit to appliance labeling and standards" (14 February 2013): http://www.spc.int/edd/section-01/energy-overview/energy/202-pacific-island-countries-commit-to-appliance-labelling-and-standards (last accessed 31 March 2013).

A number of AOSIS members are also utilizing awareness-raising programs and energy audits to promote energy efficiency, including The Bahamas, Maldives and Fiji. Each year Samoa commemorates a Renewable Energy Awareness Day.

2. Barriers to Deployment of Renewables and EE in the Islands

Although there is significant political will, there are also significant barriers in the SIDS to deploying renewable energy and energy efficiency, generally related to their small size (geographically and economically), lack of access to finance, and lack of capacity (technical and policy).

a. Renewable Energy

For renewable energy, the most significant barriers to increase deployment are access to low cost upfront capital, geographical constraints, and the existing regulatory environment.

i. Upfront Capital Support

Access to capital to cover the upfront capital costs is essential for SIDS to deploy capital-intense renewable energy installations. Because most SIDS have severe debt burdens, such financial support would need to be in form of very concessional loans or preferably grants. Many regional development banks view the relatively small size of investments in SIDS as an impediment, given that their internal control mechanisms deployed would be the same for a $1 million project as a $100 million project. This is a significant barrier to seeking concessional loans for renewable energy.

In 2010, AOSIS partnered with the Government of Denmark, the World Bank and UNDP to launch SIDS DOCK, an initiative designed to facilitate a transition to low-emission, climate-resilient development paths by connecting small island developing states (SIDS) with the global market for finance, sustainable energy technologies, and international carbon markets. In March 2014, SIDS DOCK partnered with the Government of Austria and UNIDO to establish a network of regional Centers for Renewable Energy and Energy Efficiency in SIDS. The ultimate goal of SIDS DOCK is to increase energy efficiency by 25% from a 2005 baseline, to generate a minimum of 50% of electric power from renewable sources and a 20-30% decrease in conventional transportation fuel use by 2033 across small island developing states. ….

ii. Geographical constraints

SIDS are often also geographically constrained. Singapore, like most small island states, is highly dependent on imported fossil fuel to power its economy, and has little or no hydro, geothermal, or wind resources. Notwithstanding these

constraints, Singapore is encouraging adoption of solar PV and investing in innovative RE technology, partnering with industry in applied clean energy research through the Energy Innovation Programme Office.
The small market sizes of SIDS mean that not only do they have little access to renewable energy technologies domestically, but they have little domestic capacity to either install or maintain renewable energy. Requiring off-island expertise increases both the upfront and ongoing costs of renewable energy installations, making them much less competitive compared to fossil fuel energy.

iii. Existing Regulatory Structure

Finally, on a number of islands, the current regulatory structure gives a monopoly over power generation to off-island private companies. Such companies have severely limited the uptake of renewable energy. In 2013, Grenada proposed nationalizing the domestic energy monopoly through share purchase in an effort to allow diversity of generating sources on the national electricity grid. To overcome this barrier, both legal and financial support would be required. Legal assistance is required to draft new energy supply agreements (ESA), and to negotiate new terms for utilities. The paradigm shift from centralized to distributed generation is highly possible and desirable in the SIDS, but will require new business models for the traditional utilities and probably financial compensation for loss of standard fossil fuel assets and for perceived loss of future revenue.

Appendix 3 outlines a number of other barriers that the SIDS face in scaling up renewable energy.

b. Energy Efficiency

Like renewable energy, energy efficiency projects in small island states face a number of key barriers. The IEA has outlined common barriers to energy efficiency, including high up-front costs, a lack of awareness of energy efficiency benefits (both by investors and consumers), an institutional bias towards supply-side investments, a lack of affordable energy efficiency technologies suitable to local conditions, and insufficient capacity to identify, develop, implement and maintain energy efficiency investments.

These barriers can be more acute in small island contexts, due to small market size, geographic isolation, and a lack of access to technology and financing. The 2013 Pacific Energy Summit, for example, was designed to attract investors and development partners to fill the funding gap for renewable energy and energy efficiency projects in Pacific Island states. The capacity to transform energy efficiency targets into policy action and implementation has also been highlighted as a barrier.

Appendix 1 – Chart of Select Renewable Energy Policies in the Islands

Country	Target / program
Antigua and Barbuda	• Common interconnection requirements and a common interconnection process for non-fossil fuel generating facilities up to 50kW, with a target of 15% of electricity demand being met through distributed non-fossil fuel generation (2011); • Waiver of import duty on renewable energy and energy efficiency equipment (2011);
Barbados	• Increase the share of economically viable renewable energy in Barbados' energy mix, with an indicative target of about 29 percent of all electricity consumption to be generated from renewable sources by 2029;
Belize	• National Energy Policy Framework 2011 with specific RE goals and strategies;[3]
Cook Islands	• National target to have renewable electricity on six islands by 2015, and all islands by 2020. Key to achieving this target is the roll out of PV and mini-grids across the Cook Islands. The Government is currently seeking funding for a number of such projects;[4]
Federated States of Micronesia	• National target of 30% renewable electricity by 2020; • Renewable energy development from wind and PV underway or proposed;[5]
Fiji	• National Energy Policy 2013 covering seven strategic areas: Governance and Institutional Arrangement, Grid-Based Power Supply, Rural Electrification, Petroleum and Biofuels, Renewable Energy, Transport and Energy Efficiency. Target of 100% access to electricity by 2020;
Guyana	• Guyana Energy Policy and Guyana Power Sector Implementation Plan - policies and measures for reducing dependence on importation of fossil fuels;
Jamaica	• Mandated use of bioethanol blended fuel for motor vehicles in 2008; • Established the Centre of Excellence for Renewable Energy in 2006. Renamed the Renewable Energy and Energy Efficiency Department in 2012; • National Energy Policy 2009-2030 includes a goal of 20% of all energy being renewable by 2030;
Kiribati	• National Energy Policy 2009 including a number of RE policies (e.g. strengthening RE technologies for outer islands and rural electrification, strengthening collaboration with development partners to advance RE programs, replicating successful solar programs, creating incentives for use of RE (taxes, duties and tariffs)); • Fossil fuel reduction target by 2025 - The target is focused on the following sectors; 1. South Tarawa 45% (23% RE and 22% EE 2. Kiritimati Island 60% (40% RE and 20% EE)

[3] National Energy Policy Framework 2011: http://www.iea.org/media/pams/belize/EnergyPolicyFramework.pdf

[4] Pacific Energy Summit *Pacific Energy Sector Profiles* (March 2013), 6-7.

[5] Pacific Energy Summit *Pacific Energy Sector Profiles* (March 2013).

	3. Rural public infrastructure 60% (40% RE and 20% EE *>Southern Kiribati Hospital and Ice plants* 4. Rural public and private institutions 100% (100% RE) *>Boarding Schools, Island Council, private amenities and households.*
Maldives	• National Energy Policy and Strategy 2010, which aims to strengthen management capacity of energy sector, promote RE technologies, adopt appropriate pricing policies for the energy sector, and increase national energy security.
Marshall Islands	• National Energy Action Plan and National Energy Policy 2009 set the following targets: To achieve 100% of urban electrification and 95% of rural electrification; To generate 20% of electricity from domestically based renewable energy technologies by 2020; To decrease fossil fuel consumption by 40% by 2020; To reduce energy losses by 20% by 2015.
Mauritius	• Small scale distributed generation (SSDG) feed in tariff / net metering scheme 2010 to support deployment of 2MW of new SSDG electricity generation; • Maurice Ile Durable 2009, establishes an MID Fund and carbon tax on fossil fuels to finance renewable energy and energy efficiency projects;
Nauru	• Nauru Energy Roadmap (2014). Energy sector goals include to generate 50% of electricity demand from renewable energy sources by 2020;
Niue	• Target to supply 100% of electricity from RE sources by 2020; • Currently three PV systems operating, totally 50kWp, with more planned including as distributed generation;[6]
Palau	• National Energy Policy 2010 set a target of 20% of primary energy from renewables by 2020; • Establishment of Renewable Energy Division within the local Utilities corp. • Net Metering Act 2012; • Renewable Energy Subsidy Program (RESP) through the National Development Bank of Palau; • Energy Act (currently in congress) – that will strengthen institutional arrangements for the Energy Department as a regulatory body and identify role of the National Energy Committee; • A number of RE projects are underway, including wind-monitoring towers, Grid connected PV installations, Stand-Alone solar powered street lighting and solar home systems, hybrid solar/diesel systems on outer islands and Independent Power Providers (IPP) for solar PV technology;[7]
Saint Lucia	• Target of 35% renewable electricity generation by 2020; • Participating in Carbon War Room 'Ten Island Challenge';
Saint Vincent and the Grenadines	• National Energy Policy 2009 and the Energy Action Plan 2010 targets 30% of projected total electricity output from RE sources by 2015 and 60% by 2020.
Samoa	• Energy Sector Plan 2012 to ensure Samoa reaches its target to increase renewable contribution into total energy services and generation by 10% by 2016;

[6] Pacific Energy Summit *Pacific Energy Sector Profiles* (March 2013).

[7] Pacific Energy Summit *Pacific Energy Sector Profiles* (March 2013).

Seychelles	• Energy Policy for the Republic of Seychelles 2010 – 2030 aims to diversify energy supply and achieve a 5% and 15% share of renewable energy by 2020 and 2030 respectively; • Seychelles Sustainable Development Strategy, SSDS • Energy Act 2012 • Setting up Seychelles Energy Commission, SEC, as an Electricity Regulator – SEC is currently transitioning to become a regulator. • Grid-connected rooftop photovoltaic systems project 2010 – 2014 to increase the use of grid-connected PV in electricity generation in selected main islands and smaller islands; • Tax exemptions for imported renewable energy equipment in force since 2010 – VAT Act. • Gross net-metering program for RE – consumption of electricity is offset by production from RE system. Any excess generated and fed into the grid at the end of billing period (monthly), the customer is paid 88% of the electricity production cost of the Utility. • Seychelles Energy-Efficiency and Renewable Energy Programme (SEEREP) - SEEREP is open to all household. It is a loan facility available from all the commercial banks and the Seychelles Credit Union. This loan facility is limited to SCR 100,000 per household and for use exclusively to purchase and install energy efficient home appliances, energy savings devices and renewable energy technologies. • PV Rebate scheme - This scheme is aimed to reduce the one-off cost of a PV system connected to the national electricity by providing a cash incentive of 35% to domestic borrowers upon the purchase, installation commissioning of a PV system. A second iteration of the scheme, designed to cater for commercial users, will be launched later this year.
Singapore	• Energy innovation Programme Office established in 2007 as key programme office responsible for planning and executing strategies to develop the clean energy sector; • Solar Energy Research Institute of Singapore established in 2008, and Energy Research Institute at the Nanyang Technological University (ERI@N) collaborate closely with industry to carry out application-oriented research and development; • Plans to raise adoption of solar energy in our energy system to 350 MWp by 2020, up from 15 MWp at end-2013. • SolarNova Programme introduced in 2014 aimed at accelerating solar deployment through promoting and aggregating solar demand across government agencies. •
Solomon Islands	• National Energy Policy 2007 with the long term goal of securing sustainable energy supply and supporting economic growth;

Tonga	• Tonga Energy Road Map 2010 – 2020 supports Tonga's target of supplying 50% of electricity from renewable energy sources by 2020;[8]
Trinidad and Tobago	• Renewable Energy Policy Framework 2010; • 2010 fiscal incentives to promote RE and EE, including import duty exemptions and tax credits (Finance Act No. 13 of 2010); • Collaborating with UNEP to develop a policy and legislative framework to govern RE feed-in tariffs.
Vanuatu	• National Energy Road Map 2013 – 2020 sets a target of 40% RE generation by 2015 and 65% by 2020. Also includes EE targets of 20% improvement in diesel efficiency by 2020, and the establishment of comprehensive data collection on EE;

[8] IRENA, *Pacific Lighthouses – Renewable energy opportunities and challenges in the Pacific Islands region: Tonga* (2013).

Appendix 2 – Chart of Energy Efficiency Policies in the Islands

Country	Target / program
Antigua and Barbuda	• National Energy Action Plan 2010 – 2030 and the Sustainable Energy Action Plan 2013: Strategy 1 – Energy conservation and energy efficiency;[9] • Waiver of import duty on renewable energy and energy efficiency equipment (2011).
Bahamas	• Participant in the Caribbean Hotel Energy Efficiency and Renewable Energy Action-Advanced Program launched in 2013 and funded by IDB;[10] • Eliminated tariffs on inverters for solar panels and LED appliances to ensure that more citizens would be able to afford these energy saving devices; • Energy sector reform intended to increase awareness of energy use and conservation methods and increase energy efficiency.[11]
Barbados	• Achieve savings in the country's consumption of electricity, with an indicative overall target of 22 percent savings by 2029 compared to a 'business as usual' scenario.
Cook Islands	• National Energy Policy 2003 and establishment of Renewable Energy Development Division to facilitate reliable, safe, environmentally acceptable and cost-effective sustainable energy services;[12] • Participant in Pacific Appliance Labeling and Standards program; • NZ$3.0m in development partner funding available for demand side energy efficiency projects, and initial project scoping is underway.
Federated States of Micronesia	• Goal of enhancing supply side energy efficiency by 20% by 2015 and increasing overall energy efficiency by 50% by 2020 through improved conservation and energy efficiency in all sectors of the economy and society (Energy Policy 2010); • Planned supply-side efficiency improvements through distribution and generation upgrades (Pacific Energy Summit 2013).
Fiji	• Energy Conservation and Efficiency Program involving public awareness programs, energy audits, use of energy efficient equipment and the adoption of standards and labelling for refrigerators and freezers;[13] • Currently reviewing its national energy policy and strategic action plan, including consideration of energy efficiency projects (retro-fitting buildings with EE appliances, the implementation of the Minimum Energy Performance Standards and Labeling, as well as legislation).
Guyana	• Guyana Energy Policy and Guyana Power Sector Implementation Plan - policies and measures for reducing dependence on importation of fossil fuels;

[9] Sustainable Energy Action Plan of Antigua & Barbuda, http://www.energy-strategies.org/en/projects/238-sustainable-energy-action-plan-of-antigua-barbuda

[10] IDB, "Hotel industry in The Bahamas to improve energy efficiency in hotels" (14 February 2013): http://www.iadb.org/en/news/news-releases/2013-02-14/energy-efficiency-in-the-bahamas,10334.html

[11] Hon Kenred Dorsett MP, Minister for the Environment and Housing, "Address to the Bahamas Business Outlook" (13 January 2014): http://bahamaspress.com/2014/01/15/minister-ken-dorsett-on-energy-reform-in-the-bahamas/

[12] IRENA, *Pacific Lighthouses: Renewable energy opportunities and challenges in the Pacific Islands region – Cook Islands* (2013).

[13] Department of Energy, *Energy Conservation and Efficiency*: http://www.fdoe.gov.fj/index.php/energy-security/energy-conservation-efficiency

Jamaica	• Energy Efficiency and Conservation Technical Assistance agreement signed with IDB in 2009 to identify and assess energy efficiency opportunities in the public sector. Energy Efficiency Loan Program launched in 2011, which will provide substantial savings to the Government of Jamaica through the installation of highly-efficient and energy conservation equipment to public sector buildings;[14]
Kiribati	• Target to reduce electricity generation through energy efficiency by 22 per cent by 2025; • National Energy Policy Act 2009: to promote energy efficiency and conservation through programs, measures, the use of efficient equipment and incentives; • Project to improve energy efficiency in lighting and cooling in public buildings; • Development of legislation setting energy performance standards and mandating energy efficiency labelling for certain appliances.[15]
Maldives	• National Energy Policy and Strategy 2010: Promote energy conservation and energy efficiency (Policy No 3): including through energy labelling, building codes and energy audits; facilitating participation of the private sector; awareness programs; and the utilization of waste heat from power generation.
Marshall Islands	• National Energy Policy 2009 sets the following targets: improved efficiency of energy use in 50% of households and businesses and 75% of government buildings by 2020; and a 20% efficiency improvement in transportation sector fuel use by 2020;[16] • PV/diesel hybrid energy systems project, involving aggressive demand-side management to reduce energy use and comprehensive supply-side management to improve efficiency in power conversion and delivery (Pacific Energy Summit 2013).
Nauru	• Nauru Energy Efficiency Action Plan 2008 – 2020 and the 2009 National Energy Policy Framework; • Currently developing energy road map to plan investments in the renewable energy and energy efficiency, including installation of pre-paid electricity meters, upgrade of the existing distribution network, replacement of existing street lighting with EE solar powered lights, training workshops on energy auditing, school campaigns and social media advertising.

[14] IDB, JA – L1025: Energy Efficiency and Conservation Programme: http://www.iadb.org/en/projects/project-description-title,1303.html?id=ja-l1025

[15] Secretariat of the Pacific Community "Legislation on standards and labeling of appliances under development in Kiribati" (10 June 2013): http://www.spc.int/edd/fr/section-01/energy-overview/energy/222-legislation-on-standards-and-labelling-of-appliances-under-development-in-kiribati

[16] IRENA, *Pacific Lighthouses: Renewable energy opportunities and challenges in the Pacific Islands region – Republic of the Marshall Islands;* see also Secretariat of the Pacific Community "Marshall Islands' energy future focuses on 'Energy for All'" (30 January 2014): http://www.spc.int/edd/fr/section-01/energy-overview/energy/248-marshall-islands-energy-future-focusses-on-energy-for-all

Niue	• Energy Policy and Energy Action Plan 2005 commitment to energy efficiency. Aggressive renewable energy and energy efficiency measure can save up to 25% of diesel fuel used for electricity generation;[17] • Participant in the Low Carbon Islands project launched in 2013 to encourage households to be active participants in the market for renewable energy and energy efficient products; • Energy efficiency projects include supply and demand side management and LED streetlights and LED light bulbs (Pacific Energy Summit 2013).
Palau	• National Energy Policy 2010 includes improvement of energy efficiency in all sectors of the economy; with target of 30% energy efficiency through supply side and demand side management by the year 2020; • Palau Energy Conservation Strategy (PECS) 2007; • Energy Efficiency Action Plan (EEAP) 2008; • Energy Efficiency Subsidy Program (EESP) through National Development Bank of Palau (focus on new home construction); • Retrofitting Energy Efficiency Subsidy Program (RETRO-EESP) through National Development Bank of Palau (focus on existing household EE renovations); • Pacific Appliance Labelling & Standards (PALS) program; • Energy Act (currently in congress) – that will strengthen institutional arrangements for the Energy Department as a regulatory body and identify role of the National Energy Committee; • Network extension projects to provide improve supply side efficiency and grid stability;
Papua New Guinea	• Port Moresby grid reinforcement project to improve supply side efficiency;
Samoa	• Samoan Energy Sector Plan; • Identified energy efficiency measures could reduce total electricity consumption by 9% and peak demand by 1.6MW;
Seychelles	• Energy Policy for the Republic of Seychelles 2010 – 2030 • Seychelles Sustainable Development Strategy, SSDS • Energy Act 2012 • Setting up Seychelles Energy Commission, SEC, as an Electricity Regulator – SEC is currently transitioning to become a regulator. • Promotion and Up-scaling of Climate-resilient, Resource Efficient Technologies in a Tropical Island Context Project 2014-2018 - The project will address several barriers to greater use of energy efficiency in buildings, including lack of an enabling policy framework, lack of financial tools, lack of information and awareness, and lack of vocational training and after-sales support. • Tax exemptions for imported energy efficient equipment/devices in force since 2010 – VAT Act. • Seychelles Energy-Efficiency and Renewable Energy Programme (SEEREP) - SEEREP is open to all household. It is a loan facility available from all the commercial banks and the Seychelles Credit Union. This loan facility is

[17] IRENA, *Pacific Lighthouses: Renewable energy opportunities and challenges in the Pacific Islands region – Niue* (2013).

	limited to SCR 100,000 per household and for use exclusively to purchase and install energy efficient home appliances, energy savings devices and renewable energy technologies.
Singapore	• Goal of 80% of buildings certified under the Green Mark certification by 2030; • Energy Conservation Act 2013: introduced mandatory energy management practices for large energy users in the industry sector in April 2013; • • Energy Efficiency Programme Office set up in 2007 to promote and facilitate the adoption of energy efficiency in Singapore.
Tonga	• Tonga Energy Roadmap coordinates all renewable energy and energy efficiency projects; • Supply side energy efficiency improved to reduce total system losses from 19 to 14%; • Identified energy efficiency measures could reduce total electricity consumption by 12% and peak demand by 1.3MW; • Planned network upgrades to improve supply side efficiency;
Vanuatu	• Developing National Energy Road Map • Identified energy efficiency measures could reduce total electricity consumption by 10% and peak demand by 1.3MW.

Appendix 3 – Possible barriers to the development of renewable energy and energy efficiency projects in SIDS[18]

1. Technical Barriers

1.1 Natural Conditions

- ***Land use competition on islands***
  Land area is limited on islands, leading to competition between RE projects and e.g. tourism or agriculture => land is getting expensive for RE.
- ***RE impact on landscapes and ecosystems***
  RE projects may affect ecosystems (e.g. hydro power => rivers, wind power => birds). Also noise and visual impacts are considered here.
- ***Natural disasters***
  Natural disasters (e.g. Hurricanes, flooding, earthquakes) increase the risk of destruction of RE plants.
- ***Lack of evidence-based assessment of RE potentials***
  Evidence based analyses on the RE potentials and cost effectiveness of different RE technologies are missing (e.g. comparison of cost, feasibility, levelized cost of electricity) => true potential of REs remains uncertain.

1.2 Technical Constraints

- ***Lack of technical expertise and experience***
  Experience and knowledge at the operation side is missing, especially for complex high share renewable energy supply systems (e.g. electrical engineer with RE experience).
- ***Low availability of RE technologies***
  Non-existence of local manufacturers leads to maintenance issues, spare parts are hard to organise; existing foreign technologies are not adapted to SIDS needs.

1.3 Infrastructure

- ***Inappropriate transport and installation facilities***
  Lack of appropriate facilities (ports, roads) for transport and installation of RE technologies (e.g. heavy machinery, high cranes).
- ***Unsuitable transmission system / grid stability issues with decentralised RE***
  Lack of grid stability infrastructure to include fluctuating RE; transmission capacities are often insufficient to handle distributed RE power generation.

2 ECONOMIC BARRIERS

2.1 Price/cost

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[18] This list is based on the ongoing research work of Philipp Blechinger (Reiner Lemoine Institut gGmbH and TU Berlin) for his dissertation. It is accepted for publication at the Symposium: UC Berkeley, April 10 – 12, 2014 Innovating Energy Access for Remote Areas: Discovering untapped resources under the title: K. Richter and P. Blechinger, Barriers and solutions to the development of renewable energy technologies in the Caribbean, 2014.

- ***High initial investments***
  RE require high initial costs compared to operational expenditures; investment in technology itself is expensive compared to conventional power plants; high exploration costs.
- ***High transaction costs***
  The shift from conventional to renewable power generation leads to transaction costs - for many small units they are very high per kWh (e.g. lack of experience in evaluating and operating RE projects => net present values are not as high as possible, new supply chains and networks have to be created).
- ***Diseconomy of scale***
  Low absolute demand and small size of power plants leads to diseconomies of scale (e.g. transport costs per technology are high, project development costs are high for each RE project compared to the overall investment).

2.2 Financial Aspects

- ***Lack of access to low cost capital or credit***
  Due to large foreign debt and high interest rates of some SIDS, capital costs are high, which leads to a limited borrowing capacity of governments.
- ***Lack of understanding of project cash flows from financial institutions***
  Little or no funding is available from commercial banks due to a lack of understanding and/or pilot or demonstration RE projects that results in risk averseness.
- ***Lack of private capital***
  Insufficient investment and innovation from private sector. Previous projects have often been reliant on donor money.

2.3 Market Failure/distortion

- ***Utility monopoly of production, transmission and distribution of electricity***
  Barrier to market entrance for RE investors; monopolistic structures hinder competition and innovation.
- ***Small market sizes***
  Due to small market sizes new competitors have difficulties to join the energy market => barrier to competition and investment opportunities.
- ***Lock-in dilemma (conventional energy supply structures block REs)***
  The lock-in dilemma describes the situation that an existing technology cannot be substituted by the better innovation due to institutional bias and power structures of the old system => competitive RE technologies are not adopted due to the influence and power of existing conventional power supply systems.
- ***Fossil fuel subsidies and fuel surcharge***
  Conventional power systems are often subsidised or governmentally supported (e.g. high electricity tariffs due to fuel surcharge are reduced by subsidies). This results in price/competition distortions and disproportional consumer burden.

3 POLITICAL BARRIERS

3.1 Policy

- ***Gap between policy targets and implementation***
  Most SIDS have ambitious RE policy targets. Nevertheless, these RE goals are not pushing the practical implementation and a failure to meet them has no legal consequences => enforcement of targets is too weak.
- ***Lack of incentives or subsidies for RE***
  Lack of incentives for RE (e.g. governmental financed feed-in tariffs, tax reductions for RE).

3.2 Institutional Capacity

- ***Lack of formal institutions***
  Lack of specialised government departments to disseminate information and foster investment within RE; Multi-purpose ministries cannot focus on RE.
- ***Lack of RE experts on governmental level***
  Lack of experts on government level; politicians lack specialisation and RE knowledge.

3.3 Regulatory

- ***Lack of legal framework for IPPs and PPAs***
  A regulatory framework for independent power producers that secures grid-connection and return on investment for RE projects is missing on a Business to Business level.
- ***Lack of regulatory framework and legislation for private investors***
  A regulatory framework for private investors is missing to secure grid-connection and return on investment of RE projects (e.g. net-metering). Application processes are not standardised and too bureaucratic.

4 SOCIAL BARRIERS

4.1 Consumer Behaviour/ Awareness

- ***Lack of social norms and awareness***
  Acceptance and education about RE technology is missing. Full potential of REs is not understood by citizens.
- ***Lack of educational institutions***
  Lack of educational institutions (e.g. vocational training centres, colleges, universities) focusing on RE. This leads to a lack of RE experts.

4.2 Interaction Networks

- ***Lack of RE initiatives***
  Strong local initiatives pushing the implementation of REs are missing. Informal institutions are dominated by the conventional energy supply system.
- ***Lack of local/national champions/entrepreneurs***
  Lack of role models creating best practice examples by implementing REs (e.g. well-known personalities have positive advertisement and marketing effects for RE.
- ***Strong fossil fuel lobby***
  The profiteers of existing fossil fuel (conventional) energy supply system are afraid of losing market shares. Strategic sale of diesel generators and oil to

secure the conventional power supply; political agreements within PETROCARIBE bind states to buy in more oil.

4.3 Cultural

- ***Dominance of cost over environmental issues***
  Electricity is a basic need. People are highly price sensitive and outweigh environmental considerations.

4.4 Psychological/Moral

- ***Preference for status quo***
  Negative experiences with RE in the past hindering innovative projects. The existing operational status quo is preferred.