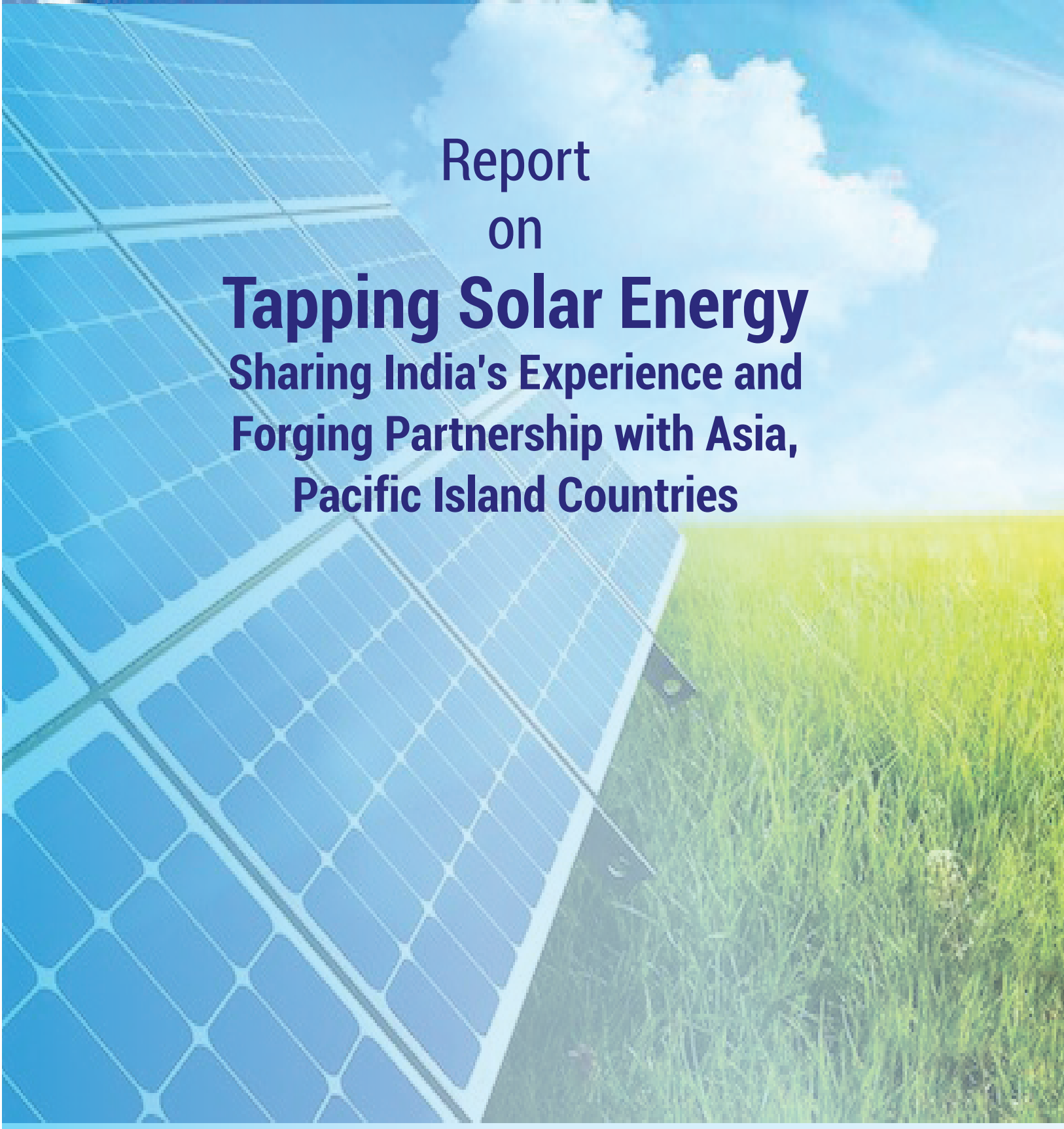

Report on Tapping Solar Energy

Sharing India's Experience and Forging Partnership with Asia, Pacific Island Countries

GDC

GLOBAL DEVELOPMENT CENTRE

Tapping Solar Energy Sharing India's Experience and Forging Partnership with Asia, Pacific Island Countries

Report of the webinar held on 17 June 2021

Background

It is increasingly well established that the Pacific Island Countries (PICs) have been seriously affected by the climate change resulting in rise of sea-levels, changes in rainfall patterns, and surging temperatures. There is an urgent need for them to adopt appropriate policies and strategies to address these issues and consider implementing renewable energy (RE) solutions like solar and wind energy. As PICs are well placed to harness the gains of RE, they can also reap the wider benefits of environmental determinants such as safe drinking water, clean air and food sufficiency apart from energy security and SDGs-driven prosperity.

As a violable alternative technology of choice, RE increasingly establishing itself firmly in India's energy mix and its emergence as the lowest cost producer not only marks the domestic shift but is also a driver of global energy transformation. It has enable India to progressively work towards achieving the right balance between economic growth and environment. The scale, size and speed of India's 'solarification' has created economies of scale and it has resulted in the emergence of a new and effective public private partnership (PPP) model.

In the recent past the cost of solar power has rapidly declined globally and it appears this downward trend is like to continue for time to come. The near-term future of this important trend is strongly visible in real terms. It is likely to present before us new possibilities for sustainable development and achieving the developmental goals set by the international community.

Key Focus of the Webinar

- Adoption of solar driven strategies, including solar micro grids, and the percentage of fossil fuels visualized to be offset by them.
- India's support and partnerships in solar energy demand assessment plan to offset fossil fuel dependence in percentage terms by 2035.
- Strategies for the creation of governmental enterprises on clean energy and their capacity building as well as access to global financing for the establishment of solar power aggregated pools among partner PICs.

- Up-skilling of local human resources in developing climate-smart innovative models combined with implementation and enforcement of such initiatives at national levels with supportive policies for sustainable financing mechanisms.
- Importance, role and engagement of private players in producing clean energy.
- Peer learning within PICs and co-creating solutions for meeting the energy demands.
- Role of South-South Cooperation and Triangular Cooperation in mitigating the challenges of PICs.

Opening Session

Ambassador Amar Sinha, Chairman, Advisory Committee, GDC highlighted that the key purpose of the interaction event was to discuss existential threat being posed by climate change to many of the island countries. He elaborated on India's experience and expertise in reducing the carbon intensity of the economy with substantial reliance on solar technology and growing emphasis on going green. He also referred to multiple initiatives taken by Government of India in this regard which could be considered to be adopted by the PIC to deal with the emerging threats.

The representative of the Solomon Islands amplified the Pacific voices and mooted the idea of working together in collaboration with Pacific Island Development Forum (PIDF) to drive investment through aggregating the ready to shovel RE projects for Green-Recovery.

The following key figures shared their knowledge and experiences at the Webinar:

- **Dr. Ajay Mathur**, Director General, International Solar Alliance (ISA), India
- **Mr. Chandra Kishore Mishra**, Former Secretary, Ministry of Environment, Forest & Climate Change, Government of India
- **Dr. Christopher Vehe**, Permanent Secretary of the Solomon Islands – Ministry of Mines, Energy and Rural Electrification (MMERE), the Solomon Islands
- **Mr. Midhun Ajaykumar***, Director of Energy, Department of Climate Change and National Resilience (DCCNR), Government Office, Nauru
- **Dr. Tevita Tukunga***, Director for Energy Department, Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications (MEIDECC), Tonga
- **Mr. Kireua Bureimoa Kaiea***, Head - Energy Department, Ministry of Infrastructure and Sustainable Energy (MISE), Kiribati

**Due to bad weather and network congestions, invitee's connections broke down*

Key Points of Presentations

Ambassador Amar Sinha

- In order to meet the twin challenges of growing per capita consumption in the country and its concerns about environment issues, India seeks a balance between the two through renewable energy.
- Since solar energy is available in abundance in the Pacific Island countries, it is both important and urgent for them to decide how to tap this free source for generating adequate renewable energy.
- Globally, the nations have been able to master the technical challenges in different degrees but they have to grapple with the challenge of finding finances. The role of International Solar Alliance (ISA) is critical in this regard as it provides excellent initial hand holding to its partners and reaches out to banks or investors for investing in such projects for higher returns.
- Regarding PICs, it is evident that there are key impediments around RE like lack of capacities, in both implementation and technical expertise. Besides there are challenges in getting private sector investment for RE.
- In order to address such impediments, PICs need to explore the modules offered under ITEC programme of India. ITEC provides both theoretical as well as practical training to mid-level officials from developing countries in order to enhance their skill sets needed to visualize, formulate and implement policies.

Mr. Chandra Kishore Mishra

- Climate change is inevitable and builds the ground for nations across the globe in responsible development. Regrettably, it seems that there is no progress on the two key elements of the Paris Declaration, namely provision of resources and transfer of technology.
- SDICs require tremendous support in several aspects and in particular renewable energy (RE) resources. Solar, being the most convenient and best available solution for power generation as a major source of renewable energy, should be tapped for the energy requirements and grid management of the Pacific Island Countries (PICs)
- The concept of Nationally Determined Contributions (NDCs) devised under the Paris Agreement in 2015, has not been able to achieve the desired goal owing to several factors. It is undeniable that to save the environment and climate change, carbon emission has to be reduced and there is a need to work towards increasing the carbon sink. However, in combating climate change, smaller countries have done much better work compared to the developed world.

- Nevertheless, to mitigate the challenges of the Indo-Pacific small island countries, there is a need for global collaboration, in terms of knowledge exchange and targeted support towards capacity enhancement, resource mobilization and technology development. Such an arrangement created between countries will lead towards optimal tapping of solar energy and ensure its utilization.
- India's Ministry of Environment, Forests and Climate Change was the first responder to come out with India Cooling Action Plan (ICAP) in March 2019 providing a 20-year perspective with actions outlined to provide access to sustainable cooling in line with the principle of responsible development, energy and resource efficiency.
- Like sustainable development, the global community should also support the need for sustainable energy consumption to achieve equilibrium.

Dr. Ajay Mathur

- It is felt that the developing countries will be able to use renewable energy as a springboard in the future because of its inherent gains. In 2015, a kilowatt hour of electricity from solar energy in India used to cost somewhere around INR 18 per kilowatt hour compared to about INR 3.50 per kilowatt hour for coal-based electricity.
- Energy efficient lighting using LED (Light-emitting diode) technology is being widely promoted in India. India's multi-pronged strategy consisted of aggregating demand, bulk procurement and building a business model in which initially LED bulb buyers were asked to pay in instalments and the monthly payment was far less than their monthly gains. Over a period of time, the price of LED bulbs dropped significantly from INR 300 in 2014 to INR 38 by 2016 thereby increasing its far greater acceptability than ever before and their market is expanding rapidly.
- Similarly, the price of electricity from solar technology dropped dramatically from about INRs.30 per kilowatt hour to INR 18 per kilowatt hour, basically due to demand aggregation on real time basis.
- Under the Electricity Act in India 2003, every State was required to procure a certain amount of renewable energy. Such legislations played a positive role in enhancing RE growth trajectory.
- The sharp decline in the rates of RE and LED highlighted the importance of technology and financial instruments providing access to large section of un-served population and thereby creating a huge market.
- It is not just about replacing an old incandescent bulb with that of LED or replacing a coal power station with a RE power station, the focus should be on the generation of new renewable energy power stations and installation of new lighting devices

like LED in places where there was no lighting earlier. For any developing country, including India, it is going to be very difficult if an overtly expensive technology is used instead of a cheaper one.

- As envisaged in the Paris Agreement 2015, India plans to have 40% of the total energy production coming from non-fossil fuels, renewable, nuclear and hydro based energy by 2030. In addition, the carbon intensity of the economy is likely to decline by 33% compared to what it was in 2005. Further, India also promised two and a half billion tons of additional carbon sinks due to sequestration as part of its commitment.
- There has been a decline in final pricing of RE because globally the investment costs have fallen and there is an increased demand. It has also declined because of the operational mechanisms that have been put into place for enabling the installation and procurement of the electricity.
- India has pledged to provide energy access to every household. In 2015, approximately 25% of the Indians did not have access to electricity but that number went down to about 1% by 2018-19. Consequently, decentralised solar applications have started playing a major role in enhancing reliability and ensuring that all households have access to electricity in India.
- The shift towards RE resources would provide support in terms of:
  - » Availability of information on real time basis to all electricity generators and electricity users minimizing information asymmetry regarding prices, performance and avoidable risks; and
  - » Capacity enhancement of grid managers to shut off other systems when RE supply is declining and immediately bring in fossil fuel-based systems in place for non-stop supply of electricity to the consumers.
- ISA works on the principle of providing physical hand holding, financial assistance and information sharing to the least developed countries and the SIDS for their first project. ISA also relies on self-sustaining model where it reaches out to banks or investors for such financial investments by offering higher returns to investors for their investments.

Dr. Christopher Vehe

- Climate change issues vary from island to island. PICs face multiple energy challenges like:
  - » Availability of limited range of indigenous energy resources;
  - » High cost of developing energy resources and extending services to remote populations;

  - » Lack of adequate energy related data and trends;
  - » Small base of skilled people to address these issues raising the issue of capacity building; and
  - » Weak bargaining position with petroleum product suppliers
- Electricity generated through the renewable sources such as solar is a natural fit for the PICs and can go a long way into addressing the main climate and development challenges related to fossil fuel.
- Nearly all the households in PICs with less population like Nauru, Palau, Cook Islands, Samoa, Tonga, and Tuvalu have better electricity coverage compared to populous islands like Vanuatu and Solomon Islands etc.
- In populous islands due to high electrification rates, coverage remains too low at about 20% of households or less. Furthermore, there are low-income households in most PICs which use little electricity because of their high costs.
- Electricity production accounts for roughly 40% of fossil fuel use in the region. The long-term dependence on fossil fuel alone has led to higher cost of electricity promoting consumers to use limited amount of electricity. As such, retail electricity tariff in PICs is among the highest in the world and there is immense scope for renewable energy in the Pacific to address climate change and high electricity costs.
- There is significant variation in the legal policy environment and effective regulatory frameworks for RE. Absence of strong institutional set up, effective policies and incentives are regarded as key obstacles in the region.
- Dramatic price reduction for solar panels, over the past 10 years has brought the cost of solar generated electricity down to the point where it is competitive with most forms of commercial generation. In the PICs, currently over 50 megawatts of grid connected solar is installed and committed in making the countries of Pacific region, one of the highest per capita users of grid connected solar in the world.
- In PICs, for grid connected photovoltaic (PV) solar development, the following stages are recommended:
  - » Stage 1: Install solar infrastructure that is widely dispersed to minimize overall variations.
  - » Stage 2: Disperse rooftop installations on government owned buildings.
  - » Stage 3: Permit customers to install privately owned roof mounted grid connected solar consistent with the buildings load without requiring increased feeder capacity.

- Currently, most PICs have few relatively large PV plants feeding electricity into the main island grids owned and operated by government entities with grants or funding via Official Development Assistance (ODA) while some of them are financed, owned and operated by private sector independent power producers. Majority of the utilities do not allow privately owned roof mounted grid connected solar PVs.
- Many PICs have adopted off-grid solar energy solutions such as standalone solar home systems and mini/micro-grids to achieve goals. Government of Solomon Islands have been carrying out solar home systems program that has installed solar home systems nationwide, electrifying 40% of the total number of households.
- The Government of Kiribati has a solar household systems program which provides electricity to over five thousand households in its outer island as compared to Solomon Islands which only can afford four thousand households. The rural electrification project implemented by Vanuatu also aims to provide solar home systems to 85% of the dispersed off-grid households.
- Small standalone systems offer the potential to catalyse a shift from privatization and centralisation of fossil fuels to decentralise and make it community owned assets. Through capacity building for operation and maintenance, this can enhance community autonomy, intense strengthening, and adaptability.
- In order to achieve scale efficiencies and manage programmatic risks, national energy access planning usually see large scale programmes, centralised planning and standardized approaches prioritized ahead of local efforts dampening the voices of the under-represented groups. This trade-offs between efficiency and empowerment must be recognized and navigated by energy departments, policy makers and program designed by CSOs, CBOs.
- Capacity building is the key component to strengthen sustainable implementation of renewable energy technologies for rural energy access initiatives in Fiji, Vanuatu, Solomon Islands and Papua New Guinea.
- The Pacific with its rich renewable energy resources has the potential for solar, wind, hydro based power generation in Fiji, Papua New Guinea, Solomon Islands, the Federal States of Micronesia and Vanuatu.
- There are various actors currently focussing on the Pacific region who all work to support the development of the framework for energy security and resilience. The new Framework for Energy Security and Resilience in the Pacific (FESRIP) 2021-2030 replaces the earlier framework of 2010-2020. In general, the focus includes actions to help the communities in the PICs to address their own energy sector priorities. This comes with a strong emphasis on improved energy sector robustness and resilience to address climate change and natural disasters, with the long-term goals

of sustainable and affordable clean energy supply, with hundred percent electricity access and low carbon transport energy for all communities in PICs.

- Recently, the Pacific region has tried to embrace the private sector as a provider of utility services including increased rural energy access. However, they have encountered difficulties on account of:
  - » Lack of innovative energy policies, gap between policy development and implementation;
  - » Perception of higher sovereign risk among potential investors;
  - » Lack of effective legal and regulatory structures
  - » Absence of national strategies to promote private sector development in energy
  - » Inadequate financing of high upfront costs for renewable energy
  - » Inadequate understanding of green energy investments in the commercial financing and banking sectors
- Historically, a considerable number of energy projects have been funded under various donor programmes under which private sector involvement figured as an objective of these interventions. However, independent evaluations of these initiatives have shown disappointing results. These models force regulators to recognize that in the long run private investors need to at least cover the opportunity costs of capital.
- The vulnerability and special characteristics of small states and weak capacity in the private sector contribute to perceived riskiness and difficulty in attracting private investment flows.
- The Pacific Islands Development Forum (PIDF) demonstrates participatory approaches to development through its advocacy work in renewable energy. Financial support received from the Government of India under it has considerably eased the process of mass adoption of solar and other renewable energy technologies by the citizens in the region.
- There is a need to encourage partnership between PICs and India through an incubator platform to drive investment through the aggregating of ready to shovel, renewable energy projects to pave the way for green recovery.
- As a way forward, a solar investment summit can be organised for PICs along with International Solar Alliance to showcase the Indian and Pacific commitment towards the development and scaling up of renewable energy in PICs.

- Government of India is welcome in order to reduce persistent vulnerabilities and build resilience since there is a need for developing a pathway that results in an improved human wellbeing and social equity while significantly reducing environmental damage.
- Developing nations interested in helping PICs should provide support in human resource development, improvement of technical knowledge and increased information dissemination. Policy advocacy by the developing nations should be taken up towards eliminating implementation challenges and convincing policy framers. Any assistance planned towards PICs should be tangible.
- While most of PICs have submitted NDCs indicating either a five- or ten-year's implementation period some of them have a longer-term vision for low emission development.
- Most of the NDCs include greenhouse gas emission reduction targets which are RE efficient embedded in their energy sector policy and action plan documents. RE based power generation is also included as a major percentage of power generation and some of them target for 100% RE based power generation in Fiji, Papua New Guinea, Samoa, Tuvalu, and Vanuatu. In addition, a few PICs have also published long-term decarbonisation strategy documents including Republic of Marshall Islands and Fiji.
- They need financial and technology-based interventions for capacity development covering financing, energy governance and proper management.

Way Forward

- Foster adoption of joint programmes with ISA on climate change action, adaptation and RE activities in GDC partner countries and PICs.
- Indian Technical and Economic Cooperation (ITEC) Programme in the MEA and NIDM could conduct both theoretical as well as practical training modules for mid-level officials from PICs in order to enhance their skill sets needed to visualize, formulate and implement policies.
- EXIM Bank, ISA and other relevant partners could consider working towards holding Solar Investment Summit for enabling access to finance for SIDS in the Indo-Pacific region to transition in favour of solar energy, including investment capital, risk capital, readiness capital etc
- GDC can consider facilitating multifaceted capacity building programmes in its targeted geographies and PICs to:

» Skill the local human resources in developing climate-smart innovative models.

» Promote peer learning within PICs and co-formulating solutions for meeting the energy demands and rural energy access.

» Share knowledge and experience with PICs on energy governance and conservation, development of resilient infrastructure to face natural disasters due to rising sea levels, promote resources mapping and encourage adoption of climate-friendly technologies.

» Encourage private sector participation in tapping the vast potential for RE in the region through innovative strategies and financing arrangements.

» Consider organizing webinars covering early warning systems, advance weather forecasting, sea level rise, data management

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About GDC

Global Development Centre (GDC) established at RIS aims to take the Indian development experience to other countries. The Centre will contribute towards evolving an alternative development paradigm anchored on the virtues of inclusiveness and sustainability. It strives to promote indigenous alternative development programmes/flagship missions advocated by India for their possible replication among its partner countries in Asia, Africa and Latin America.

GDC envisages institutionalising knowledge on India's development transformations and external cooperation. The Centre shall support India's efforts in creation of global public goods and help in establishing global relevance of India's development efforts. It will also help India learn from the experiences and development initiatives of other countries.

The broad thematic focus/verticals for research and advocacy under GDC include: Health, STI & Digital Technologies, Agriculture and Development Practices & New Frameworks.

For more information about GDC and its work programme, please visit its website: www.gdcin.org

GDC
GLOBAL DEVELOPMENT CENTRE

(Research and Information System for Developing Countries)
Core IV-B, Fourth Floor, India Habitat Centre
Lodhi Road, New Delhi-110 003 India., Tel. 91-11-24682177-80
Fax: 91-11-24682173-74, Email: dgoffice@ris.org.in
Website: http://www.gdcin.org