Challenges in Financing of Utility-Scale Clean Energy Projects in SAARC Countries

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Foreword

The energy sector of any country is critically important for its economic development and for improving the standard of living of its residents. Countries across the globe are engaged in several initiatives to achieve uninterrupted, affordable and clean energy supply for a sustainable future. Since past few years, the SAARC Member States are also witnessing transformations in their power systems and structures with a strategic thrust on promoting clean energy. SAARC Member States have shown slow but persistent efforts towards the deployment of utility scale clean energy projects. Various utility scale clean energy projects have already been initiated based on the technical and commercial considerations. Historically, multilateral development agencies and the governments have played a crucial role by funding a part of the initial project cost. However, lack of necessary and affordable long-term financing has been the major barrier in Clean Energy Technologies (CETs) adoption for full-scale transition to clean energy.

SEC has conducted this study to analyze the current investment environment, identify the challenges, and explore the required programs to mobilize funding for utility scale clean energy projects in the SAARC Member States. The study aims to enhance the availability of financial resources and to establish a conducive financial environment for deployment of utility scale clean energy projects. The study covers the power sector scenario of each SAARC Member State including the installed generation capacity, share of clean energy in energy mix, resource potential of clean energy, targets set for various CETs, regulatory and policy environment etc. The scope of work has been divided into three phases; energy scenario; the existing financial environment for utility scale clean energy projects; and recommending financial instruments and models for clean energy projects.

This study provides recommendation for SAARC Member States to overcome the challenges in clean energy project financing. Institutional investors like pension funds, insurance companies, and renewable infrastructure funds – together can play a critical role in scaling up clean energy investments. To de-risk the clean energy projects and improve the bankability, other innovative means of financing such as sovereign guarantees, partial credit guarantees, and green bonds etc. shall be explored. Also, well-functioning capital markets can reduce the private sector's dependency on bank financing. This shall be supported by aggressive policies at both central and provincial levels. Adoption of single window clearance as against seeking multiple approvals from various authorities in each SAARC member state may help faster development of clean energy projects.

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List of Abbreviations

AD	Accelerated Depreciation
ADB	Asian Development Bank
AEDB	Alternate Energy Development Board
AEPC	Alternative Energy Promotion Centre
AfDB	African Development Bank
ANREP	Afghanistan National Renewable Energy Policy
ASERD	Afghanistan Sustainable Energy for Rural Development
ASPIRE program	Accelerating Sustainable Private Investments in Renewable Energy
BoI	Board of Investment
BOT	Build - Own- Operate
BPC	Bhutan Power Corporation
BPDB	Bangladesh Power Development Board
BIFFL	Bangladesh Infrastructure Finance Fund Limited
BREB	Bangladesh Rural Electrification Board
BRT	Business Receipt Tax
BRR	Business Responsibility Report
BSEC	Bangladesh Securities Exchange and Commission
CAGR	Compound Annual Growth Rate
CBEC	Board of Excise and Customs
CDM	Clean Development Mechanisms
CDPQ	Caisse de dépôt et placement du Québec (Quebec Deposit and Investment Fund)
CEA	Central Electricity Authority
CEB	Ceylon Electricity Board
CER	Certified Emission Reductions
CERC	Central Electricity Regulatory Commission
CET	Clean Energy Technology
CIF	Climate Investment Funds
CIT	Corporate Income Tax
COP21	Conference of Parties
COVID-19	Corona Virus Disease
CPEC	China Pakistan Economic Corridor
CPPIB	Canada Pension Plan Investment Board
CPPPA	Central Public Private /Partnership Authority
CPSU	Central Public Sector Unit
CSP	Concentrating Solar Power
CY	Calendar Year

DABS	Da Afghanistan Breshna Sherkat
DDT	Dividend Distribution Tax
DESCO	Dhaka Electric Supply Company
DFI	Development Finance Institutions
DGM	Department of Geology & Mines
DGPC	Druk Green Power Corporation
DHPS	Department of Hydropower and Power systems
Disco	Distribution Company
Discom	Distribution Company
DPDC	Dhaka Power Distribution Company
DRE	Department of Renewable Energy, Bhutan
EBRD	European Bank for Reconstruction and Development
ECA	Export Credit Agencies
EE	Energy Efficiency
EFSI	European Fund for Strategic Investments
EIB	European Investment Bank
ENCON	Energy Conservation Promotion Fund.
EPC	Engineering Procurement and Construction
ESG	Environment, Social and Governance
ETFC	Electricity Tariff Fixation Commission
EU	European Union
EUR	Euro
EXIM	Export–Import Bank of India
FC	Financial Closure
FCCB	Foreign Currency Convertible Bond
FDI	Foreign Direct Investment
FiT	Feed-in-Tariff
FPO	Follow-on Public Offer
FVCI	Foreign Venture Capital Investor
FY	Fiscal Year
GBI	Generation Based Incentives
GBP	British Pound
GCF	Green Climate Fund
GDP	Gross Domestic Product
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHS	Greenhouse gases
GIB	Green Investment Bank

GJ	Gigajoule
GoB	Government of Bangladesh
GST	Goods and service tax
GW	Giga Watt
GWh	Giga Watt per hour
IBRD	The International Bank for Reconstruction and Development
ICT	Information and Communication Technology
IDA	International Development Association
IDCOL	Infrastructure Development Company
IDCs	Island Development Committees
IDEA	Institutional Development for Energy in Afghanistan
IFC	International Finance Corporation
IFI	International Financial Institutions
IMF	International Monetary Fund
INDC	Intended Nationally Determined Contributions
INR	Indian Rupee
InVITs	Infrastructure Investment Trusts
IPO	Initial Public Offering
IPP	Independent Power Producer
IREDA	Indian Renewable Energy Development Agency Limited
IRENA	International Renewable Energy Agency
JICA	Japanese International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau
kW	Kilo watt
kWh	Kilo watt hour
LC	Letter of Credit
LCOE	Levelized Cost of Electricity
LECO	Lanka Electricity Company (Private) Limited
LKR	Sri Lankan Rupee
LoS	Letter of Support
MAA	Ministry of Atoll Administration
MDB	Multilateral Development Banks
MEE	Ministry of Environment and Energy
MEEW	Ministry of Energy, Environment and Water
MEW	Ministry of Energy and Water
MHP	Micro Hydro Power
MIGA	Multilateral Investment Guarantee Agency
MNRE	Ministry of New and Renewable Energy

MOE	Ministry of Economy
MOEA	Ministry of Economic Affairs
MOF	Ministry of Finance
MoPNG	Ministry of Petroleum and Natural Gas
MoU	Memorandum of understanding
MPEMR	Ministry of Power, Energy and Mineral Resources
MRRD	Rural Rehabilitation and Development
MW	Mega Watt
NACC	Nepal Alliance for Clean Cook stoves
NAMAs	Nationally Appropriate Mitigation Activities
NBFC	Non-Banking Finance Corporation
NBFI	Non-Banking Finance Institution
NCEF	National Clean Energy Fund
NDB	New Development Bank
NDC	Nationally Determined Contribution
NEA	Nepal Electricity Authority
NEPRA	National Electric Power Regulatory Authority
NGO	Non-Government Organization
NIFRA	Nepal Infrastructure Bank Ltd.
NISE	National Institute of Solar Energy
NMMs	New Market Mechanisms
NPA	Non-Performing Assets
NREL	National Renewable Energy Laboratory
NTPC	National Thermal Power Corporation limited
O&M	Operation & Maintenance
OECD	Organization for Economic Co-operation and Development
OTC	Over the Counter
pa	per annum
PBS	Pali Bidyut Samities
PCG	Partial Credit Guarantee
PCI	Participating credit institutions
PE	Private Equity
PFC	Power Finance Corporation
PIU	Project Implementation Unit
PKR	Pakistani Rupee
POs	Participating Organizations
POSIED	Preparing Outer Islands for Sustainable Energy Development
PPA	Power Purchase Agreement

PPIB	Private Power & Infrastructure Board
PPP	Public Private Partnership
Project DD	Project Due Diligence
PSMP	Power System Master Plan
PUCSL	Public Utilities Commission of Sri Lanka
PV	Photovoltaic
PwC	Pricewaterhouse Coopers
RE	Renewable Energy
RECC	Renewable Energy Coordination Committee
RED	Renewable Energy Department
REEEP	Renewable Energy and Energy Efficiency Programme
RESCO	Renewable Energy Service Company
RET	Renewable Energy Technology
RGoB	Royal Government of Bhutan
RPO	Renewable Purchase Obligations
RPSSGP	Rooftop PV and Small Solar Power Generation Programme
RUMS	Rewa Ultra Mega Solar
SAARC	South Asian Association for Regional Cooperation
SAEF	South Asia Economic Focus
SASEC	South Asia Sub-regional Economic Cooperation
SBC	Sadharan Bima Corporation
SBP	State Bank of Pakistan
SCCI	Swedish Chamber of Commerce
SDF	SAARC Development Fund
SEBI	Securities and Exchange Board of India
SEC	SAARC Energy Centre
SECP	Securities and Exchange Commission of Pakistan
SEF	Sustainable Energy Finance
SERC	State Electricity Regulatory Commission
SEZ	Special Economic Zone
SHS	Solar Home System
SIDBI	Small Industries Development Bank of India
SLSEA	Sri Lanka Sustainable Energy Authority
SPV	Special Purpose Vehicle
SREDA	Sustainable and Renewable Energy Development Authority
SREF	Small-scale Renewables Financing Facility
SREP	Small Scale Energy Project
SSEP	Sindh Solar Energy Program

STELCO	State Electric Company
T&D	Transmission and Distribution
TWh	Tera-Watt Hour
UK	United Kingdom
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
USD	United States Dollar
VAT	Value Added Tax
VC	Venture Capital
VGF	Viability Gap Funding
WtE	Waste to Energy

Executive Summary

The energy sector of any country is critically important for its economic development and for improving the standard of living of its residents. Countries across the globe are engaged in several initiatives to achieve uninterrupted, affordable and clean energy supply for a sustainable future. The world has entered an era, where the nexus between energy and climate change is slowly becoming the focal point during the strategy and policy formation for energy sector interventions. The SAARC Member States have also witnessed transformations in its power systems and structures with a strategic thrust on promoting clean energy in the past few years.

The SAARC Member States have seen noticeable economic growth in the Fiscal year (FY) 2018 and FY 2019. However, due to the pandemic COVID -19, the GDP projection, for 2020, is revised from 4.1% growth (April 2020) to 3.0% contraction (revised in June 2020) for the region. Also, the inflow of foreign direct investment (FDI), a catalyst for economic growth in the developing countries and which can accelerate the growth of priority sectors like power, infrastructure, retail, etc., has increased at a Compounded Annual Growth Rate (CAGR) of around 15% in last three years in the region.

As the use of conventional sources to generate electricity is constantly being discouraged, the need to procure electricity from clean energy sources becomes inevitable to meet the increasing demand for electricity amongst the SAARC Member States. The SAARC Member States accommodate around 22% of world's population. Though available in abundance across the region, clean energy sources have not been efficiently tapped due to multiple challenges and constraints – financing being the major one.

SEC has commissioned this study in order to analyze the current investment environment, identify the challenges, and explore the required programs to mobilize funding for utility scale clean energy projects in the SAARC Member States; aiming to enhance the availability of financial resources and to establish a conducive financial environment for deployment of such projects. This report covers the power sector scenario of each SAARC Member State including the installed generation capacity, share of clean energy, potential of clean energy sources, targets set for various Clean Energy Technologies (CETs), regulatory and policy environment etc. The scope of work has been divided into three phases; Phase I: Energy Scenario; Phase II: Analysing the existing financial environment for utility scale CET projects; and Phase III: Recommending financial instruments and models.

Section 2 of the report reviews the current status of CETs in SAARC Member States. Bangladesh and Maldives are highly dependent on the conventional energy sources such as natural gas-based power plants and diesel generators respectively. However, India, Pakistan, and Sri Lanka are relatively diversified in terms of their installed generation capacity. Nepal and Bhutan, due to their Himalayan terrain, mainly source their power need through hydro power generation. Bhutan, being the electricity surplus nation, exports its excess generation to the neighbouring countries; especially India. Afghanistan has relatively low installed generation capacity than its demand and imports around 77% power from neighbouring counties.

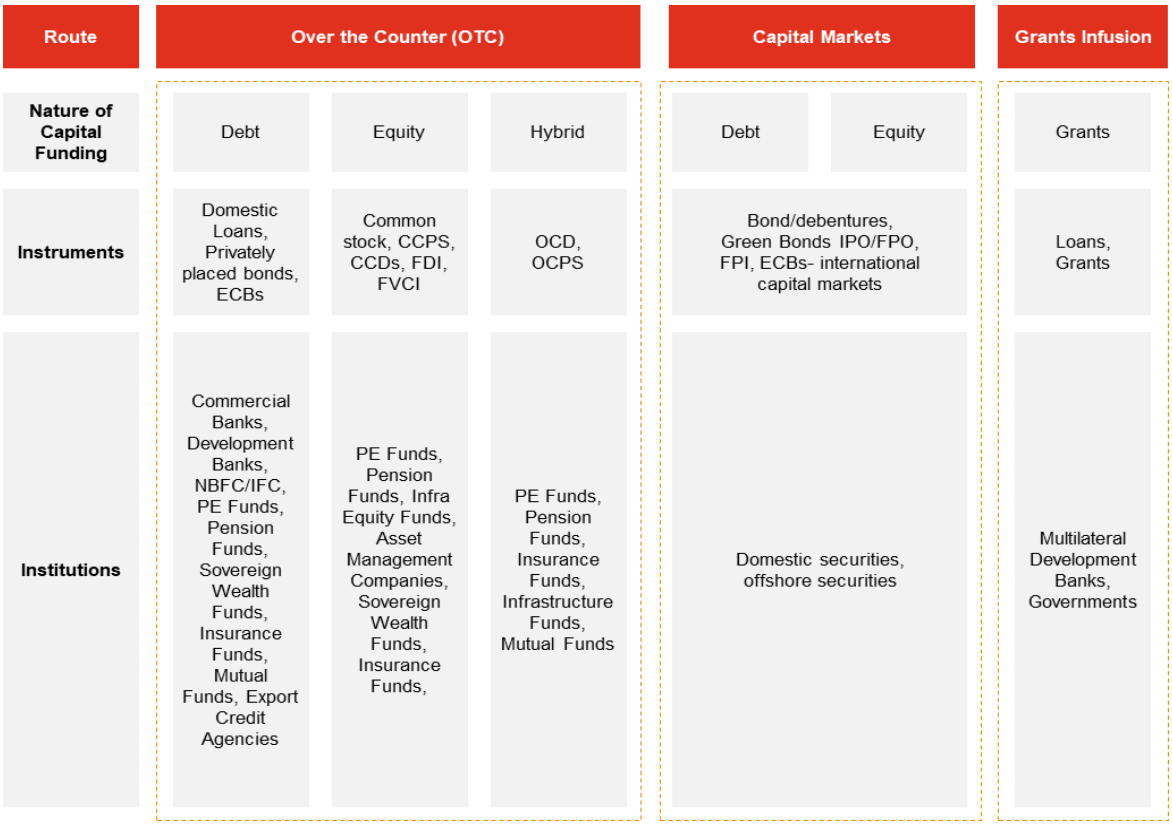
There is a huge potential of clean energy power in the SAARC Member States as discussed in Chapter 42. The Member States have shown slow but persistent efforts towards the deployment of utility scale clean energy projects. Between 2015 and 2019, Maldives has deployed clean energy projects with the highest CAGR of 20.1% followed by India at a CAGR of 10.3%. Other countries like

Bangladesh, Bhutan, Nepal and Pakistan have shown CAGR between 5% to 10%; while Afghanistan and Si Lanka have shown CAGR of less than 5%.

Except Nepal and Bhutan, other SAARC Member States have exhibited focused investments primarily in solar followed by wind technology. This is in line with the global investments, where due to maturity and scale, solar PV and onshore wind have been amongst the most lucrative technologies, compared to other technologies.

Chapter 3 of the report addresses the financing environment for a clean energy project including multiple routes of financing, institutions involved and their return expectations.

Figure 1: Financing Environment



The gap analysis and challenges of each SAARC member state related to financing of clean energy projects are covered in chapter 5. Countries have been divided into three categories (low, medium and high) to represent conducive financial environment based on the local conditions such as:

- Market size, sustainability and returns
- Financial channels, institutions and tools
- Taxation and other qualitative parameters

The detailed framework used for the said categorization is explained in Appendix A.1. The “low” category reflects that the country is lacking on the specific parameter of evaluation and requires further interventions for improvement. On the other hand, “High” category reflects that the country is relatively matured on the specific parameter of evaluation.

Based on a study of clean energy implementation targets and project pipelines, required investments and current financing environment, the utility scale clean energy projects in SAARC

Member States continue to face multiple challenges in relation to the project financing. India and Bangladesh are facing financial stress on the domestic banking system due to increasing non-performing assets. Nepal and Bhutan are still largely dependent on funds from the governments and grants from the MDBs. Despite having huge CET potential, Afghanistan has not yet established favourable regulatory and policy environment to promote investments in country's CET sector. Due to its relatively small banking system, Sri Lanka and Maldives are facing liquidity crunch to fund large utility scale CET projects. The report identifies the key areas to focus upon, in order to ease out the challenges in financing of the projects and push the development of the sector.

1. Push for Clean Energy Policies, Institutional and Regulatory Environment

A well-designed holistic policy helps to accelerate the journey of each CET from R&D to commercialization. SAARC Member States should develop comprehensive policies dedicated to CETs at both central and provincial levels and update them from time-to-time.

Based on the existing environment of CET implementation, all SAARC Member States are advised to explore a single window clearance for any CET project as against the multiple approvals from various authorities in order to accelerate implementation process and increase faith of foreign investors in the CET sector. Also, policy advocacy for other functions of the overall power sector like transmission, distribution, trading, etc. catalyse the implementation of CETs.

Afghanistan, Nepal, Sri Lanka and Pakistan should focus on implementing the power sector reforms soon. Improved policies to adopt open access across the country in India, Bangladesh, and Pakistan will further increase the penetration of CETs. Pakistan, Afghanistan and Bangladesh should explore favourable policies for promoting Islamic Banking for CET funding. Especially for Maldives, the government should explore to reduce the subsidy expenditure incurred towards the public utilities for the purchase of imported fuel and reallocate the fiscal savings towards CET developments. In Nepal and Bhutan, policies such as net metering and incentive mechanism should be introduced to promote distributed generation in the country, considering the terrain and limited scope of large scale non-hydro projects.

2. Exploring Alternative Innovative Means of Financing

CET projects in emerging countries are often constrained by real or perceived investment risks. To de-risk the CET projects and improve the bankability, SAARC Member States shall explore other innovative means of financing such as sovereign guarantee, partial credit guarantee, InvITs, green bonds etc. Section 6.2.2 summarises these tools and the potential impact of such innovative tools for financing CET projects. The categorization represents the impact of four identified innovative tools in each SAARC member state on a high to low scale based on the existing financing environment and their immediate benefit in availing financing for CET projects.

3. Increasing the Penetration of SAARC Development Fund Across SAARC Member States

SDF has approved USD 60 million of debt to four projects in Nepal and Sri Lanka. SDF may increase its investment horizon to other Member States in clean energy projects.

4. Strengthening Financing Institution to Increase the Funding in CET sector

Institutional investors, such as pension funds, insurance companies should be strengthened to fund the infrastructure projects across SAARC Member States. For countries like Bangladesh, Sri Lanka, and Bhutan, where domestic pension funds corpus is too small to cater the investment, policies need to be developed on central level to include private employees into the central pension funds,

and thus to increase investment in pension funds. For Afghanistan, Bhutan and Nepal, credit rating may be assigned by global rating agencies like Fitch, Standard & Poor, etc., which will help the stakeholders in reducing the country's borrowing costs.

In India, Government and Reserve Bank of India (RBI) should focus on addressing underlying challenges of Asset-liability mismatch and increasing Non-performing asset (NPA) in infrastructure space and promote private investments in new technologies like energy storage, hybrid solar-wind power projects, etc. by offering subsidies/reliefs for ventures/partnerships/joint ventures. In Pakistan, Securities and Exchange Commission of Pakistan (SECP) and the State Bank of Pakistan (SBP) should promote PE and pension funds (both domestic and foreign) and explore relief measures like tax benefits, default guarantee to CET projects, etc. Also, SBP and the government should promote the adoption of Islamic banking for clean energy projects on large scale. *Sri Lanka,* can explore to establish tie-ups/ arrangements with the EXIM banks of neighbouring countries or with the SDF and develop policies to facilitate the establishment of a specialized market intermediaries such as fixed-income brokerage houses, bond research analysts, or credit rating agencies to facilitate secondary market transactions in bonds.

Similar to Power Finance Corporation (PFC) in India, Bangladesh Infrastructure Finance Fund Limited (BIFFL) and Infrastructure Development Company (IDCOL) in Bangladesh, Nepal Infrastructure Bank Ltd. (NIFRA) in Nepal. Etc., developing of financial institutions may be evaluated in other SAARC Member States like Afghanistan, Bhutan, Nepal, and Pakistan to ease the financing in overall clean energy projects.

5. Developing Capital Market to Increase the Fund Availability for SAARC Member States

Well-functioning of capital markets will strengthen the long-term financing for infrastructure projects, thus reducing the private sector's dependency on bank financing. None of the capital markets in SAARC Member States is highly developed. Also, the existing Bond market is largely dominated by government securities and rarely traded in secondary market. Capital Markets in India and Maldives fall in medium category while in other countries, it is underdeveloped.

To develop the capital market in countries like Afghanistan, Bangladesh, Bhutan, Nepal, Pakistan and Sri Lanka, the following recommendations are provided:

- Securities Regulators should prefer IPO book-building procedures and IPO lock-in-period should be reduced to 1 to 2 years for licensed private equity investors.
- Separate Internal Control Division to be formed within the Securities and Exchange Commission.
- Securities Regulator should issue risk-based capital rules for intermediaries and set clear milestones and a timeline for rectification for undercapitalized intermediaries. Regulators should also adopt and initiate the implementation of a capital restructuring plan for intermediaries.
- Securities Regulator should install updated ICT system for electronic reporting by listed companies and intermediaries; electronic internal communication system and case-tracking system for investigations and enforcement cases.
- Securities Regulator should issue rules for the operation of exchange traded funds. Policy related to short-sale shall also be introduced to mainstream short-selling as typical market practice by securities dealers.

6. Increasing Tax Incentives to Various Stakeholders Across Renewable Power Value Chain

Tax incentives may be given to attract the institutions, corporates, investors and stakeholders across power value chain in CETs; and hence, increase the investment in CETs. Also, dis-incentivizing the fossil fuel will further promote the investment in renewables. Similar to Nepal, India, Bangladesh, other SAARC Member States should also incentivize the clean energy business by giving tax exemption. Additionally, in countries like Afghanistan, Bhutan Maldives, Nepal, Pakistan and Sri Lanka, to further promote the investment, complete tax holidays for large scale clean energy utilities, tax exemption or reduction in tax on generation revenue, interest payable against foreign loans, royalties, technical know-how and technical assistance shall be provided.

7. Enhancing Intra-regional Cooperation Among SAARC Member States

Scaling of RE sector in each SAARC Member State has been due to the implementation of attractive polices, support from regulatory framework that promotes private investment, etc. SAARC Member States should collaborate with relevant departments of each country in the field of solar, wind, hydro, biomass respectively to develop and enact effective policy and supportive regulatory mechanism for their countries. Also, intra-regional trainings and seminars are to be conducted to strengthen and enhance the capability building of professionals, regulators, authorities and students.

1. Introduction

1. Introduction

1.1. Background

The South Asian Association for Regional Cooperation (SAARC) was created on 8th December 1985. Presently, the South Asian region consists of eight member countries – Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. It also has nine observer countries – Australia, China, EU, Iran, Japan, Mauritius, Myanmar, Republic of Korea, and the USA. For the study in this report, only member countries have been considered as the focus area.

SAARC is a pool of countries, ranking in population from among the smallest (Maldives) to one of the largest (India) in the world. The region has a high population density, with 22% of world's population occupying only 4% of the world's land mass and relatively high levels of poverty.

Economic Growth in the Region

According to the "Asian Development Outlook" published by the Asian Development Bank, the SAARC Member States have seen noticeable economic growth in the FY 2018 and FY 2019. However, they experienced the weakest growth in the recent history in FY 2019, in line with the global downward growth trend in investments and trade.

Since December 2019, Corona Virus Disease (COVID-19) has continued to spread globally and across countries. Many governments across the globe and in Asia have imposed lockdowns of varying stringency and duration between February 2020 and June 2020 as a containment measure. These measures have declined the mobility of people and disrupted the economic activities. However, from May 2020, the containment measures have started to ease, and economic activity has resumed somewhat in many SAARC Member States.

Table 1: GDP Growth in the SAARC Member States (2018 – 2021) (%)

GDP Growth (%)	Year	2018	2019	2020 (P)		2021 (P)	
				April	June (R)	April	June (R)
South Asia		**6.6**	**4.3**	**4.1**	**-3.0**	**6.0**	**4.9**
Afghanistan	Dec-Dec	2.7	3.0	3.0	-4.5	4.0	3.0
Bangladesh	July-June	7.9	8.2	7.8	4.5	8.0	7.5
Bhutan	July-June	5.5	4.4	5.2	2.4	5.8	1.7
India	April-Mar	6.8	4.2	4.0	-4.0	6.2	5.0
Maldives	Jan-Dec	7.6	5.9	-3.0	-11.3	7.5	13.7
Nepal	Mid July	6.7	7.0	5.3	2.3	6.4	3.1
Pakistan	July-June	5.5	1.9	2.6	-0.4	3.2	2.0
Sri Lanka	Jan-Dec	3.2	2.3	2.2	-6.1	3.5	4.1

The GDP projection by "Asian Development Outlook" for 2020 is revised from 4.1% growth (April 2020) to 3.0% contraction (revised in June 2020) for the region. The projection for FY 2021 is also

revised down from 6.0% to 4.9%[1]. Table 1 indicates the outlook for all Member States.

Also, the projections for inflation have been revised marginally in June 2020 for the year 2020 and 2021 as detailed in Table 2.

Table 2: Inflation in the SAARC Member States (2018 – 2021) (%)

Inflation (%)	Year	2018	2019	2020 (P)		2021 (P)	
				April	June(R)	April	June(R)
South Asia		**3.6**	**5.0**	**4.1**	**4.0**	**4.4**	**4.5**
Afghanistan	Dec-Dec	0.6	2.3	2.3	5.0	3.5	4.5
Bangladesh	July-June	5.8	5.5	5.6	5.6	5.5	5.5
Bhutan	July-June	3.6	2.8	3.8	2.8	4.0	4.0
India	April-Mar	3.4	4.8	3.0	3.0	3.8	4.0
Maldives	Jan-Dec	-0.1	0.2	1.0	1.0	1.2	1.2
Nepal	Mid July	4.2	4.6	6.0	6.6	5.5	6.5
Pakistan	July-June	3.9	6.8	11.5	11.0	8.3	8.0
Sri Lanka	Jan-Dec	2.1	4.3	5.0	4.0	4.8	4.2

Afghanistan

In Afghanistan, transport and trade are disrupted by international border closures, and remittances fell sharply as many Afghans returned home from overseas. This fragile economy is expected to contract by 4.5% in 2020 calendar year.

Bangladesh

Bangladesh had strong growth before the pandemic, but COVID-19 has hit the export earnings, and remittances are likely to have fallen sharply in March 2020 and April 2020. GDP growth is projected to slow down to 4.5% in FY 2020 (ending 30th June 2020) but recover to 7.5% in FY 2021, due to strong manufacturing infrastructure.

Bhutan

In Bhutan, border closings affect not only tourism but also manufacturing and construction, which depend on migrant labour, raw materials and other resources from India, so the effect of COVID-19 may be greater in FY 2021 than in FY 2020 (ending 30th June 2020). GDP growth is, therefore, projected at 2.4% in FY 2020 before falling to 1.7% in FY 2021.

Nepal

In Nepal, the official advance estimate of GDP growth has been 2.3% in FY 2020 (15th July 2020), a drop by more than two-thirds of FY 2019. This is mainly because; COVID-19 has affected multiple sectors across region including construction, transport, tourism, wholesale and retail trade, and remittances.

[1] Asian Development Outlook 2020 and its revisions

Pakistan

Before COVID-19, Pakistan's economy was well on the path to recovery when a national lockdown initiated on 1st April 2020. It is projected to contract by 0.4% in FY 2020 (30th June 2020), as the outbreak restricts economic activity. Once the COVID-19 impact subsides, Pakistan will resume its efforts to address the macroeconomic imbalances and initiate structural reform. It is projected to achieve 2.0% economic growth in FY 2021.

Maldives

The Maldives has received no tourist arrivals since 27th March 2020, when visas were suspended, and all scheduled flights were cancelled. Economic growth collapsed, and the economy is expected to contract by 11.30% in 2020 calendar year.

Sri Lanka

Sri Lanka's forecast for 2020 calendar year is downgraded. Due to stringent domestic lockdown measures and the global spill over from COVID-19, the economy is projected to contract by 6.1%.

Foreign Direct Investment (FDI) in the Region

FDI is often considered as a catalyst for economic growth in the developing countries. The inflow of investments in various priority sectors like power, infrastructure, retail etc. can accelerate the economic growth via employment generation, global capital and technology transfer and so on.

The inward flow of FDI in the region and member countries is shown in Table 3 below[2]. It can be observed that the inflow into the past three years in the region has increased at a CAGR of around 15%.

Table 3: Foreign Direct Investments in SAARC Member States (Million USD)

FDI inward	2017		2018		2019	
	Million USD	Percent of World Inward	Million USD	Percent of World Inward	Million USD	Percent of World Inward
World	**1,700,468**	-	**1,495,223**	-	**1,539,880**	-
South Asia	**46,634.0**	**2.74%**	**49,851**	**3.3300%**	**55,922**	**3.63%**
Afghanistan	53.0	0.00%	119	0.0080%	39	0.00%
Bangladesh	2,152.0	0.13%	3,613	0.2416%	1,597	0.10%
Bhutan	NA	NA	6	0.0004%	7	0.00%
India	39,904.0	2.35%	42,156	2.8194%	50,553	3.28%
Maldives	458.0	0.03%	539	0.0360%	565	0.04%
Nepal	198.0	0.01%	67	0.0045%	185	0.01%
Pakistan	2,496.0	0.15%	1,737	0.1162%	2,218	0.14%
Sri Lanka	1,373.0	0.08%	1,614	0.1079%	758	0.05%

[2] Country factsheet of World Investment Report 2020 by United Nations Conference on Trade and Development

In order to keep pace with the growing demand of energy due to the rapid economic growth, the energy supply base is also required to increase substantially. In the recent years, the focus on clean energy has increased across the globe due to various much discussed reasons such as climate change, scarcity of resources, stringent regulations and environment norms – to name a few. In addition, as the clean energy technologies have achieved commercial viability and parity, these are the best solution for this energy conundrum in the coming years.

1.2. Introduction to SAARC Energy Centre (SEC)

SEC was created in 2005 through Dhaka Declaration to establish an energy ring in South Asia. It has been functional from March 2006 in Islamabad, Pakistan. SEC provides an essential element for economic prosperity of the region. It also works towards fulfilling the energy demand of the Member States. The organization is converting challenges in the energy sector into opportunities for development. It is the platform, which involves officials, experts, academia, environmentalists and NGOs to tap the potentials of cooperation in the energy sector including the development of hydropower, renewable and alternative energy, promoting technology transfer, energy trade, energy conservation and efficiency improvement in the region.

1.2.1. SEC's Role in Promotion of Clean Energy in the Region

SAARC Energy Centre through its capacity building program activities has been conducting knowledge workshops, seminars and training courses in the fields of energy, including clean energy sources. Over the years, SEC has conducted various studies across the power sector, which includes all three aspects, i.e., generation, transmission and distribution. Hence, SEC plays a crucial role in pushing the clean energy sector development in SAARC Member States.

1.2.2. SEC's Role with Respect to the Study

SEC has commissioned this study in order to understand the current investment environment in clean energy technologies, discover the challenges in financing the clean energy projects and understand the required programs to mobilize funding for utility scale clean energy projects in the SAARC Member States.

1.3. Introduction to SAARC Development Fund (SDF)

SDF was established and inaugurated in April 2010 during the sixteenth SAARC Summit held in Thimphu, Bhutan. The fund acts as the umbrella financial institution for funding the projects in SAARC Member States, which focus on economic growth, social progress and poverty alleviation in the region.

The SDF has three funding windows as below:

- Social window: Through this, SDF funds project on poverty alleviation and social/community development focusing on education; health; human resources development and rural infrastructure development.
- Economic window: SDF extends financing support to the non-infrastructural projects related to trade and industrial development, agriculture, service sector, science and technology and other non-infrastructure area.
- Infrastructure window: This is primarily utilized to fund projects in areas such as energy,

power, transportation, telecommunications, environment, tourism and other infrastructure areas.

Mandate to Facilitate Mobilization of Funding for Clean Energy

The mandate of SDF includes promotion of welfare of the people in SAARC Member States, improve their quality of life, accelerate economic growth, social progress and poverty alleviation in the region, and strengthen regional integration and cooperation through project collaboration. Strategic advantages of SDF includes:

- Umbrella financial institution of SAARC projects and programs
- Funding priority regional projects
- Harvesting synergy among SAARC Member States
- Sharing regional best practices

Contribution in Funding Clean Energy Projects

SDF has developed working relationships through the MoU with organizations like Asian Development Bank (ADB), the World Bank, UNICEF, United Nations Development Program (UNDP), and SAARC arbitration council, Small Industries Development Bank of India (SIDBI), South Asian University, and SAARC Chamber of Commerce and Industry (SCCI) to co-finance the cross-border projects and leverage resources in the SAARC Member States.

SDF has approved USD 60 million of debt to four projects under its infrastructure window; and is considering a few cross-border regional connectivity projects in renewable energy, transport, telecom and ICT[3].

Out of the four approved infrastructure projects, three (two hydropower projects and one transmission line) are in Nepal and one (Waste to Energy (WtE)) is in Sri Lanka.

1.4. Brief on Clean Energy Technologies

In 2011, the UN secretary-general launched a global campaign 'Sustainable Energy for All' to stimulate concrete international action towards granting more equitable, more sustainable and safer access to energy for all. It articulates a global vision, under which, the governments, civil society and the private sector must work together to achieve three intertwined goals by 2030.

- Ensure universal access to modern energy services
- Double the global rate of improvement in energy efficiency relative to the period 1990 - 2010
- Double the 2010 share of clean energy in the global energy mix

Each SAARC member state is unique in terms of its geography and availability of natural resources. As a result, there is a wide variation in the way the countries fulfil their energy needs. Afghanistan, a landlocked country, meets 77% of its power needs through imports; mainly from Uzbekistan, Iran, and Turkmenistan. Bangladesh produces 93.4% of its power using domestic natural gas, which

[3] Presentation on Achievements, Current Status and Future Strategic Action Plan by SAARC Development Fund, July 2020

is fast depleting and imported oil. Bhutan is an exporter of electricity with an approximately 100% of its power being produced from hydroelectricity.

India has a power generation mix of 66% thermal, 14% hydro and 18% renewable. Domestic coal has traditionally been the main source of fuel for power plants in India. However, in recent times, India is running one of the largest and most ambitious renewable capacity expansion programs in the world. Maldives, an island nation, meets all its power demand using imported oil. Nepal is rich in hydro resources due to its terrain and produces 91% of power from hydroelectricity. Pakistan's power generation mix is 65% thermal energy, 29% hydro, 3% nuclear and 2% renewable energy. Pakistan has traditionally used imported oil and domestic gas to produce electricity. Sri Lanka's power generation mix comprises of 52% thermal energy; using imported fuels, 34% hydro and 14% renewable.

Table 4 explains the potential and commercial presence of CETs in electricity generation mix in each country.

Countries like India, Pakistan and Afghanistan have also identified the potential for hybridization of clean energy sources and energy storage technologies. However, these technologies are in the nascent stage in most of the SAARC Member States, except India.

Despite having huge potential and intention to increase the reliance on CET, the growth in implementing utility scale clean energy projects is still not matured in most of the SAARC Member States. Amongst the key challenges such as higher technology costs, developing skillsets etc., a major reason attributing to the slow growth of utility-scale projects is the hindrance in securing long-term affordable finance. The key challenges in the utility scale-clean energy technologies include:

- Lack of long-term financing
- Limited experience in financing utility scale- clean energy projects
- Limited number of investment ready projects
- Regulatory and policy risk
- Lack of transmission infrastructure
- Lack of incentive program for development of utility scale- clean energy projects

Table 4: Clean Energy Technology - Potential and Commercial Presence in Each SAARC Member State

	Solar PV		Onshore Wind		Hydro		Bagasse		Waste / MSW to Energy	
Afghanistan	□	●	□		□	●	□		□	●
Bangladesh	□	●	□	●	□	●	□		□	●
Bhutan	□		□		□	●	□		□	●
India	□	●	□	●	□	●	□	●	□	●
Maldives	□	●	□	●					□	●
Nepal	□	●	□		□	●	□		□	●

	Solar PV		Onshore Wind		Hydro		Bagasse		Waste / MSW to Energy	
Pakistan	□	●	□	●	□	●	□	●	□	●
Sri Lanka	□	●	□	●	□	●	□	●	□	●

□ : Potential, ●: Commercial presence**, Blank**: Limited presence

1.5. Objective of the Study

The demand for electricity in the SAARC Member States has been steadily increasing due to rapid urbanization and industrial growth. With various factors including rising concerns over climate change, the SAARC Member States are now focusing on clean energy technologies to fulfil their future power demand. Though small-scale projects benefit the rural areas, countries can reap more benefits through the implementation of utility-scale projects, as they help cater to the needs of a larger consumer base. Also, developing utility scale clean energy projects is one of the fastest ways to reduce carbon footprints and put the respective countries on a path of a clean energy future.

Utility-scale clean energy projects such as solar PV, wind, hybrid model (solar and wind), hydro, power plant with energy storage facility, etc. are capital intensive and are typically financed by debt-heavy capital structure. The extent of infusion of debt in the capital structure largely depends upon two critical factors, i.e., borrower's creditworthiness and credit rating of the project.

To overcome the challenges in availing the financing for such utility scale clean energy projects and thus to accelerate the deployment of such projects, SEC conducted this study on "Challenges in Financing of Utility Scale Clean Energy Projects in SAARC Countries". The objective of the study is to increase the availability of financial resources and to establish a conducive financial environment for deployment of utility scale clean energy projects in the SAARC Member States.

1.6. Scope of the Study

The scope of this study is broadly divided into four phases:

- Covering the key aspects on types of clean energy technologies, mapping of these technologies in each member country and identifying the size of utility-scale projects; the report draws upon the details on the key risks and challenges associated with the technologies. The report also includes the primary utility scale projects that have been successfully implemented in the form of case studies.
- Elaborating the financing environment for utility scale clean energy projects in SAARC Member States, covering financial aspects and associated challenges at all the levels in the value chain of the projects financed after year 2012. It also includes hindrance/challenges, underlying reasons/causes (direct and indirect), and effects such challenges have on the growth/deployment of these projects.
- Need assessment of utility scale clean energy projects and their potential along with the expected deployment till the year 2030 of installed capacities of different clean energy technologies (separately for each SAARC Member State) are presented. This is followed by a discussion on what economic and other benefits are accrued from this deployment; elaborating upon the financial requirements for these future projects.

- Presenting all the parameters/aspects of a conducive financial environment required for utility scale projects based on each selected (with respect to the local conditions) clean technology in each country; detailed discussion on all the aspects at all levels (in-country and external), for each stakeholder in the chain.

1.7. Limitations of the Study

- With limited primary research, the analysis and data collection are primarily based on the public sources of information such as industry studies, journals, publications and various research databases.
- During analysis and benchmarking, reference has been made to widely acceptable norms in case the actual information is unavailable.

1.8. Methodology

The scope of work has been divided into in three phases:

Phase I: Energy Scenario

Phase II: Analysing the existing financial environment for utility scale CET projects

Phase III: Recommending financial instruments and models as detailed below in Table 5: Phase I: Energy Scenario, Table 6 and Table 7 respectively

In Phase I, the focus is on current clean energy scenario, rules and regulations and iconic projects in each SAARC Member State. Based on the potential, demand and existing country targets, the expected growth in future for large utility scale projects is also covered.

Table 5: Phase I: Energy Scenario

Phase I: Energy Scenario	
Current clean energy market scenario analysis	• Study of the clean energy current scenario, potential in future along with the demand and supply gap for primarily five technologies, i.e., solar, wind, biomass/ bagasse, hydro, and MSW/ waste to Energy in all SAARC Member States
Policies and regulations framework	• Study the regulations and policies governing the clean energy (for five technologies mentioned above) market in all SAARC Member States
Study of iconic projects	• Study of few major iconic project (for five technologies mentioned above) in brief in all SAARC Member States
Expected growth in future	• Study of the expected growth in clean energy (for five technologies mentioned above) market based on the Intended Nationally Determined Contribution (INDC) and internal targets released by respective ministries
Develop a methodology to define utility scale project	• Based on the above analysis, developing a methodology to define utility scale project, based on the size

In Phase II, the focus is primarily on current financing environment for clean energy sector in SAARC Member States. Based on the projects installed till now, the funding required to achieve the country wise planned installation by 2030, is assessed. This report also covers the existing challenges and concerns faced by the stakeholders across the value chain and primarily by

investors. Additionally, along with the economic benefits, the environment and social benefits of installing utility scale CET projects in SAARC Member States are detailed.

Table 6: Phase II: Analysing Existing Financial Environment

Phase II: Analysing Existing Financial Environment for Utility Scale Projects	
Current clean energy financing market	• Review of current financing environment in SAARC Member States to fund utility scale projects. This includes the existing financing mechanisms like clean development mechanism, renewable energy certificates, etc.
Key parameters during financing	• Identifying the key parameters considered by the financial institutions, in financing utility scale CET projects
Challenges and concerns	• Understanding the existing challenges faced by the stakeholders in the value chain, especially the investors, and assess their perspective for financing
Asses the funding requirement by 2030	• Identifying utility scale projects for the selected technologies in all SAARC Member States that are expected to be implemented by 2030 and assessing the overall funding requirement
Understanding economics utility scale CET projects	• Studying the economics of utility scale CET projects and highlight benefits accrued by countries post-deployment

In Phase III, various financial instruments have been detailed, along with the key elements in each of them, which can be used to finance utility scale projects. Based on the CET targets, macroeconomic view, economic position, inherent challenges and existing financing environment, a framework is designed to evaluate the conduciveness for CET financing in each SAARC Member State. The framework is detailed in appendix A.1.

Table 7: Phase III: Financial Model and Instruments

Phase III: Financial Instruments and Models	
Various financial instruments and investment models	• Study and understand various financial instruments and investment models to finance utility scale CET projects.
Key elements of models along with case studies globally	• Cover key elements of financing programs in each member state, debt and equity funding instruments and innovative structures along with citations/relevant global case studies
Risk and challenges in each instrument and models	• Highlight the inherent risks that they pose to the stakeholders, covering the key expectations/ returns, regulations, tools and mechanisms
Developing financial structure / model specific to each member state and final recommendation	• Based on the current and future needs, potential and targets, risk and challenges, a financial model for financing utility scale projects in each member state are developed • Highlighting the key interventions (a gap assessment) that are required for the stakeholders, with a focus on accelerating investments in such projects for all the SAARC Member States

2. Projects

2. Review of Clean Energy Projects

2.1. Review of Clean Energy in SAARC Member States

2.1.1. Market Overview of Clean Energy Projects

Installed Capacity

Country-wise details of the installed capacity of power plant and the resource mix are mentioned in Table 8[4]. Bangladesh and Maldives are highly dependent on the non-renewable (conventional) energy sources for their power demand such as natural gas-based power plants and diesel generators respectively. However, India, Pakistan, and Sri Lanka are relatively diversified in terms of their installed generation capacity. Nepal and Bhutan, due to their Himalayan terrain, mainly source their power need through hydro power generation. Bhutan, being the electricity surplus nation, exports its excess generation to the neighbouring countries, especially India. Afghanistan has relatively very low installed generation capacity than its local demand and imports around 77% power from neighbouring counties.

Table 8: Country-wise Installed Capacity (MW) in the SAARC Member States

Installed Capacity (in MW)	Year	Total Capacity	Non-renewable	Renewable			
				Hydro	Solar	Wind	Bioenergy
Afghanistan	2019	602	237	333	32		
Bangladesh	2019	21,617	21,095	230	284	3	5
Bhutan	2019	2,353	18	2,334		1	
India	2020	372,523	238,200	50,439	35,740	37,999	10,145
Maldives	2019	286	272		14		
Nepal	2019	1,289	53	1,182	54		
Pakistan	2020	39,919	27,022	9,900	1,329	1,236	432
Sri Lanka	2019	4,232	2,037	1,798	215	128	54

*Blank – Where the data is not available in public domain or utility scale projects are not available

Electricity Generation

Table 9 indicates the energy generation scenario to meet the countries' internal consumption of electricity[5]. It can be observed that despite having a decent installed capacity of renewable energy sources of electricity generation as shown in Table 8, the total percent of generation from the conventional sources is relatively higher compared to the non-conventional sources. For instance, India generated 84% of electricity from conventional sources in 2018.

[4] Statistical Profile for SAARC countries by IRENA
[5] Statistical Profile for SAARC countries by IRENA

Table 9: Source-wise Electricity Generation for the SAARC Member States (GWh)

Generation	Year	Total (GWh)	Non-renewable* (%)	Renewable (%)			
				Hydro	Solar	Wind	Bioenergy
Afghanistan	2018	1,152	16%	81%	3%		
Bangladesh	2018	74,533	98%	1%	<1%	<1%	
Bhutan	2018	6,960		100%			
India	2018	1,501,175	84%	9%	2%	4%	<1%
Maldives	2018	702	98%		2%		
Nepal	2018	4,930		98%	2%		
Pakistan[6]	2018	147,910	73%	23%	1%	2%	<2%
Sri Lanka[7]	2018	15,341	55%	42%	1%	2%	<1%

Blank represents the case where the source does not contribute in overall electricity generation
*includes thermal and nuclear power

Historical Growth in CET Deployment[8]

Table 10 indicates the growth rate for the deployment of each CET in last 5 years in each SAARC member state. The CAGR for the capacity addition between 2015 and 2019 has been arrived for the overall CET as well as for solar power, wind power, hydro power and bioenergy individually. Among SAARC Member States, Maldives has deployed clean energy projects with the highest CAGR of 20.1% followed by India at a CAGR of 10.3%. It needs to be noted that though the growth rate of Maldives is high compared to others SAARC Member States, clean energy primarily includes solar with installed capacity of 14 MW only as on FY 2019.

Table 10: 5-Year Growth (% CAGR) of CET Implementation in SAARC Member States

5-Year CAGR	Total Growth	Hydro	Solar	Wind	Bioenergy
Afghanistan	3.8%	2.5%	11.0%		
Bangladesh	6.4%		14.4%		
Bhutan	7.7%	7.7%			
India	10.3%	1.3%	44.4%	8.4%	13.3%
Maldives	20.1%		28.5%		
Nepal	8.4%	7.7%	33.0%		
Pakistan	9.8%	6.5%	42.0%	32.0%	5.3%
Sri Lanka	3.2%	1.3%	47.3%		15.7%

Note: Deployment <1% or no deployment case is represented as blank. Except Maldives, distributed clean energy

[6] Pakistan Economic Survey 2019-2020
[7] Statistical Digest 2018, Ceylon Electricity Board
[8] Renewable Capacity Statistics 2020, IRENA

implementation has not been considered for other countries.

For solar deployment, India has seen the growth rate of 44.4% in last 5 years from around 5.6 GW in fiscal year 2015 to around 35 GW in fiscal year 2019. Growth Story for Sri Lanka has been very impressive with the increase in installed capacity for solar and bioenergy projects at a CAGR of 47.3% and 15.7% respectively.

Clean Energy Potential

Each SAARC member state has a unique geography and natural resources. Table 11 briefly indicates the technical potential in terms of MW for each clean energy technology. The countries have the availability of resources to be harnessed in order to generate electricity to fulfil the demand. For instance, in an analysis, it was mentioned that if the potential in India is utilized at its optimum capacity, more than 85% of the total electricity could be generated from clean energy sources.

Table 11: Technical Potential of Select Clean Energy Technologies (MW)

Technical Potential (MW)	Hydro	Solar	Wind	Biomass/ Bagasse	Waste to Energy
Afghanistan[9]	23,000	222,000	66,000	4,000	NA
Bangladesh[10]	60	2,680	637	285	1
Bhutan[11]	26,600	12,000	760	NA	NA
India[12]	21,135	748,000	302,000	18,000	5,690
Maldives[13]	NA	24	20	NA	8
Nepal[14]	83,000	2,100	NA	NA	NA
Pakistan[15]	60,000	100,000	340,000	NA	NA
Sri Lanka[16]	NA	6,000	5,600	2,400	NA

NA: Information is not available in MW terms

Clean Energy Targets

Based on its potential, need and implementation capability, each country has identified specific targets to implement the clean energy projects in the coming five to ten years. Also, countries across the globe have publicly outlined their actions in combating the climate change, known as Intended Nationally Determined Contributions (INDCs), post the adoption of an international climate agreement Conference of the Parties (COP21) in Paris in December 2015. Under the INDCs,

[9] Afghanistan Inter-ministerial Commission for Energy
[10] Bangladesh's Power Sector Master Plan 2016
[11] Renewable Readiness Assessment for Bhutan, 2019 by IRENA
[12] Ministry of New and Renewable Energy, Government of India
[13] Renewable Energy Roadmap 2015
[14] Nepal energy assessment roadmap by ADB
[15] Renewable Readiness Assessment for Pakistan, 2018 by IRENA
[16] Sri Lanka energy assessment roadmap by ADB

the SAARC Member States have outlined an optimistic target to become carbon-neutral in terms of power generation by adopting 100% clean energy sources.

The table mention in the next page, broadly indicates the tentative targets as identified by the respective authorities for each major CET in their country[17].

Table 12: Country-wise Clean Energy Targets (MW)

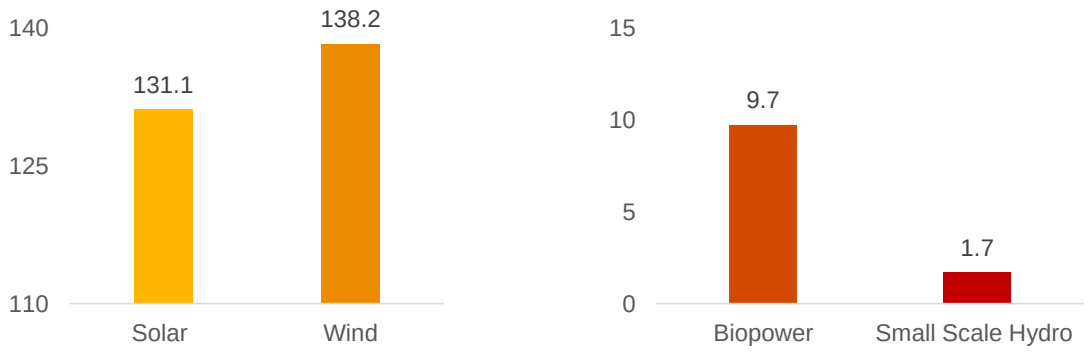
Country	INDC Target	Targeted Addition	Solar	Wind	Bioenergy	Hydro	WtE and Others
Afghanistan	100% by 2050	3,500 MW by 2025	800	600	32	2,000	56
Bangladesh	100% by 2050	3,000 MW by 2021	1,676	1,370	7	4	40
Bhutan	100% by 2050	20 MW by 2025	5	5	5		3
India	175 GW by 2022	175 GW by 2022	100,000	60,000	10,000	5,000	
Maldives	100% by 2050	Not identified clearly, ~20 to 40MW solar PV (hybrid and/or with storage) by 2030					
Nepal	100% by 2050		2,100			12,000	
Pakistan	30% by 2030	18 GW by 2030	Not identified clearly				
Sri Lanka	100% by 2050	1,000 MW by 2025	515	115	105	175	

Note: Information as reported by respective authorities of each country in their various plans and targets has been mentioned in this table. Blank – clear target is not available

2.1.2. Investments in CET World-wide and SAARC Member States

Historically, in the last decade, investments in CETs majorly have been driven by policies across the globe. Due to their maturity and scale, solar PV and onshore wind have been amongst the most lucrative areas, compared to other technologies.

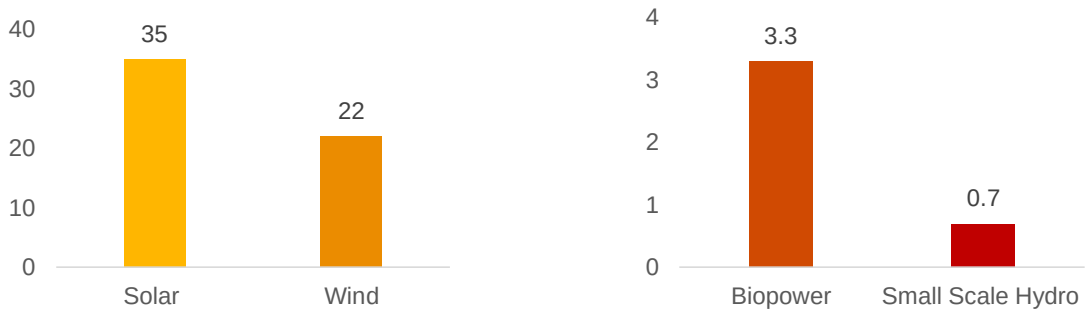
Figure 2: Word-wide Investments in Clean Energy Technologies in 2019 (billion USD)[18]



[17] REN 2020
[18] REN 2020

Figure 2 shows the world-wide new capacity investments (in billion USD) in four major CETs in 2019 as reported in REN 2020, Global status report 2020[19]. Capacity investment values include asset finance volume adjusted for re-invested equity as well as small distributed capacity investment. Solar and wind power had attracted the highest investment of around USD 131.1 billion and USD 138.2 billion respectively. However, as shown in Figure 3, developing Asian countries contributes only 20% of global investment in RE technologies.

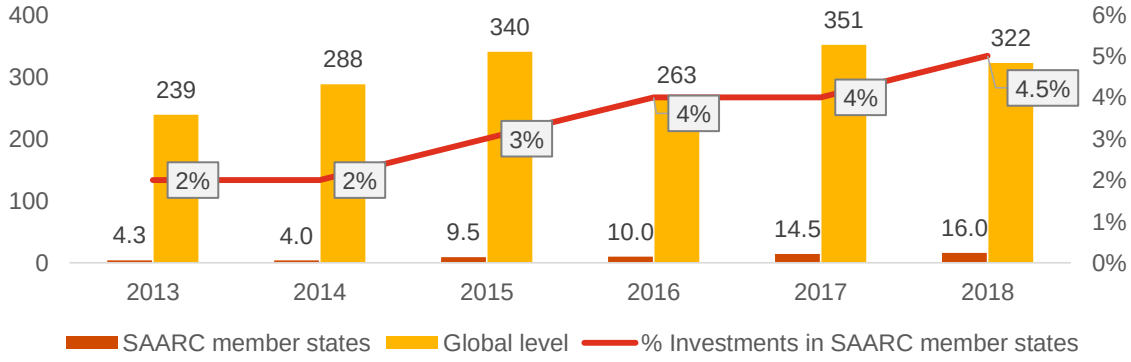
Figure 3: Investment in Developing and Emerging Asia countries in CETs in 2018 (billion USD)[20]



Investments in CET in SAARC Member States[21]

Figure 4 shows the investments in South Asian CET market for the period 2013-2018 in comparison with the global CET investments. The SAARC Member States collectively attracted around 4% of total investments each year in last three years from 2016 to 2018. These investments have largely been led by investments in India (representing an average of around 84% of the total investment in South Asia during 2013-2018) followed by like Bangladesh, Pakistan and Sri Lanka.

Figure 4: Annual CET Investments in SAARC Member State vs. Global Level (billion USD)



With increasing clean energy targets, there is a critical need in South Asia to attract additional private sources of capital. This would require governments to address the risks that affect the bankability of projects. In one of its publication, IEA has highlighted four priority areas for action:

- Enhancing the financial sustainability of utilities
- Improving the procurement frameworks and contracting mechanisms, especially for renewables

[19] REN 2020
[20] REN 2019
[21] Global Landscape of Renewable Energy Finance 2020

- Creating a supportive financial system that brings in a range of financing sources
- Promoting integrated approaches that take the demand-side into account

Among the SAARC Member States, India has seen investments flowing in for almost all CETs. Bhutan and Nepal have historically seen investments primarily in hydroelectricity. With ongoing sector reforms and policy initiatives for CET adaptation, the SAARC Member States are expected to attract more investments in the coming future.

2.1.3. Regulatory Framework for SAARC Member States

1. Afghanistan

The regulatory framework of the Power sector is in a preliminary stage of evolution. Da Afghanistan Breshna Sherkat (DABS), wholly owned by the government of Afghanistan, operates and manages the entire electricity infrastructure in Afghanistan including generation, imports, transmission and distribution activities. Currently, there is no independent private participation in any vertical of the power sector.

Ministry of Energy and Water (MEW) and Ministry of Rural Rehabilitation and Development (MRRD) is responsible for policy and strategy development for the electricity sector. The Ministry of Finance (MOF) and Ministry of Economy (MOE) are concerned with planning and budgeting projects. An independent regulatory body, present in evolved electricity markets such as India and US, is absent in Afghanistan.

The Renewable Energy Directorate (RED), a technical body, was created in 2009 at MEW for the development of renewable energy projects. Brief of each of the institution is as follows:

- **Ministry of Energy and Water (MEW)** is responsible to prepare policies, strategies, action plans and laws, create a platform for decision-making, implement renewable energy projects, and help other developing agencies with security, land acquisition, and licensing issues.

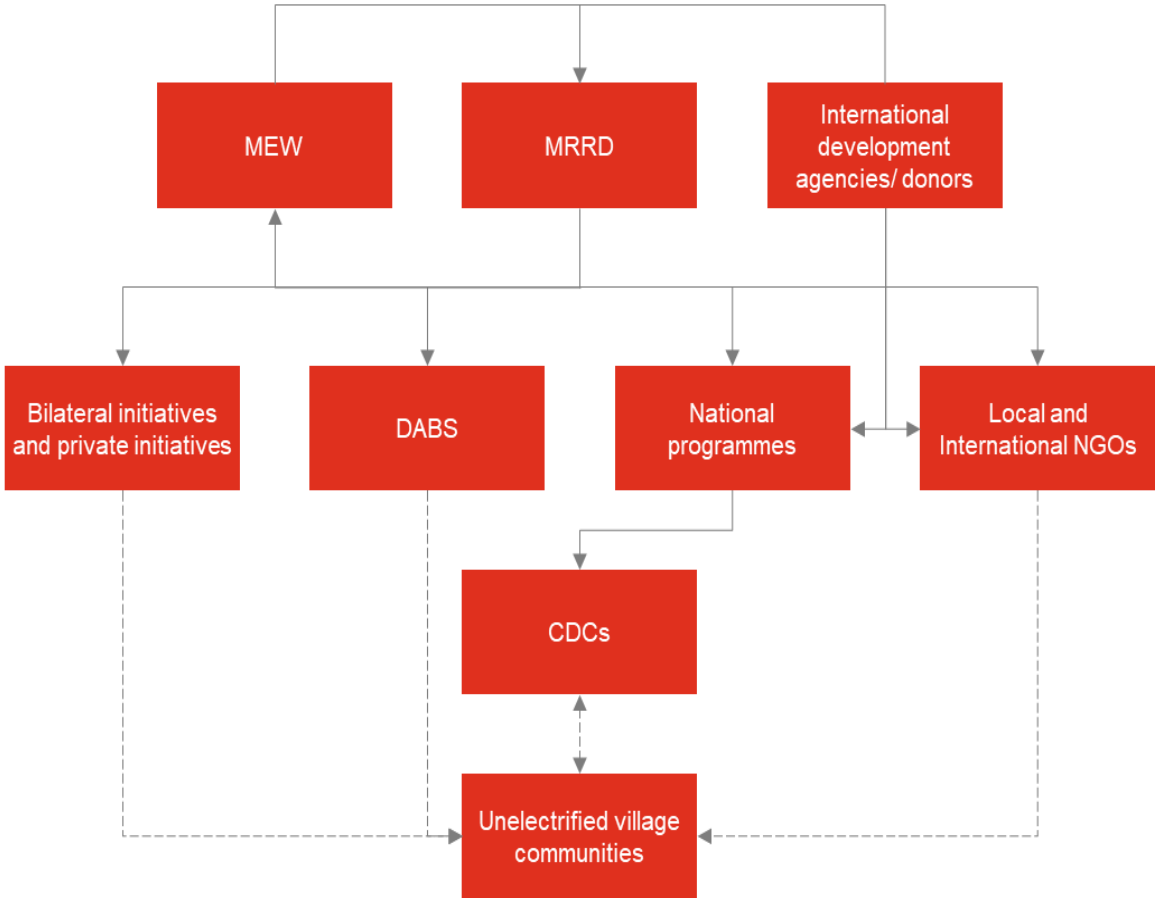
  Implementation of projects greater than 1,000 KW is a mandate of MEW and other private utilities such as Da Afghanistan Breshna Sherkat (DABS) while that of projects smaller than 1,000 kW is the mandate of MRRD.

- **Renewable Energy Department (RED),** built in 2009, is the technical body responsible for the development of renewable energy projects at MEW. Other responsibilities of REDs include assessing renewable potential and develop resource maps; preparing provincial level renewable master plans; developing benchmarks and performance standards; designing and implementing pilot projects that support either technology or innovative concepts such as Public-Private-People-partnership, renewable energy projects to support Sustainable development, roof-top projects on government buildings, etc. along with facilitating technical training, awareness generation, and capacity building of stakeholders across the government organizations (GOs) and non-government organizations (NGOs).

- **Renewable Energy Coordination Committee (RECC),** is currently responsible to oversee the implementation of Afghanistan National Renewable Energy Policy (ANREP) at the Ministry of Energy and Water. Other objectives include ensuring implementation and monitoring of the National Renewable Energy Policy and Strategy for renewable energy

development; ensuring the coordination and cooperation between the ministries involved in renewable projects and their relevant stakeholder organizations; identifying policy and strategy needs for renewable energy and ensuring that these needs are attended to by the relevant ministries and programs, and attending to the needs of the Provincial Energy Commissions.

Figure 5: Power Sector Structure - Afghanistan



- **Ministry of Rural Rehabilitation and Development (MRRD)** is primarily responsible to promote rural energy services and thus alleviate poverty and improve the livelihood of rural households at village level. In case of projects that need to be implemented at the district level or provincial level or the scale of the project is bigger than 1,000 kW, MRRD coordinates with MEW and/or DABS.
- **Da Afghanistan Breshna Sherkat (DABS)** is the only independent state-owned utility in Afghanistan, owning all the central generation, distribution, and transmission assets in country. It is responsible for operation and management of power sector in the country.

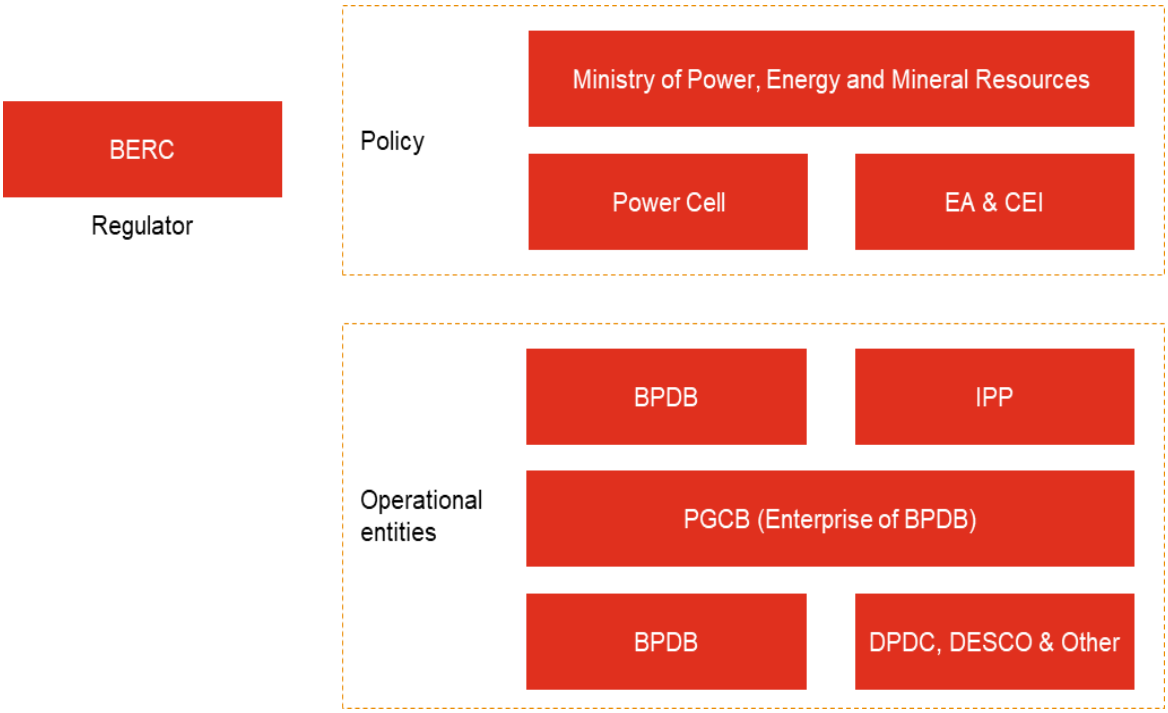
2. Bangladesh

Power Division under the Ministry of Power, Energy and Mineral Resources (MoPEMR) manages the electricity matters in Bangladesh. Power is majorly generated by the Bangladesh Power Development Board (BPDB) and its subsidiaries, private generation companies and independent power producers (IPPs). Power Grid Company of Bangladesh (PGCB)'s is the authority responsible for transmitting power. It is supplied to the customers in local cities by BPDB in the metropolitan area by Dhaka Power Distribution Company (DPDC) and the Dhaka Electric Supply Company (DESCO), and in rural areas by the Pali Bidyut Samities (PBS).

The sector is unbundled in generation, transmission and distribution segments, but BPDB is a single buyer of all generation and supplies in bulk to distribution utilities. Majority of the clean energy projects are implemented by the government entities while private sector involvement is very little in clean energy generation.

Two energy regulatory bodies Bangladesh Energy Regulatory Commission (BERC) and Sustainable and Renewable Energy Development Authority (SREDA) have been established to oversee tariffs and operations in gas, electricity and oil and to promote energy efficiency and renewable energy respectively. Independent regulatory commission for the energy sector was established in the country under the Bangladesh Energy Regulatory Commission Act 2003. To promote the development of renewable energy across country, Sustainable and Renewable Energy Development Authority Act 2012 was passed to establish SREDA. Government's Renewable Energy Policy, formulated in 2008, was targeted to generate 5% of total energy from the renewable by 2015 and 10% by 2020. Through "500 MW Solar Power Mission", MPEMR has also planned to increase off-grid solar capacity to 500 MW and satisfy the escalating need for energy consumption.

Figure 6: Power Sector Structure - Bangladesh



BPDB: Bangladesh Power Development Board, BERC: Electricity Regulatory Commission, IPP: Independent power producers; EA & CEI: Electric Advisor and Chief Electric Inspector

3. Bhutan

The key government institutions playing the major role in the development of power sector in Bhutan include

- Department of Energy (DOE), Department of Geology and Mines (DGM) and Department of Trade (DOT) under Ministry of Economic Affairs (MOEA)
- Department of Forestry and Forestry Development Corporation Limited under Ministry of Agriculture and Forest (MOAF)
- Government owned utility companies - Bhutan Power Corporation (BPC) and Druk Green Power Corporation (DGPC) and
- The regulatory authority - Bhutan Electricity Authority and National Environment Commission

The MOEA focuses on the conventional and renewable energy production, consumption and exports. The Department of Renewable Energy is the nodal agency for the implementation of the renewable energy policy under MOEA. The MOAF is responsible for planning and governance of biomass and related matters. Within the MOEA, the Department of Renewable Energy is the main agency for implementing policy, developing master plan, supporting the REDF, co-ordination of the action plans of different organizations and agencies and facilitating project developers related to renewable energy.

Also, Bhutan Electricity Authority, as the power sector regulator, is responsible for deciding tariffs; enforcing operational, technical, safety standards; issuing licenses; and monitoring other regulatory functions.

Two state-owned major power utility companies in the country are Druk Green Power Corporation Limited (DGPC), and the Bhutan Power Corporation (BPC). BPC is the nodal agency responsible for transmitting and distributing electricity while DGPC is responsible for power generation. BPC owns and operates micro/mini-hydro and diesel power plants (with less than 5 MW capacity). DGPC, the holding company for the existing hydropower companies, operates the large hydro power plants in the country.

4. India

In India, power and electricity constitute a concurrent subject and both the union and state governments are held responsible in the Indian Constitution. At central / union level, Ministry of Power (MoP) is primarily responsible for the development of electrical energy in the country. However, the Ministry of New and Renewable Energy (MNRE) is the nodal ministry for the matters relating to clean and sustainable energy. It is responsible for facilitating and the development of renewable energy to supplement the energy requirements of the country. At state level, the power / energy departments work for electricity related matters.

MNRE governs various institutions like National Institute of Solar Energy, the National Institute of Wind Energy and the Indian Renewable Energy Development Agency (IREDA). IREDA is a non-banking financial institution and has a mandate to provide loans for clean energy and energy efficiency projects. SECI is responsible for conducting reverse bidding for solar and wind projects and to implement various MNRE subsidy schemes, such as, the solar park scheme and the grid-connected solar rooftop scheme.

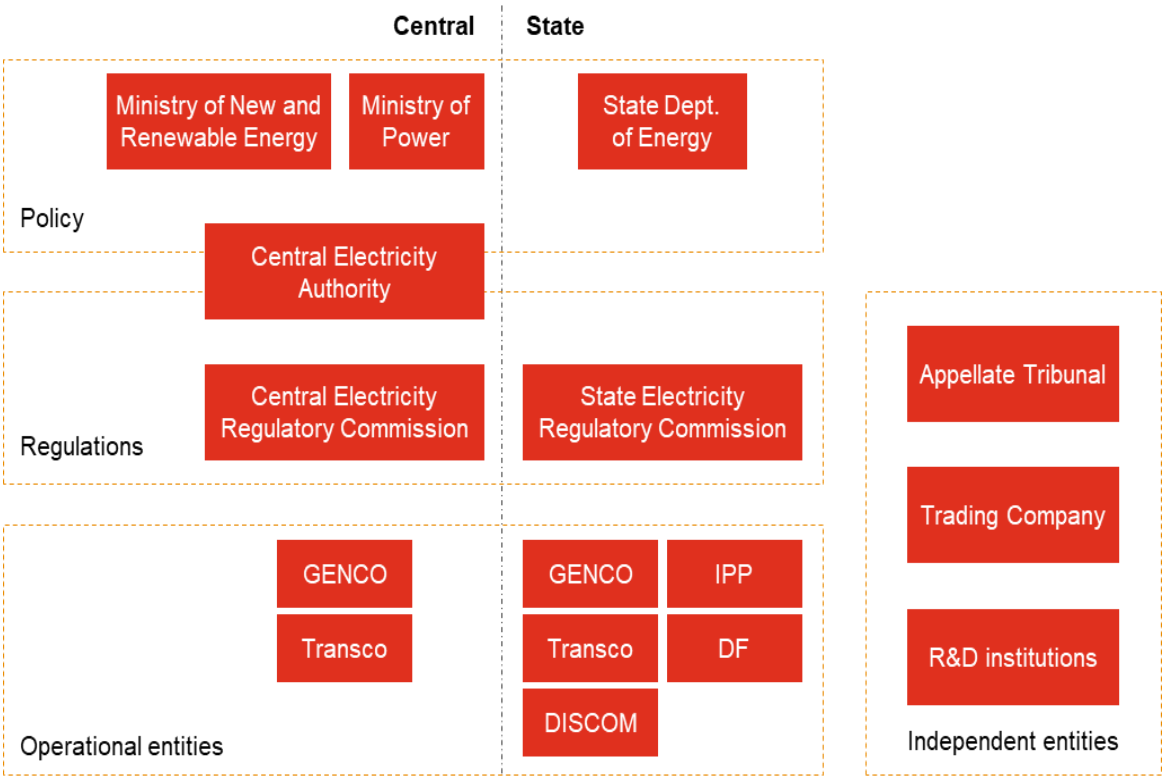
Regulatory commissions at both central [Central Electricity Regulatory Commission (CERC)] and state [State Electricity Regulatory Commission (SERC)] levels control the sector by way of tariff regulations for generation and transmission facilities. They are also responsible for adjudicating disputes related to power generating companies or transmission licensee and issuing fresh licenses for the transmission licensee and electricity trader as well.

Central Electricity Authority (CEA) primarily advises the ministries of the central government on the national electricity policy; technical standards for construction of electrical plants and electric lines; and the grid standards for operation and maintenance of transmission lines. It also advises the state governments, licensees and the generating companies on operation and maintenance of electricity systems owned by them. CEA is also responsible for collecting and maintaining data record related to generation, transmission, trading, distribution and utilization of electricity.

In India, power sector is decentralized. Each of the functionalities, i.e., power generation, transmission, distribution and power trading are governed separately. Private players have been active in power generation since long and their presence in transmission and distribution segments is rapidly growing in recent times with various sector reforms. Solar and wind sectors in India are both driven by the private players and are highly competitive in nature. However, the other emerging clean energy technologies are still driven by the governmental agencies and support.

In India, large hydropower plants are under purview of MoP and biofuels are managed by the Ministry of Petroleum and Natural Gas (MoPNG).

Figure 7: Power Sector Structure - India



GENCO: Generation companies; Transco: Transmission Companies; DISCOM: Distribution Companies; DF: Distribution Franchisee; IPP: Independent Power Producers

5. Maldives

In Maldives, the power sector is highly centralized due to multiple geographic, economic reasons. Participation of private players, bilateral/multilateral agencies and non-governmental organizations (NGOs) is also limited.

Ministry of Energy, Environment and Water (MEEW), which is the apex body, handles the power sector related matters. State Electric Company (STELCO), Fenaka Corporation and Malé Water and Sewerage Company (MWSC) collectively provide electricity services directly to the consumers and industries in Malé and other 24 of the 199 inhabited islands. Island Development Committees (IDCs), community and private providers generate and supply electric power in rest of the islands. Generation plants operated by IDCs are assisted by the Ministry of Atoll Administration (MAA). MEEW is responsible for the development of clean energy generation and increasing share of sustainable energy in energy mix.

Maldives Energy Authority (MEA) is an independent regulatory body affiliated to the Ministry of Energy and Environment (MEE) and operates under the guidance of a governing board appointed by the President. MEA has framed following regulations to develop the power sector in the country.

- Generation, Distribution and Supply Licensing Regulation: Regulation No: 2015/R-143
- Net Metering Regulation 2015: Regulation No: 2015/R-231
- Service Provider's Code (Draft)
- Utility Investment Approval Regulation (Draft)

6. Nepal

The power sector in Nepal consists the following:

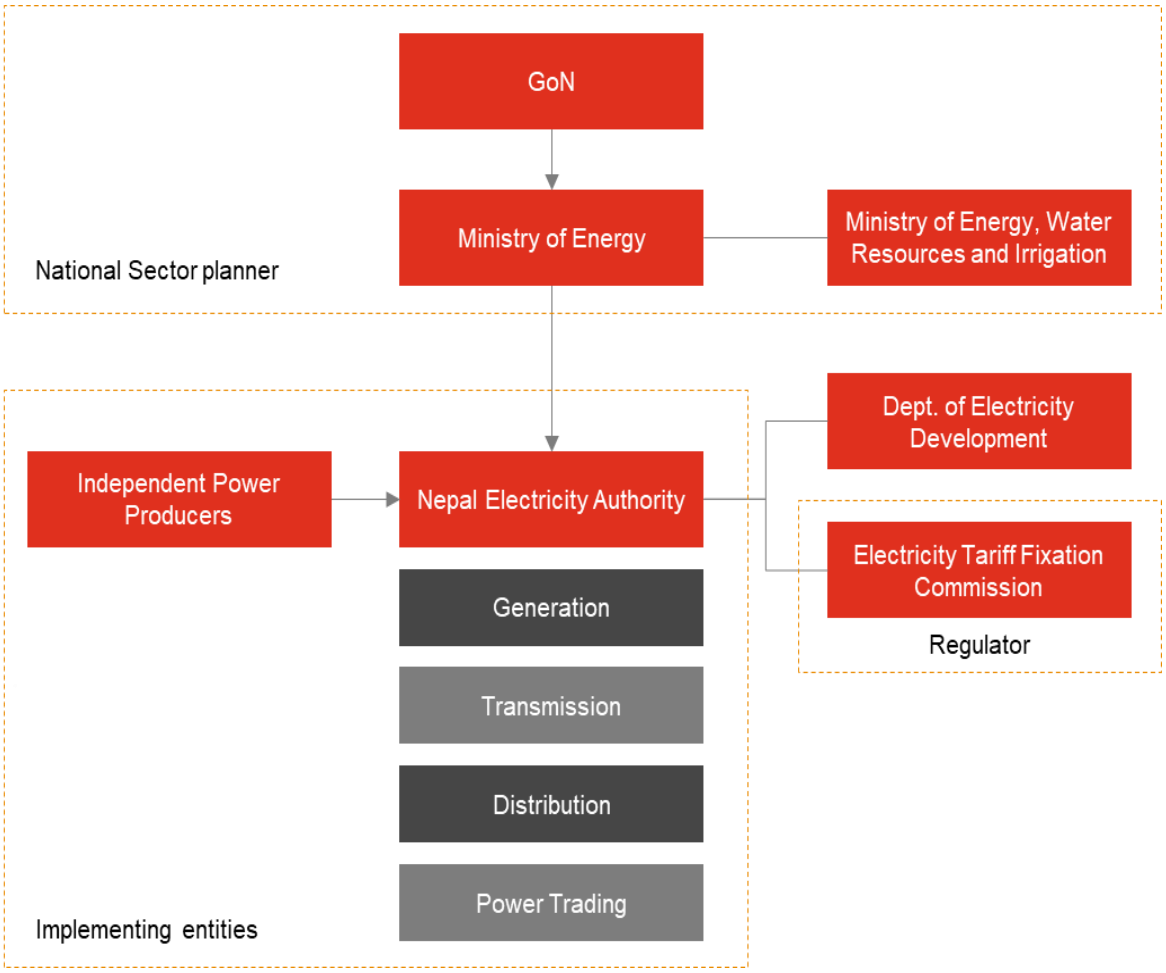
- The **Ministry of Energy** is the line ministry with primary jurisdiction and authority for the Energy Sector.
- The country has four levels of institutional arrangements: (i) policy, (ii) regulatory, (iii) operational, and (iv) implementation.
- **Nepal Electricity Authority (NEA)** is responsible for planning, constructing, operating and maintaining all generation, transmission and distribution facilities. It also recommends and realizes affordable tariffs for the same.
- **Electricity Tariff Fixation Commission (ETFC)** had been established with NEA to set the retail tariff rate by reviewing and approving tariff filings, made by the NEA and other licensed authorities under the Electricity Act of 1992. However, the Government of Nepal (GoN) recently enacted legislation to form the Electricity Regulatory Commission, which will replace the ETFC.
- **Ministry of Energy, Water Resources and Irrigation** primarily looks after the conservation, development and utilization of the water resources for power production and irrigation. A government institution named Alternative Energy Promotion Centre (AEPC) is operational under this ministry with an objective to make the renewable energy a mainstream resource in the country.

- **Investment Board Nepal (IBN),** established in 2011, is a central fast-track government agency chaired by the Prime Minister mandated for FDI approval and implementation of power project with capacity more than equal to 200MW.
- **Apex Law,** Electricity Act 1991 conceives the presence of private sector in generation, transmission and distribution sectors.
- **Applicable Regulations**, Electricity Regulations 1992

National Planning Commission is responsible for coordination and development of the government's 5-year multi-sector investment program. Power sector is yet not unbundled. However, process is underway to create a separate power generation business, single transmission entity and eight distribution utilities across provinces.

In 2017, the government has passed the Nepal Electricity Regulatory Commission Act, 2017 to establish an independent regulatory regime for the power sector. The Commission is formed with the objective to maintain a balance between the demand and supply of electricity, regulate the electricity tariff, protect the right and interest of the electricity consumers and make the electricity services reliable, available to all, qualitative and secured one.

Figure 8: Power Sector Structure - Nepal



7. Pakistan

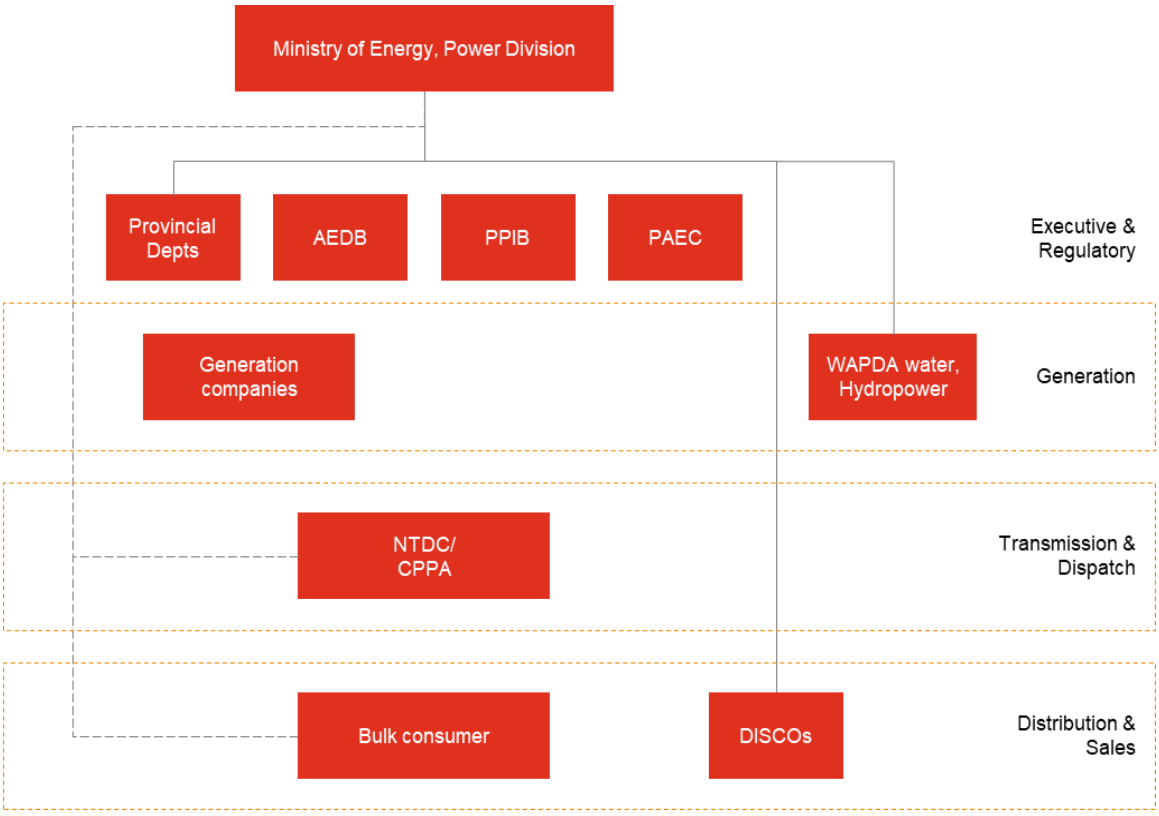
The two main segments of Pakistan's energy sector, electricity and petroleum (oil and gas), used to be governed by the Ministry of Water and Power and the Ministry of Petroleum and Natural Resources, respectively. However, in August 2017, the federal Ministry of Energy was formed. It took over the power and oil and gas sections of the previous ministries, as its two administrative divisions. Each division is further served by multiple implementation agencies and independent regulatory bodies.

Historically, the sector was publicly owned and managed through two vertically integrated public utilities, the Water and Power Development Authority (WAPDA) - a government-owned statutory body, - and the Karachi Electric Supply Corporation (KESC) - a public limited liability company with government controlling interest. After restructuring, WAPDA is now responsible only for developing and maintaining large hydropower and water resource projects. The Karachi Electric Supply Corporation, or K-Electric as it is now called, is still a vertically integrated power utility serving Karachi. It has been privatized with a 22% stake of government.

The power division of the Ministry of Energy remains the executive body, holding administrative oversight of the sector, with NEPRA playing its role as independent regulator. The division is responsible for preparing and analysing policy drafts and proposing legislative changes to be presented to the cabinet or parliament.

The national parliament is the supreme forum for legislation. Federal government entities such as Alternative Energy Development Board (AEDB), Private Power and Infrastructure Board (PPIB) and Pakistan Atomic Energy Commission (PAEC) are responsible for implementing, coordinating and facilitating policies for the division. Provincial governments have established provincial energy departments to draft and implement energy and power policies. Block diagram in Figure 9 represents a list of the key government institutions in the power sector along with their assigned roles and responsibilities.

Figure 9: Power Sector Structure - Pakistan



DISCOs: Distribution Companies

8. Sri Lanka

The Ministry of Power, Energy and Business Development (MOPE&BD) in Sri Lanka is the nodal Ministry to govern the electricity and renewable energy matters. It is responsible to formulate and implement policies, programs, and power projects across Sri Lanka. It also monitors, investigates, and develops electricity facilities related to hydropower, thermal power, mini hydro, coal, and wind power and other renewable energy sources.

MOPE&BD supervises the agencies/ companies associated in electricity generation and distribution in the country, i.e., Ceylon Electricity Board, Sri Lanka Sustainable Energy Authority, Lanka Electricity Company, Lanka Coal Company, Sri Lanka Atomic Energy Board, and Sri Lanka Atomic Energy Regulatory Council.

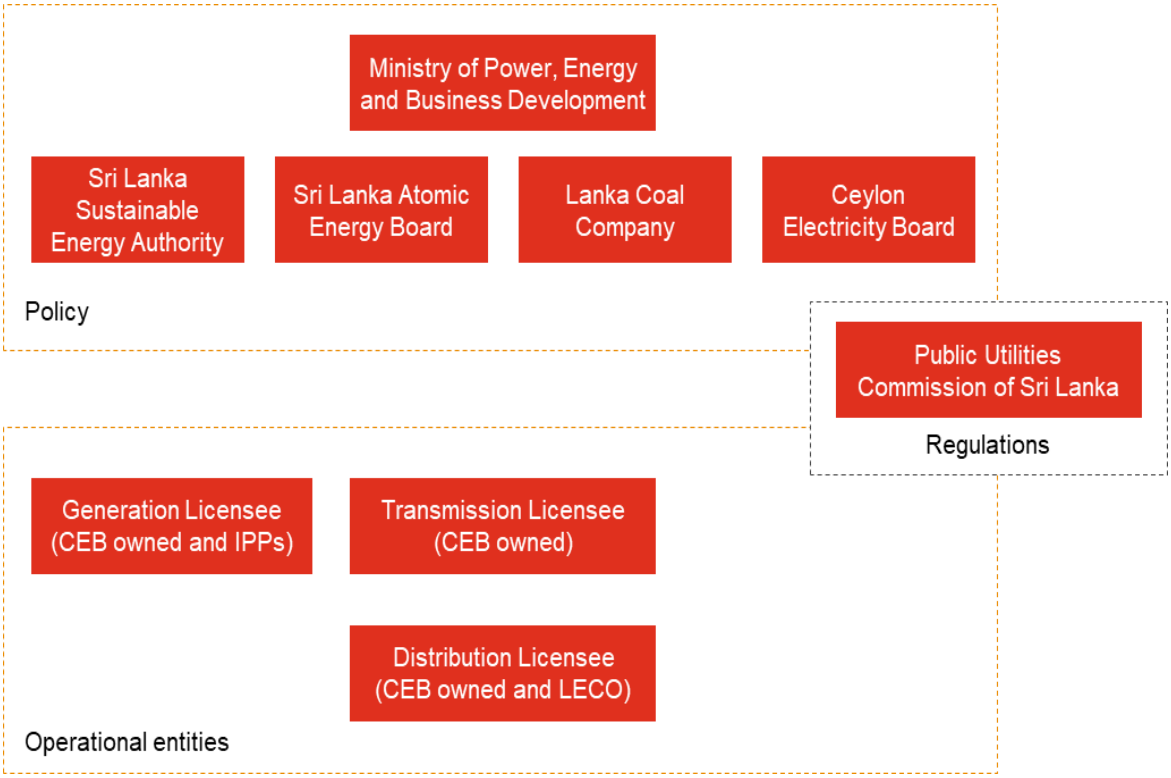
The proposed unbundling of the power sector into separate generating, transmission, and distribution companies in the Electricity Reforms Act 2002 failed to materialize. Later in 2009, limited unbundling has been in introduced under the Electricity Act 2009, where all businesses have remained under one corporate ownership, i.e., CEB, while generation, transmission, and distribution functions are separately licensed. CEB now holds six embedded licensed entities, one generation license, one transmission and bulk supply license, and four distribution licenses

In Sri Lanka, independent regulator for power sector is not present. However, the multi-sector regulator, Public Utilities Commission of Sri Lanka (PUCSL) presently performs the functions of technical, economic, commercial, and safety regulator of the electricity industry. Currently, CEB does not submit the required information to PUCSL in relation to the economic, technical, and

commercial regulatory activities. Accordingly, determination of allowed revenues and the cost of supply has not been performed since 2017.

The electricity industry is managed largely by state-owned companies. Private sector participation in the electricity industry is limited to power generation.

Figure 10: Power Sector Structure - Sri Lanka



*CEB: Ceylon Electricity Board, LECO: Lanka Electricity Company

2.1.4. Policy Landscape of SAARC Member States

Table 13 explains the few key policies and programmes being implemented by each member country in order to push and streamline the adaptation of clean energy technologies.

Table 13: Country-wise CET Focused Policies

Country	Policy / Programme	Brief explanation
Afghanistan	Afghanistan Renewable Energy Policy, 2015	• This policy was developed to facilitate a transition from donor-supported to private - investment driven renewable energy sector. The second term (2021-2032) targets to establish a financial institution dedicated to renewable (REN) projects that will provide customized financial support to all the projects of private sector, local enterprises, NGOs, women led REN businesses and others. It will pool in funds from the government resources as well as from the donors and international financial institutions such as the Asian Development Bank, Islamic Development Bank, World Bank, etc.
	Power Services Regulation Law	• This law de-licenses and deregulates small scale power production through renewables of up to 100 kW generation plants.

Country	Policy / Programme	Brief explanation
	Public Private Partnership (PPP) Law	• PPP law provides the policy guidelines for setting up public-private partnerships, with the objectives of regulating PPPs and keeping in mind transparency, competition and cost effectiveness. The key provisions include formation of a Central Public Private /Partnership Authority (CPPPA).
Bangladesh	Renewable Energy Policy of Bangladesh	• It focuses on scaling up contributions of renewable energy to electricity and heat energy by enabling public and private investments in the project development.
	Solar Homes Programme and Solar mini and nano grids	• The government financial institutions have introduced a few financing scheme and concerted programs to diversify the renewable energy installations. Under these schemes, loans are being channeled through the Participating Organizations (POs) with attractive interest rates between 6-9% and at 60%-80% of project cost.
Bhutan	Sustainable Hydropower Development Policy 2008	• It captures almost all the aspects of hydro power such as the institutional structure, investment, fiscal incentives, taxes, waiver policy for export, etc. It also encourages public and private investments from local and foreign entities in medium (25 MW to 150 MW) and large projects (150 MW to 1 GW).
	Alternative Renewable Energy Policy 2013 Renewable Energy Master Plan 2016	• It ensures adequate use of modern energy services in rural areas through distributed renewable energy projects. It also has a provision for a Renewable Energy Development Fund (REDF), which has yet to be established.
India	Jawaharlal Nehru National Solar Mission (JNNSM)	• The JNNSM (National Solar Mission) originally set a target of deploying 20 GW of grid connected solar power, and 2 GW of off-grid power by 2022. This was revised in 2015 to achieve 100 GW by 2022.
	National Tariff Policy	• It mandates SERC to fix the percentage of renewable purchase obligations (RPO) from renewable energy sources, considering the factors including the availability of renewable energy in the region, the impact on retail tariffs and procurement by distribution companies at preferential tariffs determined by the SERCs.
	India Renewable Electricity Roadmap 2030	• In its Roadmap 2030, NITI Aayog has paved a path on policy, financing, grid integration for vigorous deployment of renewable electricity in India.
	National Wind-Solar Hybrid Policy	• It promotes large-scale wind-solar hybrid power project with an objective to optimize the usage of transmission infrastructure and land. This will not only support in reducing the intermittency of renewable power generation but will also help in grid stability.
	Renewable Energy policies of the states	• More than 15 states of India have adopted their own solar / wind / renewable energy policies in line with the national guidelines to improve the share of clean energy in their energy mix. Policies of a few states like Rajasthan, Gujarat etc. also support experimental

Country	Policy / Programme	Brief explanation
		projects like offshore wind farms, geothermal, solar thermal energy sources, etc.
Maldives	Energy Policy and Strategy 2016	• This policy aims to improve the institutional and regulatory framework of the energy sector, promote renewable energy in overall energy mix and encourage the private players to participate in clean energy development.
	National Strategic Action Plan (2019-2023)	• National Strategic Action Plan has set clear targets to increase the share of renewable energy by 20% from 2018 and bring it up to 70% of the total energy mix by 2030.
Nepal	Hydropower Development Policy, 2001	• As the water resource is available in abundance in the country, this policy broadly sets up the rules and regulations for the development of hydro-electric power plants and generating hydroelectricity at a reasonable price. • Under this policy, small scale hydropower plants of up to 100 kW capacity at the rural level are declared as prioritized sector for domestic financing institutions. Also, the policy covers large-scale export oriented hydroelectric projects.
	Subsidy policy for renewable energy, 2013	• This policy accelerates the delivery of better-quality renewable energy services, using various technologies to households, communities, and micro, small, and medium enterprises in rural areas.
	Rural Energy Policy, 2006	• It mainly targets rural electrification by the installation of clean biomass technologies, off-grid micro hydro systems, solar lights to replace kerosene lamps.
Pakistan	Development of Renewable Energy for Power Generation 2006	• It is also known as the Alternative and Renewable Energy Policy 2006 and planned in three phases - short, medium and long term. It covers the development of solar, wind and small-scale hydropower projects. Later, bagasse, biomass and waste-to-energy were also added as CET via an addendum in 2013. However, the policy did not set specific targets for CET implementation.
	Power Generation Policy 2015	• It covers the development of new thermal and large hydropower projects (greater than 50 MW) in both the public and private sectors.
	Alternative and Renewable Energy, 2019	• ARE Policy 2019 has replaced the previous policy of 2006 to develop CETs in country. Additionally, it has defined a roadmap for the transition from the traditional procurement methods of cost plus and upfront tariffs to competitive bidding for the CET projects. It has set targets to generate 20% of total electricity using CET by 2025 and 30% by 2030 (20X25 and 30X30 target).
Sri Lanka	Sri Lanka Energy Sector Development Plan	• Among multiple focuses, clean energy specific target is set to increase the share of electricity generation from renewable energy sources from 50 percent in 2014 to 60 percent by 2020. It aims to meet the total generation demand from renewable and other indigenous energy resources by 2030.

Country	Policy / Programme	Brief explanation
	Battle for Solar Energy	• This initiative promotes small solar power plants on the rooftops of households, commercial, industrial and public establishments. The target is to add 200 MW and 1,000 MW of solar electricity to the national grid by 2020 and 2025 respectively.

2.2. Selected Case Studies from Around the World

Countries around the world are actively pushing for a greater dependence on sustainable power sources to meet their energy need. To achieve these goals, revolutionary clean energy projects have been constructed on massive scales in past few years. A few of the selected operational CET projects based on their unique features have been detailed out as below:

1. Grid Connected Utility Scale Solar Power Project	
Project Name	Kamuthi Solar Park
Capacity	648 MW
Location	Tamil Nadu, India
Financing	Unlike in majority of the projects, where the project is built under a single SPV, in this, the project is built through 5 SPVs (3x 72 MW and 2x 216 MW). The project is funded at debt to equity ratio of 70:30. The tenure of debt is 18 years. However, except in one SPV, where the debt repayment is on quarterly basis; in other SPVs, the repayment schedule is on a monthly basis. The SPVs shall maintain Debt Service Reserve equivalent to 6 months of debt as security. In addition to this, it shall maintain a Debt Service Coverage Ratio. There is a provision to use the cash surplus in any of these 5 SPVs for servicing the debt in other SPVs in case of deficit.
Uniqueness	First mover in large scale solar power park
Features	• First large-scale single location grid connected solar photovoltaic plant in India – 648 MW • Implemented by single private developer company • The land was offered on a long-term lease to project development company for the first time in Indian Solar sector
Adani Green Energy Limited, part of the Adani Group implemented this largest single location solar project in record 10 months. It was the largest single location solar project, when it got operational in September 2016, entailing an investment of USD 690 million (INR 45.5 billion). Entire 648 MW capacity has tie up for long term power offtake with Tamil Nadu Generation and Distribution Corporation at a weighted average tariff of 7.9 US cents per unit. The project is made up of 5 segments (2*216 MW and 3*72 MW) at a single location. For the first time in India, the need for a large land area for a centralized solar power plant was fulfilled by taking the land of around 2,500 acres on a lease for 25 years.	

2. Grid Connected Utility Scale Wind Power Project	
Project name	Jadraas Onshore Windfarm
Capacity	200 MW
Location	Sweden

2. Grid Connected Utility Scale Wind Power Project	
Financing	In 2012, the project was financed with equity contributions from developers (Arise Wind power AB and Platina Partners LLP) and debt of ~USD 280 million from PensionDanmark and two Scandinavian commercial banks.
Uniqueness	Financing arrangement
Features	• Unique financing arrangement including guarantee by the Kingdom of Denmark to secure one third of the private investment ~USD 160 million (~EUR 120 million) from a Danish institutional investor – PensionDanmark • The largest onshore wind farm in Sweden and Scandinavian Europe at time of commissioning in May 2013 • Benefits from the Swedish renewable electricity certificate which provided – a long term revenue stream (15-year) and a safeguarded viability to the project
This project has an installed capacity of 102 MW with 66 turbines. It was the largest in Scandinavian Europe in May 2013 with the capacity factor of ~33%. The project is designed to deliver enough energy to almost 1 million Swedish homes per year. The project is financed with equity contributions from developers and debt from PensionDanmark and two Scandinavian commercial banks. This project demonstrated successful engagement of an institutional investor, which was not traditionally into renewable energy projects back then in 2013 era, to provide a large proportion of debt using public money. In 2019, the Renewables Infrastructure Group (TRIG) has purchased 100% stake of this wind farm for a consideration of ~USD 275 million (~EUR 207 million).	

3. Hybrid Power Project for Islandic Geography	
Project name	El Hierro Renewable Energy Hybrid System
Capacity	11.5 MW
Location	El Hierro, Canary Islands, Spain
Uniqueness	Best suitable for islandic geography
Features	• Demonstration of water–energy nexus in practice to move towards a 100% renewable energy supply for island countries
El Hierro is a small volcanic island of area ~278 km², having a population of around 0.01 million. To eliminate the diesel-based electricity generation system, the principal generators here have been transferred to a wind power plant of 11.5 MW (5 turbines of 2.3 MW each) backed up by a pumped-storage hydropower system. The plant is operational since 2014 providing electricity to the domestic and commercial sectors along with three desalination plants.	

4. Utility Scale Hydro Power Project	
Project name	The Mangdechhu Hydro Electric Power Project (HEPP)
Capacity	720 MW
Location	Bhutan
Financing	The Government of India has funded the project through a 70% loan and a 30% grant. The loan has been provided at an interest rate of 10% with repayment tenure of 12 years. In 2019, the Government of India extended the repayment tenure by 2 years.

4. Utility Scale Hydro Power Project	
Uniqueness	Large scale hydro power plant with inter country collaboration
Features	• Strategically important project to meet indigenous power requirement and to supply excess power to the needy neighboring country by harnessing the natural resources available in abundance. • One of the 10 hydroelectric projects to be developed as part of the Royal Government of Bhutan's initiative to generate 10 GW of hydropower by 2020 with support from the Government of India.
This run-of-river power plant has been built on the Mangdechhu River in Trongsa Dzongkhag District of central Bhutan. It achieved COD in August 2019 and has the long-term offtake arrangements with PTC India (Indian entity) and Druk Green Power Corporation (Bhutanese entity). Inter-country collaboration in this project was at its peak in the 2010 -2012 era as majority of the contractors of the project are Indian entities like NHPC, BHEL. Jaiprakash Ventures, Alstom T&D India, Kalpataru Power, Gammon India, Marti India and so on.	

5. Grid Connected Biomass (Dendro) Power Plant	
Project name	Dehiattakandiya Grid Connected Dendro Power Plant
Capacity	3.3 MW
Location	Sri Lanka
Financing	The project is funded by ~USD 2.5 million of equity contribution from the developers and ~ USD 5.3 million of debt from a syndicated loan, guaranteed by the project sponsor company.
Uniqueness	Commercializing country specific clean energy resource
Features	• Harnessing the largest biomass resource available in the country as a viable renewable energy option. • Private Participation along with the technology transfer from the established player.
Sri Lankan publicly listed company Vidullanka and its joint venture partner OC Energy Lanka (Pvt) ltd, a unit of Japan based Obayashi Corporation has commissioned this project in May 2019. The 3.3 MW plant is expected to generate 22 million units of electricity per year. The project cost incurred is ~USD 7.8 million (exchange rate 180 LKR/USD). It uses locally available Gliricidia, Ipil and Coconut Husk as fuel.	

2.3. Selected Case Studies in SAARC Member States

1. Kandahar Solar Power Project, Afghanistan	
Technology	Solar PV
Status	Operational
Capacity	10 MW (15 MWp)
Financing	• The project faced challenges in terms of unavailability of long-term dollar denominated loan at a lower interest rate

	• ADB provided a long-term loan of USD 4 million, which enabled the project to move forward • A concessional loan of USD 3.9 million was provided by Canadian Climate Fund for the Private Sector in Asia II (CCFPS II), which helped bridge the financial gap and enabled financial closure of the project • Equity of USD 4.04 million was provided by Insaat ve Taahhut • Viability Gap Funding (VGF)* of USD 7 million was provided by DABS
Offtaker arrangement	20-year PPA with DABS
Uniqueness	First private utility-scale solar power project implemented on build, own, and operate basis
This 10 MW Solar PV Plant is the first plant funded by private player on build, own, and operate basis. Private player named as 77 Construction has developed this project and began commercial operation on October 16, 2019. United States Agency for International Development (USAID) has provided USD 10 million in incentive funds. This project has helped in successfully establishing a model approach for the MEW and DABS to further attract additional private sector investments in energy projects in Afghanistan.	

*VGF is a mechanism to finance the economically justifiable infrastructural projects that are not financially viable. This is usually a one-time grant provided by the government to make the projects commercially viable.

2. Herat Wind Farm, Afghanistan	
Technology	Wind Energy
Status	Under implementation
Financing	• USAID has committed to contribute USD 23 million of the project cost of USD 43 million. • ADB is also the funding agency in this project. • The project is yet complete the financial closure.
Capacity	25 MW
Offtaker arrangement	PPA with DABS for 20 years
In 2018, 77 Construction USA Corp had proposed to design, build, finance, commission, operate, and maintain a ~25 - 30 MW wind power project in Herat province. USAID had approved the proposal to partially fund the project under Afghanistan Broad Agency Announcement (“BAA”) in December 2018. The PPA with DABS has been executed in September 2020 and the project is expected to start its commercial operation by end of 2022.	

3. Rangunia Solar Power Project, Bangladesh	
Technology	Solar PV
Status	Under Construction
Capacity	55 MW

Financing	The Request for Proposal, floated by Bangladesh Power Development Board (BPDB), for implementation of the project included the following conditions related to financing of the project: • The bidder is required to arrange the required financing (debt and equity) for the project and shall be responsible for financial closure • Minimum equity investment will be 20% • If the project sponsor is a single firm, it shall hold at least 51% equity ownership in the project. In case of a consortium, the lead sponsor shall hold at least 51% in the project company while another sponsor shall maintain 20% or more • The bidder shall arrange standby credit facility equivalent to at least 3% of total cost As per the Private Sector Power Generation Policy, BOO project can involve limited recourse financing and funds for the projects shall be raised without any direct sovereign guarantee of repayment.
Offtaker arrangement	PPA with BPDB for 20 years
Uniqueness	The lowest levelized tariff ever for any utility scale solar power project in the country – 7.48 US cents per unit
A consortium of Metito, Jinko Solar and AlJomaih Energy and Water have won a 55 MW solar power project in a competitive bidding conducted by BPDB. The consortium will build the project on a BOO basis on BPDB land under a 20-year concession agreement and it is expected to generate power by the end of the year 2021. Metito has entered in Bangladesh for the first time through this project. The project has received a levelized tariff of 7.48 US cents per unit, which is the lowest tariff reported for any solar power project in the country.	

4. 100 MW Wind Power Project, Bangladesh	
Technology	Wind
Status	Under implementation
Capacity	100 MW (2 projects of 50MW each)
Financing	The Request for Proposal, floated by Bangladesh Power Development Board (BPDB), for implementation of this project included the following conditions related to financing of the project: • The bidder is required to arrange the required financing (debt and equity) for the project and shall be responsible for financial closure • Minimum equity investment will be 20% • If the project sponsor is a single firm, it shall hold at least 51% equity ownership in the project. In case of a consortium, the lead sponsor shall hold at least 51% in the project company while another sponsor shall maintain 20% or more • The bidder shall arrange standby credit facility equivalent to at least 3% of total cost As per the Private Sector Power Generation Policy, BOO project can involve limited recourse financing and funds for the projects shall be raised without any direct sovereign guarantee of repayment.

Offtaker arrangement	NA
Uniqueness	First such large-scale tender for wind power projects
The BPDB has recently released a notice inviting tenders to develop 100 MW of grid-connected wind power projects at two sites in the country on BOO basis for 20 years. The deadline for submitting bids is November 3, 2020.	

5. Waste-to-Energy Facility, Maldives	
Technology	WtE plant with a capacity of 500 tons per day (tpd) (2 treatment lines of 250 tpd each) to generate 8 MW of electricity
Status	Under implementation
Capacity	8 MW
Financing	• Asian Infrastructure Investment Bank has provided USD 40 million as loan • Japan Fund for Joint Credit Mechanism shall provide USD 10 million Grant to finance the expenditure – design and construction, consulting services and others • ADB has approved a loan of USD 73.39 million and a grant of USD 5,00,000 for institutional capacity strengthening of Ministry of Environment and Environmental Protection Agency. The loan has a principal repayment period of 24 years. An interest rate of 1% is levied in the grace period (before the first repayment of loan) and 1.5% thereafter. As per the loan agreement, the repayment of loan shall be in US dollar
Offtaker arrangement	NA
Uniqueness	Integrated solution to address the issue of solid waste disposal and environmental degradation
In Maldives, greater Malé and its neighbouring 32 outer islands suffer from severe environmental pollution and deteriorating liveability due to inadequate collection and haphazard disposal of solid waste. Over 830 tpd of solid waste are generated in the area and dumped at a dump site on Thilafushi island. The government is developing waste treatment facility along with a WtE to generate 8 MW of electricity at an estimated cost of USD ~152 million on design-build-operate modality with the private sector, with a 15 years operation and maintenance period.	

6. Quaid-e-Azam Solar Power Park, Pakistan	
Technology	Solar PV
Status	Phase I (100 MW) and Phase II (300 MW) operational
Capacity	1,000 MW in three phases
Financing	Phase I • The project is financed at a debt-to-equity ratio of 75: 25. The Equity for the project is arranged by the Government of Punjab province. • The project has availed a long-term loan facility from a consortium led by Bank of the Punjab. The loan shall be repaid in 11 years including a grace period of 1 year. An interest rate of KIBOR plus 3% is applicable. • As per the agreement, the company is required to maintain Debt Service Coverage Ratio of 1.25 and minimum current ratio of 1.0 Phase II and III • China Exim Bank and China Development Bank have funded the project at a debt-to-equity ratio 80:20. • Both the phases II and III are development under the CPEC (China-Pakistan Economic Corridor)
Offtaker arrangement	NA
Uniqueness	First large-scale grid connected solar power project
This is the first utility-scale, grid connected solar power park of Pakistan. The original plan of the project consists of three phases (Phase I – 100 MW, Phase II – 300MW and Phase III – 600MW). Out of which 400 MW (4 projects of 100MW each) capacity under Phase I and Phase II was connected to the grid in 2016 and remaining 600 MW capacity is not yet constructed.	

7. 50 MW Wind Farm by Zephyr Power, Pakistan	
Technology	Wind
Status	Operational
Capacity	50 MW
Financing	• FMO has provided USD 20.6 million financial package of a senior and subordinated long-term loan. The interest rate is LIBOR plus 4.75%. • CDC, which is the shareholder in Zephyr, has provided a loan of amount USD 9.9 million at an interest rate of LIBOR plus 4.75%. • The company has also availed loan of USD 9.9 million from United Bank Limited Pakistan at an interest rate of KIBOR plus 3%.
Offtaker arrangement	PPA with NTDC
Uniqueness	first joint debt/equity investment in the country by CDC
Zephyr Power is owned by a consortium of local Pakistani business partners and CDC Group PLC, the development finance institution of the United Kingdom established to construct 50 MW wind power project in Thatta district of Sindh province. The project achieved commercial operation in March 2019.	

2.4. Defining Utility Scale Projects

Utility scale project considered for this study is defined as the one which 1) feeds directly into the grid 2) not a commercial and industrial project and located remotely 3) ground mounted in case of solar deployed either as Independent Power Producer or in Solar Power Parks 4) involves evacuation of electricity generated through the national/ private transmission network.

Another most important point, which needs to be defined in utility scale projects is the size of the projects. To define utility scale projects, different countries claim and define different sizes for different technologies. For example, utility scale projects in solar have been defined in the range of 1MW to 50 MW globally by different entities.

Here, utility scale projects have been defined for each SAARC member state for each technology; considering the government and institution guidelines, investment scenario, bids auctioned in past, projects been installed and commercialized. Long term commitment for offtake of generated electricity plays a vital role to decide upon the scale of the project, as it provides stability/certainty in future revenue generation. Therefore, the projects in pipeline and targeted to be implemented in near future are also considered. Major renewable technologies are considered, which have more than 5% share in the total generation of any country.

Table 14: Defining Utility Scale Projects

Utility Scale (MW)	Hydro	Solar	Wind	Biomass/ Bagasse / WtE	
				Biomass / Bagasse	Other WtE
Afghanistan	>10 MW	>10 MW*	>10 MW*	NA	NA
Bangladesh	>50MW	>20 MW*	>20 MW*	NA	NA
Bhutan	>500 MW	NA	NA	NA	NA
India	>25 MW	>50 MW	>50 MW	>10 MW	>10 MW
Maldives	NA	>1 MW*	NA	NA	NA
Nepal	>50 MW	>5 MW	NA	NA	NA
Pakistan	>50 MW	>20 MW*	>20 MW*	NA	NA
Sri Lanka	>50 MW	>10 MW	>10MW	>5 MW	>10 MW

*Note: As these technologies have not been widely installed in respective countries, projects under development phase or under construction phase are considered only. Bangladesh and Maldives have initiated the process for installing wind (50 MW) and solar (21 MW) projects respectively. However, both the projects are in tendering phase only. Few selected cases have also been mentioned in section 2.3.

Note “NA” represents the limited presence of utility scale CET based on mentioned assumptions.

3. Financial Environment for Clean Energy Projects

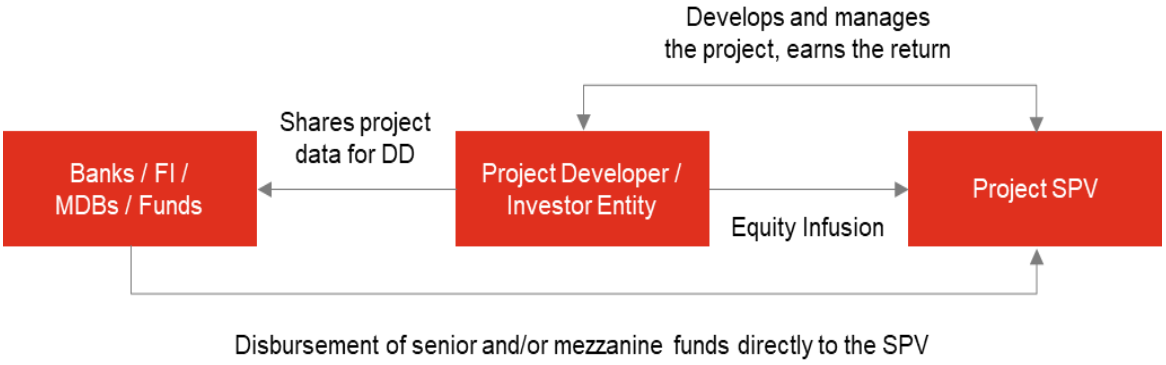
3. Financial Environment for Clean Energy Projects in SAARC

Once the capacity of a typical utility scale project is defined for each member state in the previous section 2.2 and 2.3 , this section discusses the financing environment for funding of such utility scale CETs.

3.1. Project Financing

The evolution of clean energy technologies has attained an inflexion point in terms of cost-effectiveness and further improvements are expected to continue to come at an accelerated pace. An estimate shows that more than 40 countries like Mexico, Chile, the UAE, China, India, Australia, Germany, etc. have already reached grid parity without subsidies. Historically, non-recourse asset financing and balance sheet funding are the two preferred sources of exposure to clean energy infrastructure. In case of on-balance sheet funding from utilities and specialists, the company that owns the project may raise bond or other debt finance for project construction via its own corporate balance sheets, and therefore, it bears the whole risk of project execution. On the other hand, in asset (project) financing, the developer is likely to partially or fully own the equity in the special purpose vehicle supplemented by the debt tie-ups. Thus, the project risk is being shared by both equity and debt contributors. In developing countries, like India and China, the asset financing structure is prevalent. Figure 11 shows the simplified block diagram of the well-accepted project (asset) financing structure.

Figure 11: Project (Asset) Financing Structure



As reported by Bloomberg NEF, in 2019, on-balance sheet financing made up 65% of the total clean energy finance of USD 230.1 billion, i.e., USD 148.6 billion, while nonrecourse project finance accounted for balance 35% of total clean energy finance (USD 81.1 billion). The bond or other category financing instruments, which include leasing, continued to be only very small proportion of the total, at USD 327 million[22].

With passing time, multiple investors have been attracted to fund the CET projects via different ways for both equity and debt funding.

In the next page, Figure 12 showcases the landscape of routes, available instruments and the institutions, which can be used for funding of CETs projects.

[22] Global Trends in Renewable Energy Investment 2020

Figure 12 : Financing Environment

Route	Over the Counter (OTC)			Capital Markets		Grants Infusion
Nature of Capital Funding	Debt	Equity	Hybrid	Debt	Equity	Grants
Instruments	Domestic Loans, Privately placed bonds, ECBs	Common stock, CCPS, CCDs, FDI, FVCI	OCD, OCPS	Bond/debentures, Green Bonds IPO/FPO, FPI, ECBs- international capital markets		Loans, Grants
Institutions	Commercial Banks, Development Banks, NBFC/IFC, PE Funds, Pension Funds, Sovereign Wealth Funds, Insurance Funds, Mutual Funds, Export Credit Agencies	PE Funds, Pension Funds, Infra Equity Funds, Asset Management Companies, Sovereign Wealth Funds, Insurance Funds,	PE Funds, Pension Funds, Insurance Funds, Infrastructure Funds, Mutual Funds	Domestic securities, offshore securities		Multilateral Development Banks, Governments

ECB: External Commercial Borrowings; CCPS: Compulsory Convertible Preferential Shares, CCDs: Compulsory Convertible Debentures; FDI: Foreign Direct Investment; FVCI: Foreign Venture Capital Investment; OCD: Optionally Convertible Debentures; OCPS: Optionally Convertible Preferential Shares; IPO: Initial Public Offering; FPI: Foreign Portfolio Investment.

3.1.1. Nature of Capital Funding

Any project can be funded via two ways 1) borrowing capital from lenders as a loan, 2) through equity by investing own funds or from selling a stake to investors.

Banks, financial institutions (FIs), non-banking finance corporation (NBFCs) or International Financial Corporations (IFCs) lend money to the CET projects and will expect the debt to be repaid within a certain period, thus earning a relatively small return on the transaction. On the contrary, equity capital usually looks for opportunities to invest – own an equity stake in companies / projects or a portfolio of projects and expects a greater return for the level of risk they take.

A privately-owned company may also bring in money from the capital market route via floating an Initial Public Offering (IPO) by offering its shares to raise capital from various investors through the stock exchange. Established companies may also issue further share capital via follow-on public offer (FPO) to fund expansion plans. Thus, on case to case basis, the capital structure may be represented as shown in Figure 13 below:

Figure 13: Typical Capital Structure and Role of Public and Private Players

3.1.2. Debt Finance

OTC Route

As briefly explained in Figure 12, any CET project may attract the debt funding through loans and ECBs, directly over the counter from private markets or public markets through registered corporate, government and green bonds.

CET projects often SAARC Member States like India, Nepal, Bangladesh and Sri Lanka. Also, the cost of debt has higher levels of leverage than other non-infrastructure investments due to steady revenue streams for long term and accurate cash flow projections. Debt instruments have historically comprised 70-90% of the total capitalization of solar and wind projects, which is comparatively higher in the developing countries in comparison with the developed economics due to their illiquid domestic debt markets. In developing economies, the project finance debts are generally offered in the local currency in order to minimize the currency mismatch between project revenues and debt repayment, although hard currency issuance is possible. Also, lately in developing countries like India, China, Nepal, the UAE, Mexico, etc.; cash flows are being hedged to allow multi-currency financing structures, both in dollars (USD) and local currency. Though, for countries with shallow debt markets or emerging capital markets, debts are given in dollars (USD) only with the provision of certain legal frameworks and the enforceability of contracts.

The major sources of debt financing are international and national commercial banks, NBFCs, infrastructure financing institutions, multilateral development banks (MDBs) and IFC, investment funds, and private investors.

Capital Market Route

Bond markets are also becoming potentially large source of finance for CET projects. Plain corporate bonds, subordinated bonds, convertible bonds, and preferred stock are some of the common instruments in capital market. Nowadays, companies especially prefer to refinance the operational projects at the project or corporate level (mix of CET projects) by issuing bonds in domestic or international markets. As the risk involved in a brownfield project is lower than that of a greenfield project, the cost of borrowing reduces dramatically by approximately 200-300 basis points; depending on multiple factors like technology, country, operational track record, project performance, etc.

One example of class specific instrument, as mentioned above, is green bond. It is just like a regular corporate bond with primary difference of intention of issuer to invest in green projects. The issuer raises funding from the investors in exchange of green bonds. The investors are paid a fixed

interest, and the principal amount is paid after a mutually agreed period or at the maturity of the project. Local banks and other financial institutions, which directly invest in RE projects, can also raise green bonds for their liability.

According to the Climate Bond Initiative, only China and India have emerged as the key markets among the emerging markets, with a 73% share of cumulative green bonds issuances of ~USD 140 billion between 2012 and 2018[23]. The Agricultural Bank of China issued the first green bond and raised USD 1 billion by a state-owned Chinese bank in 2015. India also entered the green bond market in 2015 with the YES Bank issuing the first green bond for financing the clean energy projects. In August 2016, NTPC Limited, India's largest power utility, also issued its first ever green bond (with Masala bond feature*) of USD 299 million for a 5-year tenure. In India, the average coupon rate for domestic issuers is on the higher side in a range of 6.5% - 7.75%, compared to 4.6 - 4.7% for international issuance.

Adani Green Energy Limited, an Indian renewable energy developer, raised USD 362.5 million in 2019 by issuing dollar denominated bonds. The company has utilized the proceeds, partially to repay its respective foreign currency loans and local borrowing. The balance of the net proceeds will be utilized for capital expenditure, other project related liabilities or for general corporate purposes.

Global rating company S&P rated the paper with BBB-, which has been the lowest in the investment grade. This was the first 20-year offshore green bond, bearing an interest rate of 4.625% out of India and the first such investment grade bond.

Being inspired from this success, the company is planning to raise up to USD 12 billion through the sales of green bonds over the next four to five years to fund its development plan and become the world's biggest renewable energy player.

Further, the comparison of the available instruments, institutions, and their expected yields is detailed later in section 3.4.

3.1.3. Equity Finance

Equity finance refers to the sources of funds that a project developer company / investor can avail in return for an ownership interest. In most cases, the return is determined by the success of the project, as equity investors are exposed to the project-specific risk and no security is provided by the investee. Equity investment typically constitutes 10-30% of a total project capitalization. Generally, equity contributors for CET projects prefer to keep the share of equity as low as possible, which limits their liability and maximizes the return on capital employed (leverage). Maximization of return on equity infused in the projects may be possible through maximizing dividend yield, since many projects lack a strong growth component. Investors may share the ownership in the project if it is held for its life, or they may get a share of the proceeds if the project is sold off.

OTC Route:

Over the past decade, different kinds of institutions are actively seeking opportunities to invest directly in CET projects / developer company depending on the business model, risk appetite and

[23] Green bonds: The state of the market 2018

*Masala bonds are INR denominated bonds issued outside India by Indian entities.

the development phase of the CET. Direct investment has often been an adopted route by the institutional investors that have the in-house resources, capability to source quality projects, perform due diligence, finance the investments and manage them.

Figure 12 above has showcased the institutions present in CET project funding. Venture capital generally focuses on early stage of technology companies; private equity firms invest majorly in matured technology with the investment horizon of 3-5 years; pension funds' ticket size is relatively larger for a longer period (10 to 15 years), in projects having minimum risk; while infrastructure investment refers to the investment in low risk infra projects like road, power transmission and rail construction.

Capital Market Route:

Another source of equity finance is public equity via capital markets route. In public equity companies, assets are traded in some forms of vehicle listed on a stock exchange. A listed corporate company can raise equity capital by issuing the shares (like IPO and FPO) for trading on domestic stock exchange or international stock exchange like London Stock Exchange (LSE) or New York Stock Exchange (NYSE). Listed infrastructure funds also raise capital either in a similar way, or by gathering investment capital from investors to deploy into infrastructure investments (open-ended). Such funds (closed-ended or open-ended funds or investment trusts) may attract the small ticket sized retail investors to invest directly into CET projects, as the fund managers manage the portfolio of projects/assets and operations on behalf of all their investors. Such funds further may invest in listed project companies, or in unlisted project companies as well.

For CET projects situated in the emerging countries, co-investment platforms are also becoming an alternate option to the traditional OTC routes. Number of large pension funds and sovereign wealth funds are pooling their financial and internal resources to invest jointly in CET projects / project developer companies.

Australia's largest superannuation fund – Australian Super and Canada's largest single-profession pension plan – Ontario Teachers' Pension Plan - have jointly invested USD 1 billion each in the National Investment and Infrastructure Fund (NIIF) of India's Master Fund in 2019.

This was the third round of fund raising for a 15-year master fund, which is focused to invest the equity capital in core infrastructure sectors like transportation, clean energy and urban infrastructure.

In Nepal, Dolma Impact Fund (Dolma), BO2, North Associates and One to Watch are few active PE / VC funds, targeting small and medium enterprise (SME) and clean energy sector. In 2017, they collectively had asset under management for USD 48 million.

Dolma is a Mauritius-registered fund, which focuses on multiple of sectors including hydro power, solar, healthcare, agriculture, education, tourism, technology, etc. They have ambitious plans to invest USD 200 million for the development of a 170 MW solar power plant; out of which, a 25MW solar plant has already been installed in Nuwakot District in Nepal. The referred largest solar power plant of Nepal is installed at a single location.

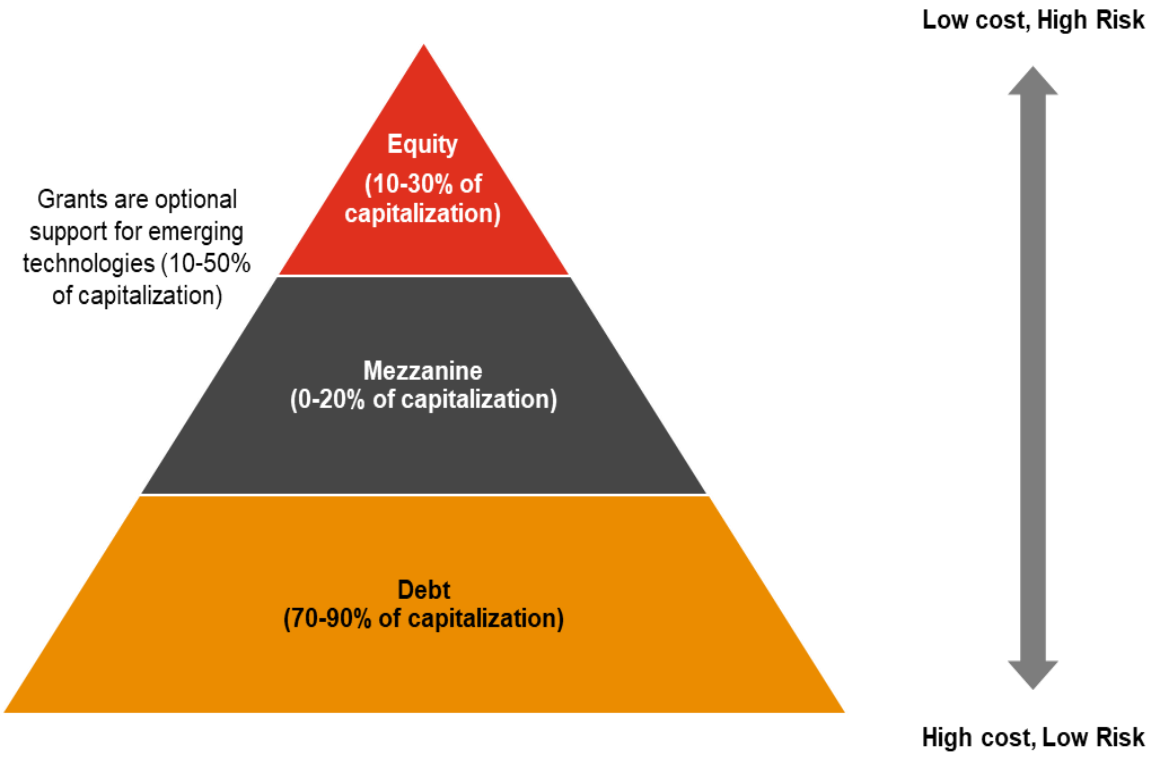
Further, the prevailing institutions in CET projects in the developing countries and their return expectation are detailed later in section 3.4

3.1.4. Other Means of Finance

Hybrid Finance

Hybrid instruments of funding such as mezzanine finance are debt instruments with equity-like participation, thus forming a bridge between debt and equity instruments. Subordinated debt and mezzanine funding provide a degree of credit support to the senior project financing. It can also act as a key in securing the senior debt for the projects of not very matured technologies. Mezzanine debt offers higher yields and can also include equity participation rights, which may attract certain investors like pension funds and mutual fund houses.

Figure 14: Project Capitalization



Grants

A grant can be specified as a lump-sum funding usually made available to project implementing companies for construction and development of the project. These payments are generally linked to the project revenues or tied to certain milestones to be achieved in the project life. It can be free of charge or subject to a concession fee. Grants help to reduce the financing cost during construction and can be paid out at any time during the project life. It is not a risk mitigation instrument, but a grant can effectively offset objective risks in project finance. The quantum of the grant disbursement for each project is also equally important to catalyse the sector developments.

In developing countries, where the funding arrangement for new technologies is difficult, the project authority generally offers monetary grant. In some cases, the public authority may also provide public assets like right to use public land for free or at reduced cost for project developments.

MDBs like ADB, World Bank, IMF, KfW, JICA also deploy funds via grant financing to support and mobilize the CET transition of the emerging countries, e.g., Climate Investment Funds (Clean Technology Fund and Strategic Climate Fund) at the World Bank have been financed by their donors with an objective to deploy the funds in the form of grants and loans to developing countries for climate mitigation programs and projects.

In 2017, ADB had approved a grant of USD 44.76 million for a 20 MW solar PV project in Kabul region of Afghanistan. The intention of the grant was to boost the construction of solar power projects in the country. It was the first largest solar project of Afghanistan.

3.1.5. Carbon Financing

The Clean Development Mechanism (CDM) of the United Nations Framework Convention on Climate Change (UNFCCC) is a mechanism mentioned under Article 12 of the Kyoto Protocol. It allows the developed countries to use Certified Emission Reduction (CER) credits generated from the sustainable development of projects in the developing countries to meet part of their emission reduction targets under the Kyoto Protocol. In this mechanism, the developing countries receive investments for implementing clean technology projects and revenues from the sale of these CERs. The issuance of CERs is subject to stringent validation of a project as CDM project by UNFCC CDM. One CER is equivalent to one tonne of carbon dioxide equivalent (tCO2e).

CDM promotes investments in CET; only when it is part of a larger financial support package. Presently, the effectiveness of CDM as a financing tool for CET projects across the SAARC Member States is limited because of high costs of transaction, complexities in registration process, etc.

As the second commitment period of the Kyoto Protocol is approaching to an end in 2020, authoritative guidance on registration of new projects and issuance of CERs for emission reductions achieved after 2020 by existing projects is currently not clearly defined. One of the reasons for such ambiguity is lack of coordination in transition of CDM scenarios into the Paris Agreement architecture by their respective governing bodies (Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) and the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA)).

3.2. CET Financing in Each SAARC Member State[24]

Afghanistan:

Afghanistan is in the public funding mode of financing. They must procure as much international help in terms of policy formulation and funding as possible. Also, the government should take the lead in driving this initiative, with the aim to increase the PPP mode of financing in a set amount of time.

Bangladesh:

Bangladesh is in the PPP mode of financing, as it is a mature market with a sizeable population. It can make use of financial instruments with public funding being used as the support to attract investments. Some of the schemes of the Bangladesh government such as the solar home systems

[24] Mobilizing International and Regional Finances / Funding for Implementation of Renewable Energy Projects in SAARC Member States

have done very well because of innovative local funding options and the dedicated efforts of the government. Bangladesh should continue be dependent on PPP mode for a sizeable amount of time and further develop its funding infrastructure for increased investments.

Bhutan:

Bhutan is a relatively small country with abundant natural resources. Bhutan has developed the sector policies and evolved from the public funding mode to the PPP funding mode. It may strengthen its position in the PPP funding mode by attracting investments and giving further impetus to its cross-border power trade initiatives.

India:

India has taken several initiatives in the renewables space with specific central level and state level targets. It is in the advanced stage of the PPP funding mode and can further strengthen its already robust renewable energy sector by entering the purely private mode. This process is already underway in India.

Maldives:

Maldives is in the public funding mode. Being an island nation, it has limited resources that can be tapped for renewable energy, and at this point, it is largely on the government to develop this sector.

Nepal:

Nepal is a small Himalayan nation with limited market maturity but abundant natural resources. However, it is in the public funding mode at this point because the basic financial infrastructure to enter the PPP mode has still not evolved.

Pakistan:

Pakistan, which is a sizeable market and its financial infrastructure is mature enough to handle the PPP funding mode of renewables, is imperative for a country of this size. However, the policy framework and government initiative are lacking in the renewable energy space, as priority is being given to other sectors.

Sri Lanka:

Sri Lanka is an island nation with a robust renewable energy framework and many initiatives taken by the government to develop this sector. Hence, it is currently in the PPP funding mode of financing.

3.3. Structuring of CET Projects in SAARC Member States

Following case study of 'Rewa Ultra Mega Solar (RUMS) Park in India' can be referred to develop project and financing structure of clean energy projects in SAARC Member States.

Push for solar energy as an alternative source of energy began in India with introduction of Jawaharlal Nehru National Solar Mission (JNNSM) in 2010 as part of the National Action Plan for climate change. The mission was envisaged with achieving ambitious target, which was later revised to 175 GW Solar capacity by 2022.

This renewed ambitious target by Government of India coupled with dramatic fall in prices of solar PV modules has fuelled the growth of solar sector in India. Further, with the introduction of reverse bidding process in the sector, tenders have been offered even at prices lower than conventional power plants, making it arguably reach grid parity. The RUMS (3X 250 MW) achieved the lowest ever tariff of US cents 4.43 per unit.

Rewa Ultra Mega Solar Park – Key Features, which make it unique

Bid process for the RUMS, 3X250 MW drew a lot of worldwide interest due to the extremely competitive bids it received during the auctions. RUMS, which is a one of the several solar parks, is planned to be built up across India under the Govt. of India's ambitious target, IFC was the transaction manager for this bid advisory work; while PwC acted as regulatory and commercial consultants.

RUMS, a 50:50 joint venture between SECI and Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL), was the implementing agency for this solar park. The RFPs were issued in March 2016 and pre-bids and roadshows were held over next 8 months. The final tenders were released in December 2016, and after a fiercely fought reverse auction, which ran for 33 hours continuously, the winning bids of US cents 4.43 per unit (INR 2.97 per unit) for first year tariff is one of the lowest ever discovered in India. Even the levelized rate (since the bid allows 5 paise escalation year on year till 15th year) comes to US cents 4.92 per unit (INR 3.30 per unit). This is 32% lower compared to the previous lowest tariff (in India) of US cents 6.48 per unit. Globally too, when compared to other projects of similar size, such as DEWA 800 MW in Dubai, which received a bid of US cents 3 per unit, the price discovered is very attractive, considering applicable taxes in India.

The results have led to stakeholders in the solar industry take note of the fact that if the key bidder issues are addressed in structuring of the project, market is ready to offer a very good price. Following are the key features, which make this transaction unique:

- **Policy and Regulatory:** The transaction required several policy and regulatory issues relating to third party sale and Open Access and Scheduling of power to be addressed. These are listed below:

    - *Third party sale to an Open Access Consumer:* Delhi Metro Rail Corporation (DMRC), an Open Access consumer, along with Madhya Pradesh Power Management Company Limited will purchase 750 MW equivalent of solar energy from the project. Unlike other Solar bidding PPAs in India, project developers of RUMS would be executing a PPA directly with end the consumers without any trading margin or intermediary. This allows the solar project developers to assess the credit risk of procurers appropriately and the effect such direct PPAs with end consumers has been reflected in the tariff discovered.

    - *Optimum Scheduling:* For the first time in India, a solar power project has been designed to supply power to an inter-State Open Access consumer. DMRC (an Open Access consumer) will buy 25% of the energy from the Project, not because it is mandated, but because solar power from this project will be cheaper compared to power presently available to it. The project will promote greater penetration of solar power by being a pathfinder in opening a large market of creditworthy open access consumers as purchasers of solar power.

- **Building Infrastructure:** One of the key objectives of the project was to get one of the lowest tariffs. This was ensured through a better preparedness on part of the bid agency as well as optimum use of the available resources.

    - *Low Infrastructure Charges:* The project gets benefit of the World Bank loan, which has been used to build the internal infrastructure of the park for the tenants. Out of this loan, around 40% is coming through the Clean Technology Fund (CTF), which is at super concessional rate of 0.25%. This helped in having low charges for the infrastructure use.

    - *Land Acquisition:* Large parcels of land required for the project (1590 hectares) were procured smoothly and in a tight timeline. Private land was procured based on the consent of landowners. This lays new standards for smooth implementation of large projects. The developers will be handed over the entire land at the time of PPA signing.

- **Payment Security:** The payment delays are entirely de-risked by a 3 layered payment security mechanism. Second, off-take risk is taken away by the provision of deemed generation.

    - *3-tier payment security mechanism:* Payment Security Mechanism, devised for this transaction, is a three-tier payment security guarantee with Letter of Credit, Payment Security Fund and State Guarantee (for Madhya Pradesh Power Management Co. Ltd, MPPMCL component of power purchase from the project). Such Payment Security Mechanism improved the credit worthiness of the transaction and enabled higher interest among developers (both national and international).

    - *Deemed Generation benefit:* The developers get deemed generation protection to developers for unavailability of transmission network (for more than 175 generation hours in a year). This has significantly improved the risk profile of the project.

- The RUMS is funded at debt-to-equity ratio of 77:35 by the three winners under reverse auction. International Finance Corporation (IFC) has arranged financing for around 75% of the projects' cost in the form of INR-denominated loans with a final maturity of 20 years. The SPVs are required to maintain Debt Service Reserve in cash equivalent to 3 months of debt as security. In addition to this, it shall maintain a Debt Service Coverage Ratio.

- **Other Innovative features:** Some of the other innovative features of the bid are listed below.

    - *Innovate Reverse Auction:* A major innovation has been re-designing the reverse auction process followed in solar projects. It allows the bidders to bid a separate tariff for each plot of land, and further allows bidding in increments of one hundredth of Indian Rupee, enabling savings for procurers, when the bidders have exhausted their ability to reduce the bid by one Paisa.

    - *Change in Law:* The change in law provision covers any increase or decrease in costs (other than incurring additional capital expenditure), or any increase in taxes. Thus, it covers the uncertainty for the bidders for events, which are likely to erode their IRRs.

    - *Termination Clause:* On event of default of Solar Project Developer or Procurer, appropriate termination compensation has been defined in the project agreements, to make good the other party of the PPA on event of termination. Such termination compensation is expected to provide certainty on transactions both from procurer and SPD perspective.

The results of RUMS have brought to fore the fact that 'better project preparation, de-risking the transaction structure and reducing variability for the bidders' are essential to interest serious players in the market. This was one of the key reasons that the bid attracted 20 bidders including some renowned companies such as SoftBank, ENEL, Engie, Sembcorp, Adani, Ostro, etc. to participate in the bid. The bid was finally won by three IPPs, i.e., Mahindra Renewable, Acme Solar holdings and Solengeri Power.

The overall implementing strategy and financing structure employed in RUMS had many innovative elements including optimum proportion of sale of power to third party as well as the state utility, payment security mechanism, provision for change in law and termination clause, etc. Such structures should be employed to accelerate the implementation of the CET projects in SAARC Member States.

3.4. Investor Expectations

In last few years, clean energy has emerged as the most transacted sub-sectors in the overall infrastructure asset class in developed as well as developing countries, as most of the countries have established national renewable energy policies, targets and incentives. With more CET projects planned and commissioned eventually, various classes of investors have also shifted their focus and adjusted their risk appetite to get higher returns from solar PV, onshore and offshore wind, and bio-energy projects. Typical return expectations from CET projects in SAARC Member States by a popular class of investors are briefed in Table 15:

Table 15: Summary of Investor Class and Their Expectations from Investments in CETs in SAARC Member States

	Debt Finance			Equity Finance			
	Commercial Banks	NBFC / FI	MDBs	Venture Capital Funds	Private Equity Funds	Infrastructure Funds	Pension Funds / Insurance Funds
Source of Fund	Public money, Current Account and Savings Accounts	Domestic and Global Capital Markets, Mutual Funds,	Donations from member countries and other developed countries, World Capital Markets	Sources with high risk appetite - Pension Funds, Mutual Funds, High Net Worth Individuals	Sources with medium risk appetite - Institutional Investors and High Net Worth Individuals	Institutional Investors and Pension Funds	Public Money
Cost of borrowing of the funds*	7% - 10%	8% - 11%	-	NA	NA	NA	NA
Risk Appetite	Medium	Medium – High	High	High	Medium	Low	Low
Investment Horizon (years)	5 to 15	5 to 10	10 to 20	3 to 8	3 to 5	5 to 15	10 to 15 years for pension funds 1-10 years for insurance funds
Expected Return*	9-12%	10-14%	NA	20-50%	>25%	>15%	10% -13%

3.5. Risk and Challenges in CET Development and Financing

Despite having whole gamut of interested investors, financing instruments and multiple routes, CET projects in different countries face quite a few challenges in the overall implementation and availing funding due to lack of long-term commitment for debt, weak or underdeveloped local financial markets constraining re-finance or exit from the project, lack of sector knowledge etc. Few of the key challenges being faced across the SAARC Member States are detailed as below:

Sovereign Risk:

Credit rating of each country is based on multiple factors, which primarily include outlook; political, administrative and institutional stability; economic stability; FDI inflow; government debt; banking sector performance, etc. This helps investors analyse the risk in country; and thus, gaining confidence on their investments. Three countries – Afghanistan, Bhutan and Nepal do not have any credit rating certified by external credit rating agencies such as standard and poor, Fitch ratings, etc.

Institutional Uncertainties:

Very often, the institutional setting of the country's power sector demands continuous coordination between different government entities / departments at federal as well as provincial governments, to mobilize the required finance. At times, the presence of multiple decision authorities creates degree of uncertainty for the domestic as well as foreign investors. For example, in Nepal, the absence of the approval channels for the large hydro power projects in late 2000s has resulted in delay in the execution of 5 projects. In 2012, the Investment Board of Nepal took over 5 internationally bided projects from the Council of Ministers and only 2 out of 5 (Arun3 – 900MW, Upper Trishuli – 216 MW) projects have achieved financial closure by February 2020.

CET as Part of Power Sector:

Roadblocks in availing financing for CETs also emerge partly due to tagging them under the overall umbrella of power sector. The power sector consists of electricity generation, using conventional sources of energy, power transmission and distribution infrastructure. Overall, the power sector is matured in terms of operational track record, proven technology, risks involved, financing framework, investors' confidence and so on. However, CETs will take time to attain the similar maturity levels.

In few countries like India and Bangladesh, due to the increase in indebtedness of corporate companies, high non-performing assets (NPA) and overexposure to power sector, stress on balance sheets of banks and FIs are increasing. As a result, majority of the commercial banks and FIs are reluctant to lend further to the power sector projects including clean energy projects.

Scale of Project and Investment:

Sometimes, for a small-scale project, the cost of transaction and time invested may effectively be more than the scale of investment itself. Thus, large and sizeable investors/FIs/IFCs may lose interest in investing in such projects. For example, biogas plants generally face challenges in raising long-term debt, as the funding amount is too small for most domestic banks and financial institutions, while it is unconventional for the banks' small and medium enterprise financing teams to lend in such sectors.

Poor Organization of Long-term Financing

In majority of SAARC Member States, the long-term financing for the CETs is poorly organized. For instance, the domestic bond market is still not matured enough for CETs in almost all the SAARC Member States, as there has been a tendency of investors to invest in low-risk, high rated (AAA) government securities and large corporate bonds, or other low-risk options. The long-term funds available through domestic insurance and pension funds occupy only a fraction of the total investments. However, the foreign insurance and pension funds are lately seen investing into CETs in a few SAARC Member States like India, Bangladesh and Nepal. Also, the barriers in terms of consumer awareness, lack of credit-worthy consumers, high cost of funds, unclear regulatory and policy related to financing environment in the country, etc. make the access of long-term financing further difficult in SAARC Member States. The same are further discussed and summarised in Section 5.

Volatile Foreign Exchange Market

Another challenge is associated with the volatility of the foreign-exchange market, resulting into foreign-exchange risk. It can become a major setback in attracting the international finance into the sector. The cost of capital may increase due to the local currency fluctuation and expectation of the foreign investors.

Considering the above factors, in Table 16, significant financial barriers and risks imposed have been summarized and ranked for different CETs. Here, five financing risks are identified majorly prevalent in CET projects, irrespective of the country, and classified under three categories, based on the severity of the impact on each CET technology.

Table 16: Financing Risk Matrix[25]

Identified Risk	CET	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri - Lanka
Lack of long-term financing	Wind	H	H	H	M	H	H	H	H
	Solar	H	H	H	M	H	H	H	H
	Hydro	H	H	H	M	H	H	H	H
	Bio	H	H	H	M	H	H	H	H
Lack of project financing	Wind	H	M	H	L	H	M	M	M
	Solar	H	M	H	L	H	M	M	M
	Hydro	H	M	H	M	H	M	M	M
	Bio	H	M	H	M	H	M	M	M
High and uncertain project development costs	Wind	H	M	M	L	M	M	M	M
	Solar	H	M	M	L	M	M	M	M
	Hydro	H	M	M	L	M	M	M	M
	Bio	H	M	M	L	M	M	M	M
	Wind	H	H	H	L	H	H	M	M

[25] Mobilizing International and Regional Finances / Funding for Implementation of Renewable Energy Projects in SAARC Member States

Identified Risk	CET	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri - Lanka
Lack of equity finance	Solar	H	H	H	L	H	H	M	M
	Hydro	H	M	M	L	H	M	M	M
	Bio	H	M	M	L	H	M	M	M
Foreign exchange volatility	Wind Solar Hydro Bio	It is equally applicable for projects of all technologies which are externally funded							

Note: Here Bio represents biomass and bagasse.

L– Low: Small or no impact (mitigation of risks is desirable); M–Medium: Moderate impact (mitigation of risks is likely to be required); H- High: Significant impact (mitigation of risks is required)

Today, typical operational life of a CET project is 25-30 years across the world. In SAARC Member States, the typical Power Purchase Agreement (PPA) is for a long term for a period of 20-30 years. However, the appetite to extend such long-term debt for more than 15-20 years by major domestic financing institutions and commercial banks is not developed yet as summarised from the Table 15. As a result, in absence of the long-term financing products, the banks and FIs extend short term debt to credit long term CET projects, which increase both the cost of lending and project risk.

The risk of availing project (asset) financing is moderate for almost all CETs. As explained in Section 0, the non-recourse asset financing is gaining momentum for CET projects because of self-sustaining cash flows, stable revenue-stream (in terms of fixed PPA) and low operating cost.

The CETs like solar projects, wind projects and biomass projects have almost fixed cost elements and small implementation timeline. Hydro projects are often located in environmentally and socially sensitive areas and are exposed to regulatory changes. Thus, they face uncertainty in terms of cost and time overrun. Hence, the risk pertaining to the project development cost is considered moderate for hydro power projects.

Due to this high risk of investment in low / middle income countries or developing countries, there are limited numbers of large-scale project sponsors with the ability and willingness to fund renewable projects on a corporate finance basis, which leads to one of major issue, i.e., lack of equity. This lack of equity capital means that project sponsors are often unable to cover the costs of development activities without external assistance. The lack of equity capital also increases the dependence on project financing, as sponsors are unable to provide collateral for loans or to put up large amounts of equity. As a result, loans have to be secured against future cash flows, given the absence of alternatives.

Few other operational challenges affecting the financing of CET projects include land acquisition, getting the necessary permits on time, offtake arrangement (Power Purchase Agreement with power off taker), etc. In a nutshell, there exist a multitude risks and challenges associated with financing of clean energy sector project across its life cycle. This not only leads to uncertainties in project execution but also makes the process of availing the required funding complex.

Projects Terminated in India

Recently in May 2020, one instance was observed for termination of the concession agreement by the authority to execute waste to energy project in Kochi city of southern Indian state – Kerala due to failure in financial closure.

Four years ago, the Kochi corporation had executed a concession agreement with GJ Eco Power Private Limited, to install the waste to energy plant at an estimated cost of approximately USD 41 million. One of the major reasons for failure in achieving financial closure is dispute over the payment mechanism to meet the expenses over and above the power tariff fixed by the Kerala State Electricity Regulatory Commission (KSERC).

Delay or dispute in land acquisition for projects can also result in failing to achieve the financial closure. In January 2020, The CERC of India had ordered the Central Transmission Utility to encash a bank guarantee of a wind power project in Gujarat. This is primarily due to the delay in financial closure of the project as a result of change in state's land policy.

3.6. Implication of Slow Growth and Cost Value of Missed Opportunity

Slow growth of the development of CET projects can be an outcome of multiple challenges. A few of them are already explained in section 3.5. Few countries like China, India, Germany, and Norway have partially succeeded in overcoming these challenges in clean energy transition. However, majority of the developing countries in Asia and Africa are still facing challenges at multiple fronts in planning, developing and executing the utility scale clean energy projects; leading the slow growth in energy transition. There may be technical, social and commercial consequences of such slowdown of CET implementations including the dependency on external sources for design and technological know-how, increased cost of project implementation due to inflation over the years and missing of grants and funding from few of the dedicated MDBs and climate funds.

For an illustration, the Asian Development Bank in its "Country operations Business Plan for 2020-2022" [26] for Afghanistan, Bhutan and Pakistan, has disclosed indicative availability of funding for project loans, policy-based lending for structural reforms and multi tranche financing facilities (MFFs) for energy, transport, water and other urban infrastructure sectors, as summarized in Table 17. "The final allocation will depend on available resources and the outcome of the country performance assessments" and slow growth of planning and execution of CETs in those countries may end up losing these funding for the sector.

Table 17: Indicative Availability of Funds for Energy Sector by ADB: 2020 - 2022

Country	Sector	Key areas of assistance	Indicative availability of funds
Afghanistan	• Power supply and electrification	• Construction of regional and domestic electricity transmission lines • Construction of electricity distribution lines • Generation of renewable energy	• Amount: USD 120.00 million (ADF) and USD 345.00 million(co-financing)

[26] Country Operations Business Plan for Afghanistan, Bhutan and Pakistan for 2020 – 2022 by ADB

Country	Sector	Key areas of assistance	Indicative availability of funds
		• Increased usage of renewable energy, rehabilitation of gas wells, development of energy sector capacity and institutional reform	
Pakistan	• Development of domestic energy resources (hydropower, renewable energy, coal, and gas), and • Development of transmission and distribution networks	• Hydropower and other power generation • Energy efficiency and strengthened transmission and distribution • Enhanced enabling environment for private sector investment in the energy sector with policy and regulation reforms	• Amount: USD 1.67 billion (USD 970 million regular OCR and USD 700 million COL) and USD 450 million co-financing
Bhutan	• Energy security and the energy sector's contribution to revenue, economic growth, employment, and climate change mitigation	• Increased cross-border power trade and domestic electricity access • Hydropower production and transmission	• Amount COL: USD 95.00 million ADF grant: USD 5.00 million Regular OCR: USD 145.00 million

Note: COL - Concessional Ordinary Capital Resources Lending; ADF – Asian Development Fund; OCR - Ordinary Capital Resources

As mentioned above, clean energy sector is emerging as the hotspot for various investor classes globally. Further slowdown implementation of CETs may cost a country a missed opportunity to attract such global investors.

4. Future Scope of Utility Scale Clean Energy Projects in SAARC

4. Future Scope of Utility Scale Clean Energy Projects in SAARC

4.1. Project Pipeline

The clean energy potential is substantial in the SAARC Member States. In order to fulfil their power demand, they have also identified the need to commercially harness it. Utility scale projects of solar and wind technologies are now matured and commercially established in countries like India, China and UAE. Countries like Nepal, India and Bhutan of the region have multiple large scale operational hydroelectric projects. For bio-energy based utility scale projects, Sri-Lanka and India have shown progress but they are still at a nascent stage and same is the case with rest of the SAARC Member States. Trends show that the countries have set the ball rolling for the utility scale projects for proven clean energy technologies such as solar, wind and hydro power. In Table 18, the tentative deployment of these proven CETs in next 10 years is estimated based on various factors for CETs such as current installed capacity (Table 8), historical growth (Table 10), identified potential of each CET (Table 11) and identified targets by each SAARC member state (Table 12).

Table 18: Estimated Capacity Addition by 2030 (in MW) in SAARC Member States

Estimated Capacity Addition by 2030 (MW)	Hydro		Solar		Wind		Total	
	Initiated	Estimated Addition by 2030	Initiated	Estimated Addition by 2030	Initiated	Estimated Addition by 2030	Initiated	Estimated Addition by 2030
Afghanistan	1,200	2,863	100	1,450		1,200	1,300	5,513
Bangladesh	370	60	1,270	1,913	1,150	1,370	2,790	3,343
Bhutan[27]		7,600		12		9		7,621
India	12,000*	23,030	13,500	147,933	9,300	127,307	34,800	298,271
Maldives			11	26			11	26
Nepal[28]	2,390*	14,000	480	892			2,870	14,892
Pakistan	890*	22,748	460	12,800	775	12,700	2,125	48,248
Sri Lanka[29]	1,000	431	360	1,735	170	2,185	1,530	4,351

*Includes medium and large-scale hydro power projects

Afghanistan

Despite having huge potential and targets for clean energy projects, the country has not identified clear pipeline for the project execution. Few of the planned projects include 40 MW grid connected solar PV project in Herat. IFC is assisting the government of Afghanistan in this project.

Bangladesh

Equivalent to 150 MW capacity of utility scale solar power projects at multiple locations is under

[27] National-Transmission-Grid-Master-Plan-2018
[28] Nepal Energy Sector Assessment, Strategy and Road Map
[29] Assessment of Sri Lanka's Power Sector, ADB

construction and ~1,000 MW capacity is at various stages of planning and implementation. Major under construction solar projects include 50 MW capacity awarded to a consortium of Metito Utilities, Jinko Power and Al Jomaih Energy and Water at a tariff of USD 0.0749 per unit in August 2019 and 50 MW each awarded to Germany's IB vogt and Bangladesh's domestic company AG Agro Industries in October 2019, at a tariff of USD 0.10 per unit. This tariff is the lowest ever tariff seen in the country.

Bhutan

Bhutan is a carbon neutral electricity surplus country. The government authorities are planning to continue to maintain the same status by focusing on hydro power projects and a very few small-scale decentralized bioenergy projects in the coming years. The identified target for CET implementation is as small as 25MW including solar and biomass.

India

Among the SAARC Member States, India has well planned pipeline for implementing CET projects including solar, wind, hydro, biomass and WtE power projects. However, major focus is on solar and wind power projects. Government of India has given a target of 175 GW by 2022 - 100 GW of solar, 60 GW of wind and balance by others. As on October 2020, total approximately 89 GW has already been installed – 36 GW of solar, 38 GW of wind and balance by other. Around 46 GW of solar and 14 GW of wind are under various stages of bidding and bids of total 41 GW (33 GW of solar and 8 GW of wind) are yet to be floated. A few RE rich states have also planned GW scale projects, which will be awarded soon via competitive bidding route.

Other CETs like biomass and WtE are also being planned but the scale of implementation is relatively small. Often the WtE plants attract the environmental concerns due non-segregation of waste, which impacts the power generation by the plant and leads to pollutants. Though the ecosystem for biomass and WtE is not yet established for large scale utility scale projects, the implementation has gained momentum and expected contribute in the overall electricity generation in years to come.

Maldives

The islandic geography of Maldives restricts the country to implement grid connected utility scale CET projects. The project pipeline for utility scale CET projects is not considered for the analysis. However, there are few projects, which are under development and under bidding process such as installation of 10 MW floating solar system in Addu city, 11 MW of land-based solar in Addu City, Fuvahmulah City, Kulhudhuffushi City, GDh. Thinadhooo, B. Evdhafushi, and Lh. Hinnavaru.

Nepal

Nepal has very limited project pipeline for CETs, other than hydro power plants. ~30 MW large scale solar are under construction, which includes country's largest solar project of 25 MW on Debighat Hydropower Plant in Trishuli. It is funded by the World Bank under Grid Solar and Energy Efficiency Program. Among the SAARC Member States, Nepal has relatively the largest pipeline of the hydro power projects under design and implementation stages.

Pakistan

In Pakistan, around 460 MW of solar projects and 775 MW of wind power projects are at various stages of implementation as reported by the AEDB. Forty-two MW (4 projects) have obtained

Letter of Support (LOS) from AEDB and are in the process of achieving Financial Closure (FC). Solar projects equivalent to ~420 MW capacity have obtained LOI from AEDB and are required to participate in the upcoming competitive bidding to be carried out by AEDB.

Twelve wind power projects (around 610 MW capacity) have achieved FC and are under construction. Wind projects of ~165 MW are at different stages of project development. Equivalent to ~870 MW of hydro power projects are being developed. Few of them are a part of CPEC.

Sri Lanka

Around 250 MW of hydropower capacity and 170 MW wind power capacity are at various stages of development. The largest wind power project of the country till date is Mannar Wind Farm, which is completed as scheduled in August 2020. It has added further 100 MW capacity of wind power and has been implemented by the CEB and funded by ADB.

Despite having huge potential of biomass and dendro based power plant, the large-scale implementation has not been successful in the country. However, small scale (~1 to 5 MW) implementation of such projects for decentralized and captive usage is being accepted across the country.

4.2. Need for New Investments

To implement clean energy projects at such a huge scale in defined timelines, timely mobilization of investments at local level is one of the most important factors. The need of investment quantum depends on the installation cost of specific clean energy projects. Installation cost depends on multiple of factors, i.e., availability of land, resources and cost of funding, also varies across region and locations. However, it is also important to note that the installation cost for majority of the mature CETs has reduced in last decade across the world.

According to the latest cost data from IRENA, the global weighted average Levelized Cost of Electricity (LCOE) of

- Utility-scale solar PV projects fell 82% between 2010 and 2019
- Bioenergy projects fell from USD 0.076/kWh to USD 0.066 per unit in 2019
- Newly commissioned hydropower projects increased from USD 0.037 per unit in 2010 to USD 0.047 per unit in 2019. However, it is still very competitive, and is less than the cheapest new fossil fuel-fired cost project.
- Onshore wind projects commissioned in 2019 fell to USD 0.053 per unit, 39% lower than in 2010

Also, the weighted average installation cost for various technologies in 2019 is shown in Table 19[30] in the next page.

Table 19: Installation Cost for 2019

Weighted Average Installation Cost in 2019 (USD/kw)	Asia	India	China	Average
Hydro	1,350	1,489	1,184	1,341

[30] REN 2019

Weighted Average Installation Cost in 2019 (USD/kw)	Asia	India	China	Average
Solar	1,921	793	879	1,198
Wind	2,237	1,201	1,173	1,537
Bioenergy	2,408	1,350	1,385	1,714

The cost of hydro power project is a weighted average for all the construction types and sizes (10 MW to 1,000 MW). Also, the cost for bioenergy fired power projects is indicated in a range of USD 500 -4300 per KW, as the pattern of deployment by feedstock varies by each member state. In India, the range of installation cost varies from the lowest USD 508 per KW for bagasse projects to the highest USD 4,000 per KW for landfill gas projects (WtE).

The average installation cost for Asia, India and China for each CET is arrived to eliminate the vast variations of costs for project installation. Based on this, the average installation cost as shown in Table 19, and estimated project pipeline of each country, the need of investment for installation cost by 2030 has been estimated as shown in Table 20:

Table 20: Estimation for Investment Need

	10Y Estimation for Capacity Addition (MW)			Estimated Investment Required (million USD)		
	Hydro	Solar	Wind	Hydro	Solar	Wind
Afghanistan	2,863	1,450	1,200	3,839	1,737	1,844
Bangladesh	60	1,913	1,370	80	2,291	2,106
Bhutan	7,600	12	9	10,192	14	14
India	23,030	147,933	127,307	30,884	177,175	195,671
Maldives	0	26	0	0	31	0
Nepal	14,000	892	0	18,774	1,068	0
Pakistan	22,748	12,800	12,700	30,505	15,330	19,520
Sri Lanka	431	1,735	2,185	578	2,078	3,358

*India specific weighted average installation cost for each technology is considered to arrive at investment requirement.

The need of investment has been calculated based on the tentative capacity addition estimated by 2030 in each SAARC member state as shown in Table 17 and weightage average installation cost as shown in Table 18. Operational projects as of 2019 have been excluded while calculating the estimated capacity addition in Table 19.

4.3. Socio-economic and Environmental Benefits

Fast adoption of clean energy technologies is a key contributor towards sustainable development, benefiting human wellbeing, employment growth, environment sustainability etc., as shown in

Figure 15.

Figure 15 : Scaling the Benefits of CET on ESG Scale

Almost all the SAARC Member States have huge potential of various clean energy technologies and have seen increased investment in the recent past. The energy transformation from conventional energy sources to clean energy will have a dual role to play, i.e., fuelling economy-wide development and creating wide varieties of jobs within the country.

Table 21: Estimated Direct and Indirect Jobs in Clean Energy Sector Worldwide, 2018-19

Technology	Estimated job created in 2019 (million)
Solar PV (grid connected)	3.75
Hydropower	1.95
Wind power	1.16
Liquid biofuels	2.47
Solid biomass	0.76
Biogas	0.34

According to IRENA jobs database, approximately 11.5 million direct and indirect jobs were created in 2019 in the overall clean energy sector[31]. Also, in its Energy Transformation Scenario, 41.9 million jobs creation by 2050 in clean energy sector are estimated[32]. Only Hydro power sector has created approximately 2 million jobs worldwide in 2018, out of which 17% were in India and 5% were in Pakistan[33].

[31] Renewable Energy and Jobs Annual Review 2020

[32]Transforming the energy system – and holding the line on rising global temperatures

[33]Renewable Energy and Jobs: Annual Review 2019, IRENA

Based on the historical growth in capacity addition and trends for manpower employed to install the wind and solar projects in India and China, IRENA has estimated an average of 4-8 direct jobs per MW created for construction and commissioning of a 1 (one) MW scale solar and wind power projects[34]. This estimate of 4-8 direct one-time jobs/MW can be used to arrive an estimated jobs creation in SAARC Member States to construct and commission wind and solar power projects. Here, the estimated capacity addition by 2030 as shown in Table 22 is considered for solar and wind energy technology.

Table 22: 10Y Estimation of One-time Job Creation in each SAARC Member State

	No. of Jobs in Solar		No. of Jobs in Wind	
	Min	Max	Min	Max
Afghanistan	5,800	11,601	4,800	9,600
Bangladesh	7,652	15,304	5,480	10,960
Bhutan	48	96	36	72
India	591,734	1,183,468	509,228	1018,457
Maldives	104	208	0	0
Nepal	3,568	7,136	0	0
Pakistan	51,200	102,400	50,800	101,600
Sri Lanka	6,940	13,880	8,740	17,480
Total (million jobs)	**0.67**	**1.33**	**0.58**	**1.16**

Such employment creation tends to increase due to the increased penetration of CETs, which will eventually result into skilled workforce availability in each country and improved economic growth.

Since industrial revolution, power generation and environmental degradation have a very close relationship. Fossil fuel burning has severely impacted the earth's atmosphere that the mankind may not be able to recover or reverse. However, the clean energy technologies have shown hope to reduce the carbon footprint and emission of toxic gases into environment and create low/zero carbon economy. For SAARC Member States, the CET addition will help reducing the overall carbon footprint and pollution; because these resources are considered as environment-friendly and have negligible emission of exhaust and poisonous gases like carbon dioxide, carbon monoxide, sulphur dioxide, etc. unlike the conventional energy sources.

As summarised in Figure 15 above, SAARC Member States have multi-fold benefits in terms of improved local employment, better health of the society, improvement of life standard, reduced emissions, income development, demographic impacts and so on due to large scale deployment of the CETs for electricity generation.

[34] IRENA Jobs Database

4.4. Drivers for New Investments in CETs

The world has seen a lot of changes and has evolved in the past few decades. Africa and Asia are now emerging as the centre of development and investment hotspots due to multiple reasons, such as rapid economic growth and development, increasing populations and urbanization, as well as improving access to basic amenities and services. South Asia has emerged as the world's fastest growing region economically as well as the region with the highest growth rates in the consumption of commercial energy. The developmental path and resulting energy mix have varied considerably from country to country as detailed in the earlier sections.

This impressive growth story across the region and the world has created confounding challenges to energy access and energy security. Also, serious concerns have been observed related to deterioration of the environment and climate change. In such times, the countries across the world have agreed and committed to contribute towards the sustainable development by balancing their economic growth with the environmental sustainability. To ensure the energy security in sustainable ways, shift towards the clean energy is the only feasible option available. One such analysis by the IRENA has shown that pursuing a clean energy transition would have a small, but positive impact on the region's GDP.

Developing countries like China, India and Brazil are the torchbearers for adopting the new clean energy technologies for their energy needs. From the growth stories of such countries, a few major drivers for attracting new investments can be summarised.

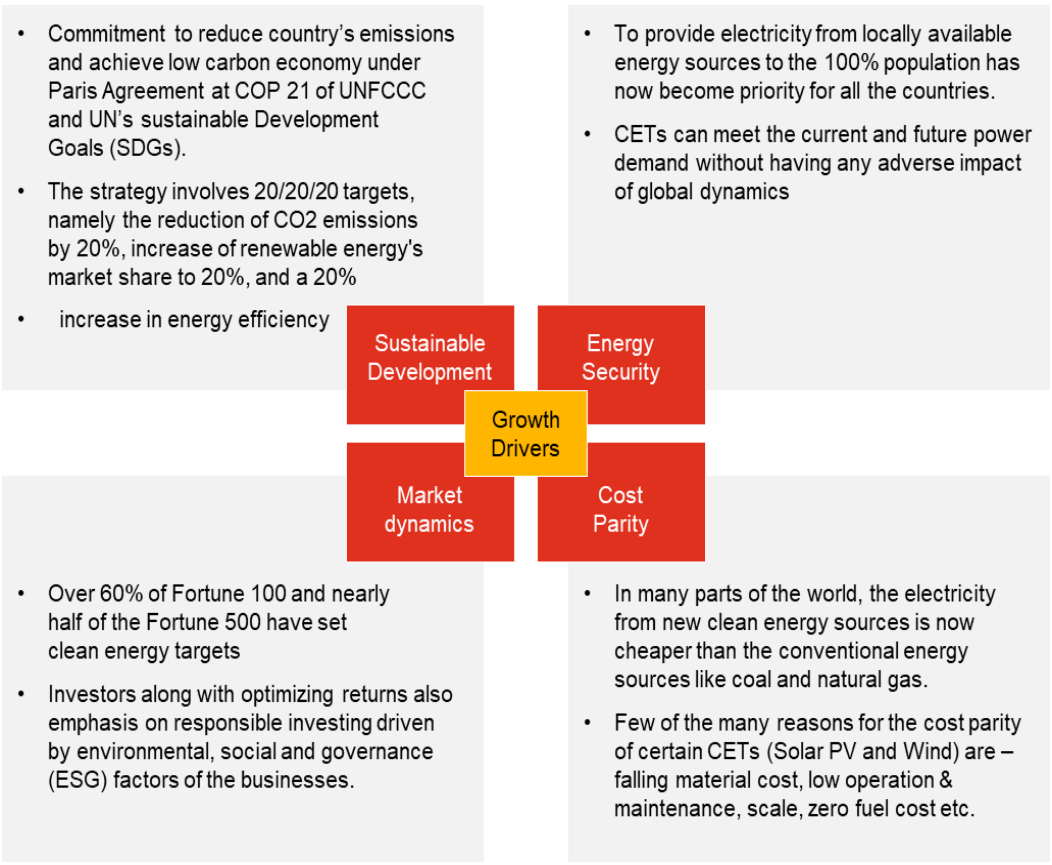
Sustainable Development

As Energy is one of the major contributors to climate change and it produces around 50% of GHG gases, world economies came together in record numbers in COP21 of UNFCCC in 2015. Major world economies have realised the need to reduce the carbon emission and become a low carbon economy after the Paris Agreement in 2016. To attain the purpose, 17 Sustainable Development Goals (SDGs) have been adopted. To achieve the SDG 7, i.e., Clean and Affordable Energy, investing in solar, wind and other CETs; improving energy productivity; and ensuring energy for all is vital. Each SAARC member state has committed to reduce its national green-house emission and accelerate the transition towards carbon-neutral energy system. As on date, only Bhutan enjoys the privilege of generating 100% electricity using clean energy sources. Further developments in CET sector are expected across SAARC Member States in order to reduce the GHG emissions and create a sustainable future.

Market Dynamics

In past few years, the adoption of clean energy by the electricity consumers has drastically improved. Consumers themselves are looking for ways to increase renewable percentage in the energy they use and are considering the use of CETs solutions to address the low-carbon challenge. CETs by Commercial and Industrial (C&I) consumers via open access route are widely being adopted in SAARC Member States like India, Bangladesh and Pakistan. Here the C&I consumers install wind, solar or biomass-based power generation facility at their own cost to meet their electricity requirement.

Figure 16 : Growth Drivers of Clean Energy Transition



In India, top 1,000 listed companies are mandated by the central regulator of the capital market, Securities and Exchange Board of India (SEBI), to disclose their Environment Social and Governance (ESG) annual performance under the Business Responsibility Report (BRR). Also, the disclosure of ESG performance has been mandated in developed countries such as China, the United Kingdom (UK), Europe, etc.

Energy Security[35]

Deploying clean energy technologies like solar, wind, hydro, etc. supports the energy security of the country by adding diversity to an overall electricity generation portfolio. Sources of energy are locally available, and a country is not required to be dependent on global dynamics for the fuel like coal, natural gas, etc. Also, the characteristics like modularity and comparatively shorter implementation period make the CETs useful to provide the electricity to the last mile communities, where grid connected power cannot be reached.

Cost Parity

In many parts of the world, CETs like hydro power, solar and wind energy have now achieved the cost parity and the cost of electricity form CETs are same or less than the cost of conventional power. Among the SAARC Member States, India has successfully achieved the cost parity (even with pit head coal stations), while the rest of the Member States are keen to do so. The thrust to replace the existing fossil fuel-based electricity generation facilities with clean energy sources, without paying a premium price, is driving the implementing agencies and power utilities to

[35] Renewable Energy to Support Energy Security

increase the scale of CET deployment. Recent levelized cost discovered in Bangladesh and Pakistan has bridged the gap. Additionally, it has also been supported by recently published Wood Mackenzie research report that investments in renewables power will have 23% lower cost than coal power on average by 2030 across the Asia pacific region[36].

The tariff details are discussed in detail for respective SAARC Member States in Chapter 5. With increasing penetration of CETs in energy mix and increased commercialization, this will further improve in the future. Reduced cost of electricity will attract more capacity addition and more investments in the CET sector.

[36] https://www.pv-magazine-australia.com/2020/11/27/new-woodmac-report-forecasts-renewables-cheaper-than-coal-by-2030-across-asia-pacific/

5. Financing the Future Clean Energy Projects in SAARC

5. Financing the Future Clean Energy Projects in SAARC

5.1. Afghanistan

5.1.1. Market Size, Sustainability and Returns

Around 56% of the total 592 MW CET capacity of Afghanistan are on account of Hydro generation. There is immense potential for power generation from other CET sources such as wind and solar. However, only 22 MW of Solar capacity is installed so far in the country. There has not been significant capacity addition in CET in last 3 to 5 years in the country. Only one new utility scale solar project of 15 MW [37] capacity, installed in Kandahar by Zularistan Ltd. and selling power to the Government/DABS under a PPA contract for 20 years period has got commissioned in 2016. Additionally, 10 MW Kandahar Photovoltaic Power Plant is the first-ever private-sector investment, which started commercial operation on 16 October 2019. Other case studies have been discussed in detail in Section 2.3 Investments in CETs, which are mainly concentrated in hydro and solar, stands at around 2% [38] of the annual GDP.

The Afghanistan Renewable Energy Policy has set high targets for CETs of ~5 GW by 2032. This is expected to be at around 95% of total energy mix as per the targets of Power Sector Master Plan (PSPM). It is pertinent to note that the per capita consumption of the country is currently amongst the lowest in the world. Thus, even though the country has targeted for multi-fold growth in CETs, these targets could get further evolved, based on the overall electricity demand as the Afghan economy grows in the coming years.

According to the World Bank data in 2018, out of around 98.71% of population in Afghanistan, grid-based electricity supply is available to around 92% of urban households and only 12.7% of rural households. Approximately 73.2% of rural households use solar power as their source of electricity.

The MEW has come up with a dedicated policy to promote Renewable Energy across the country. The policy developed is quite comprehensive in nature and recognizes most of the aspects required to develop a matured market for renewable energy technologies. The policy also focuses on the need to develop independent power projects, captive power and off-grid CET projects. Furthermore, it also recognizes the need to provide market enabling incentives for CETs such as renewable purchase obligations, preferential and other financial incentives for CETs. To provide for increased focus on development of CETs, there is a need for the creation of technology specific policies going forward.

Solar Projects of up to 2GW capacity have already been identified, for which Expression of Interest (EoI) had been called by the Ministry of Energy and Water, Afghanistan in 2018. Though there is huge potential to harness CETs especially in solar and hydro, the pipeline of project does not commensurate to that of the available potential.

Incentives

CET projects in Afghanistan are funded majorly through donor funds and MDBs. In order to attract adequate investments from the private sector, The Afghanistan Renewable Energy Policy offers

[37] https://www.zularistan.com/en/mwp_photovoltaic_systems/references/15mw_pv_power_plant_kandahar/index.html

[38] https://www.zularistan.com/en/mwp_photovoltaic_systems/references/15mw_pv_power_plant_kandahar/index.html

following financial incentives. Recent example of such incentives offered to a private investor is given as below:

- Upfront Capital Support in the form of Subsidies and VGF
- Preferential Tariffs and Performance linked incentives
- Interest Subvention and Debt Moratorium
- Customs and Sales tax duty exemption
- Income tax exemption for first 5 years of commercial operations
- Land acquisition by Government
- Security during project implementation

However, the detailed specific guidelines on the same have not been issued till date.

Project Tariff and Returns

The feasibility studies done so far indicate a levelized cost in the range of USD 0.07 per unit[39] – USD 0.15 per unit without storage. Thus, the payback period for typically government subsidized CET projects is expected to be in the range between 5 – 9 years, which can be considered as a catalyst for new investments in the sector. Payback period is the time taken to recover the cost of the investments and the investments reach break-even point. For a typical CET project, a payback period in the range of 5-7 years or lower is considered attractive by the investors, considering 25 years of useful life, as the project lifetime extends almost 20 years after this payback period.

In 2018, the National utility Da Afghanistan Breshna Sherkat (DABS) has entered into Power Purchase Agreements with two companies — Turkey's 77 Construction Company and local Afghani firm, Zularistan-Baywaj — for cumulative solar capacity of 30 MW. Afghan government is also providing a tariff subsidy of USD 0.065 per unit[40] for the project.

5.1.2. Financing Channels, Institutions and Tools

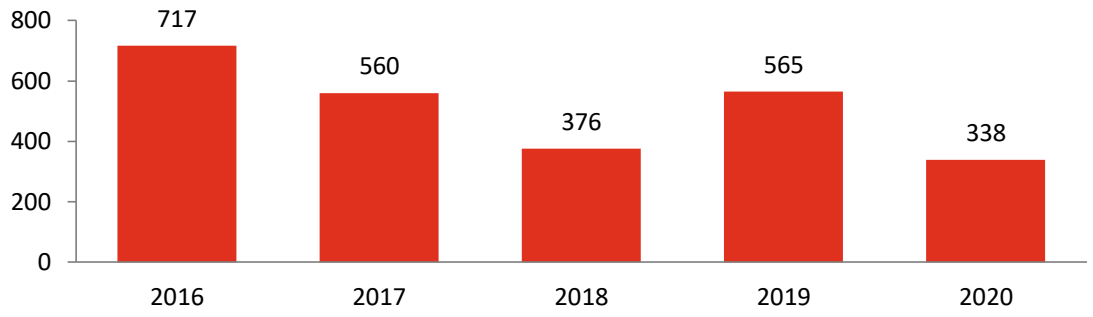
Multilateral Funding and Foreign Aid

The CET projects in the country have been primarily funded by the Government of Afghanistan vide credit lines offered by multilateral and foreign Development funds. Over the past few years, Afghanistan has been receiving aid from multilaterals, in the form of International Bank for Reconstruction and Development (IBRD) and International Development Association (IDA) lending. The IBRD give loans to the governments of creditworthy low-income and middle-income countries. The IDA provides interest-free loans called grants and credits to the governments of the poorest countries. Commitment towards Afghanistan is shown in the Figure 17 below:

[39] Eight Afghanistan Energy Study Committee, World Bank

[40] http://taiyangnews.info/markets/afghanistan-signs-ppas-for-30-mw/

Figure 17: Commitment of Funds by IDA, World Bank (million USD)



Source: IDA, World Bank

In 2017, Asian Development Bank (ADB) has approved a grant of USD 44.76 million to support the development of a 20 MW solar power project in Afghanistan in Naghlu.

In 2019, ADB issued a loan of a USD 4 million to Barakat Kandahar Solar Energy for development of 15 MW solar plant[41].

External funds in Afghanistan are in the form of developmental aid or FDI from donor countries directly or via trust funds. Since 2003, development aid for Afghanistan has increased. However, Private FDI has been declining. Development aid increased from USD ~1.2 billion in 2003 to a peak of nearly USD 7 billion in 2011 and declined to USD 5 billion in 2013. FDI fell to USD 60 million in 2013 from USD ~270 million in 2005. Major donor countries include the US, Russia China, India, Pakistan and Saudi Arabia.

Banks and NBFC

Afghanistan has a well-established central bank in the form Da Afghanistan Bank, which is responsible for the formulation and implementation of the countries monetary policy. The country has presence of Islamic as well as conventional banking system. Islamic financing works on the principle of Sharia, in which charging of interest and investment in speculative contracts (such as derivatives) is strictly prohibited. Islamic financing in the country is offered via two types of Sharia compliant structure –

- Mudarbaha: In this arrangement, the financer provides the capital to a party, which is responsible for investment and management of the capital. The profit and losses are shared amongst them in pre-agreed ratios.
- Ijara: This is like a leasing-based contract, where the lessor (owner of the asset) leases the asset in lieu of stream of payments. Such instruments are usually used for a durable asset, which the bank can sell in the event of a default by the lessor.

There are currently 13 formally recognized banks in Afghanistan, of which three are state owned, eight are private banks and two are foreign banks. Some of the key banks in the region are

[41] ADB: Press Release

Afghanistan Commercial Bank, Islamic Bank of Afghanistan, Afghanistan International Bank, Azizi Bank Bank-e-Millie Afghan, Kabul Bank, New Kabul Bank and Pashtany Bank. Because of difficulty in accessing credit through formal financial institutions and banks, most of the firms are dependent on the informal financial sector (retained earnings, family funds, etc.). Also, the high short term and medium-term interest rates in the range of 15% – 20%[42], offered even by the recognized banks, further make the CET projects more unattractive. Also, due to lack of guarantees or private insurance against commercial risks, long term financing becomes even more difficult. There is no presence of formalized NBFC sector in Afghanistan such as in India and Bangladesh.

Capital Market

Any form of capital market is currently absent in Afghanistan. Setting up of capital market has been planned as part of the economic development of Afghanistan. The country has gone through a series of political and economic issues and the major challenges that have hindered the development of capital market includes:

- Highly unstable economy
- Lack of safety and security
- Huge corruptions in financial and nonfinancial sectors
- Lack of public knowledge and awareness
- Lack of regulation, governance, policies and infrastructure, and
- Lack of matured reforms in laws

However, studies conducted in past have suggested to work on the pre-requisites of the stock market and pave a way for a conducive environment.

PE Funds

In 2016, InFrontier Afghanistan Fund led to the country's first Private Equity infusion from the funds raised from CDC Group, UK and Dutch Good Growth fund. PE investments have been majorly in pharmaceuticals sector with no notable presence in renewable energy.

The financial markets are in its stages of infancy with very little private participation in the infrastructure sector. There may be a scope of introducing innovative tools such as asset securitization, carbon credits, etc., in the future, with increased scale of CET implementation and matured financing environment. In other developed countries where CET deployment has seen tremendous growth in recent years, private participation has increased profitability and stability of investments in CET projects in the country. On the similar line, this could lead to substantial private participation in the sector in Afghanistan.

5.1.3. Taxation

Taxation structure and incentives play a major role in the growth of renewable sector in any country by increasing investments, attracting public and private players, foreign players and institutions' and thus adding the growth the country.

[42] Assessment Report of Afghanistan Renewable Energy Union 2016

In Afghanistan, corporate income tax is a flat tax of 20%[43] of net taxable income. Net taxable income is computed by deducting all ordinary and necessary business expenses from gross income. Corporate rates apply to legal entities such as corporations, limited liability companies, and other legal entities. The taxation of income is not dependent on permanent establishment of an entity in the country. Any income from an Afghanistan source and from a non-resident entity shall be taxable at 20%.

There is no Value Added Tax (VAT) in Afghanistan. However, a Business Receipt Tax (BRT) at the rate of 2% of gross receipts (before any deductions) is applicable for business activities pertaining to goods and services in the country. To increase the mobilization of financial resources, income received from interest is currently exempted from BRT. Further, to spur investment in infrastructure, incentives such as accelerated depreciation for capital goods and civil infrastructure are also given under the Income Tax Law of 2005. Imported goods are taxed at nominal rates of 2% and 3% for registered businesses and non-registered businesses respectively.

Capital gains from sale of movable assets, immoveable asset and corporate shares are taxed at a rate of 1%. Moreover, such capital gains would form a part of taxable income and would be subject to corporate tax (post deductions) as applicable, where this 1% tax paid can be used as credit.

5.2. Bangladesh

5.2.1. Market Size, Sustainability and Returns

Primarily due to the rigorous efforts of policymakers, effective project implementation by the developers and support from developing partners, performance of Bangladesh's power sector has been impressive in the last few years. In the last 10 years, there has been remarkable increase in capacity addition from 4.5 GW in FY 2007–2008 to 22 GW in June 2019[44], with private sector participation accounting for more than 40% of the total installed capacity. As on Sept'20, the installed capacity of solar is 35 MW, and there is no wind power project.

Natural gas, coal, imported oil, LPG, imported LNG, hydroelectricity and imported electricity from India are major commercial sources of energy. Biomass accounts for ~27% of the primary energy and the rest 73% is being met by commercial energy: natural gas accounting for 63% of the commercial energy and imported oil accounting for the major share of the balance[45]. The electricity access to total population has increased impressively from 55% in 2010 to 90% in July 2018. However, per capita generation of electricity is 510 kWh, which is much lower as compared to the South Asian neighbouring countries[46].

Bangladesh government has taken various steps to increase the use of renewable energy in future, including solar home system, solar irrigation system, etc., but much more efforts are required. As on June 2020, total RE installed capacity, including off grid, grid connected and captive, is only 628 MW[47], which is not even 5% of the total installed capacity. However, to increase the renewable share in the total energy mix, the government has collaborated with China for producing 500 MW of electricity from renewables. Additionally, wind turbines with a capacity of 2.9 MW are already

[43] Article 4 of Income Tax Law, Afghanistan

[44] https://www.dhakatribune.com/bangladesh/2018/09/08/in-pictures-celebrating-20-000mw-of-power

[45] Hydrocarbon Unit Energy and Mineral Resources Division Ministry of Power, Energy and Mineral Resources, January 2020

[46] https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=BD

[47] https://thefinancialexpress.com.bd/economy/renewables-neglected-in-proposed-budget-1592279359

operational in the coastal area of Bangladesh. A pilot project to install wind turbines along the seashore with a capacity of 20 MW has been planned by the government. Based on the results of the pilot project, another 200 MW of power could be harnessed from wind power.

As targeted in Power System Master Plan (PSMP) 2016, Bangladesh aims to increase the installed capacity to 2,470 MW by 2021, and 3,864 MW by 2041. Further, considering the high potential of wind and solar in the country, they shall account for around 40% and 50% of the 2,896 MW of total RE capacity by 2021, respectively. In accordance with the recent Revisited Power System Master Plan (PSMP), by 2030, Bangladesh forecasts power consumption demand to reach 188TWh, 202TWh and 213TWh under the low, base, and high scenarios, respectively.

According to the Ministry of Power, Energy and Mineral Resources, the government is keen to utilize renewable energy and "If any investor comes up with a 10 GW renewable energy plan, the government is ready to award the contract, even on unsolicited basis, in reality the progress in Bangladesh is very slow". The Power Division so far has awarded over 60 solar power projects, most of which could not be implemented because of the failure of the sponsors. The land scarcity is a major bottleneck in implementing solar power projects across the country.[48] It was further substantiated by financial institutions in Bangladesh that although banks have been mandated to invest 5% of total corpus in renewable energy sector, progress of installation is slow due to acute scarcity of land for big projects.

Project Tariff and Returns:

In the past, the government has signed PPAs for 11 facilities with total generation capacity of 685 MW and letters of intent were issued for a further 12 projects with a total capacity of 760 MW. However, due to slow progress in installation of solar projects, the government has decided to cancel the two solar facilities with total generation capacity of 250 MW.

Also, purchase tariffs for some of the projects have been reduced from USD 0.18 per unit to as low as USD 0.0749 per unit[49] in recent times.

Feed-in-Tariff mechanism (FIT) has not been introduced in Bangladesh. Draft law to introduce FIT has been finalized by BERC but the Gazette notification has not been issued yet[50].

Incentives[51]

In Bangladesh, the government has articulated different fiscal incentives to attract private investments. The following lists the available incentives for private sector:

- Corporate income tax exemption for private power producers for a period of 15 years
- Exemption from income tax in Bangladesh for foreign lenders to such companies
- Import of plant and equipment and spare parts up to a maximum of 10% of the original value of total plant and equipment is permitted within a period of 12 years of commercial operation without any customs duties, VAT and other surcharges
- Private power companies are allowed to buy insurance of their choice as per the

[48] https://unb.com.bd/category/special/renewable-energy-could-be-bangladeshs-best-option-post-covid-19/52253

[49] https://www.pv-magazine.com/2019/11/14/bangladeshi-government-will-renegotiate-solar-tariffs-for-projects-which-miss-deadlines

[50] https://www.lexology.com/library/detail.aspx?g=cba68495-1230-4aed-9567-1090bf2b3c11

[51] Rapid Assessment GAP analysis Bangladesh

requirements of the lenders and the utilities. The companies are not mandated to obtain insurance/reinsurance only from the National Insurance Company, namely Sadharan Bima Corporation (SBC).

- The Government of Bangladesh (GOB) has declared the power generation as an industry. As a result, the companies will also be eligible for all concessions, which are available to industrial projects.
- The remittable dividend for the investors is treated as new foreign investment, if the investor wishes to re-invest.
- Foreign companies registered in Bangladesh are treated same as locally owned companies regarding borrowing facilities.

Developing 50 MW of solar projects in Bangladesh

A consortium of German Based company, ib vogt, and local partner, AG Agro Industries won a contract to develop a 50 MW grid-tied solar project in the Chittagong district of Bangladesh. The project will be developed on a BOO model, i.e., build, own, and operate. Further, company is expected to sign PPA with BPDB, procuring the power for 20 years at a tariff of USD 0.1094 per unit, under the condition of 'no electricity, no payment.'

5.2.2. Financing Channels, Institutions and Tools

In Bangladesh, gas based, Heavy Fuel Oil (HFO) or dual fuel fired power projects have been financed traditionally by a consortium of non-banking financial institutions (NBFIs), local banks, Export Credit Agencies (ECAs), international financial institutions (debt or equity investments), and foreign investors.

Banks and NBFI[52]

Government-owned infrastructure-focused NBFIs, such as the Bangladesh Infrastructure Finance Fund Ltd. (BIFFL) and Investment Development Company Limited (IDCOL), provide low-cost debt financing to large infrastructure and power projects. However, corpus invested by these institutions in not substantially large to meet the required funding to implement large number of utility scale CET projects. Summit Meghnaghat Power Company Limited (305-335 MW dual fuel), Energypac Confidence Power Ventures Chittagong Limited (HFO, 108 MW), Quantum Power Systems Limited (HFO, 105 MW), Summit Power Limited Expansion project (33.75 MW), Lakdhanavi Bangla Power Limited (Dual Fuel, 52.2 MW), Regent Energy and Power Limited (Gas fired, 108 MW) are some examples of projects successfully financed by IDCOL over the period.

Since the implementation of Rural Electrification and Renewable Energy Development (RERED) project by the World Bank, the off-grid solar systems have become affordable through a combination of consumer credit and (declining) subsidies. Typically, the partner banks/NBFIs provide microfinance loans to households. Households are required to make a down payment equivalent to 10-15% of the total system cost. The remainder is repaid in next 2-3 ears at prevailing market interest rates (around 12–15%). Sixty to eighty percent of the credit that the partner organization extends to the household is eligible for refinancing from IDCOL at the prevailing

[52] Transforming the power sector in Bangladesh, PwC 2018

market interest rate of 6-10%, with around 5-7 year of repayment period and a 1–1.5 year of grace period. The size of such off-grid systems is a few KW only. The same financing arrangement for a utility-scale CET projects cannot be applied successfully.

While the cost of debt availed from government owned IDCOL or BIFFL has been in the range of 6-10% for off-grid clean energy implementation, the utility scale CET projects have been funded purely on commercial terms based on the cost of funding for the commercial banks and NBFIs. However, it has been observed in the range of 12-14% with the tenure of the debt of 10-15 years.

Multilateral and International Financial Institutions

International financial institutions such as ADB, IFC and the World Bank have a significant presence in boosting the investment in country's power sector. In addition to debt financing of public sector power projects, the World Bank has also extended Multilateral Investment Guarantee Authority (MIGA) facility to the private firms. This has further improved the financial attractiveness of private sector projects. Moreover, the World Bank has also financed infrastructure and power projects including, power generation, transmission, distribution, renewable energy, and services along with other infrastructure projects, at an approximately 5–6% interest rate through its programme - Investment Promotion and Financing Facility (IPFF) Programme[53]. Since the local market rates are predominantly in the range of 12–14%, the World Bank lending rates are substantially lower and thus increase the investment in power sector.

IFC has provided both equity and debt financing to IPP projects. Some of the projects funded by IFC include[54]:

- Bibiyana – 341 MW combined-cycle gas-fired power plant (Co-financed with ADB and the Islamic Development Bank)
- Sirajganj dual fuel combined cycle 414 MW plant
- Summit Group's power projects
- United Group's power projects in 2016

ADB has financed many public sector projects with a limited presence in financing the private sector projects. Through ADB's Private Sector Operations Department (PSOD), it has extended debt financing and partial risk guarantees for the development of projects such as LNG terminal near Kutubdia Island, LNG-based power plant in Meghnaghat etc.

Export credit agencies (ECAs) based financing in power sector is also done in Bangladesh to further increase the investment in power sector. These are government-sponsored institutions developed in order to support the export of capital goods and services in the country. HSBC, the multinational bank, arranged the first ECA financing in 2012 for Ashuganj Power Station Company Ltd. Usually, the credit facility period in such cases is 12–13 years, along with a grace period of 2–3 years.

Capital Market

Bangladesh's bond market is only 12% of its GDP and is primarily dominated by the government bonds. A non-power sector corporate bonds issued in the past were privately placed, with only one

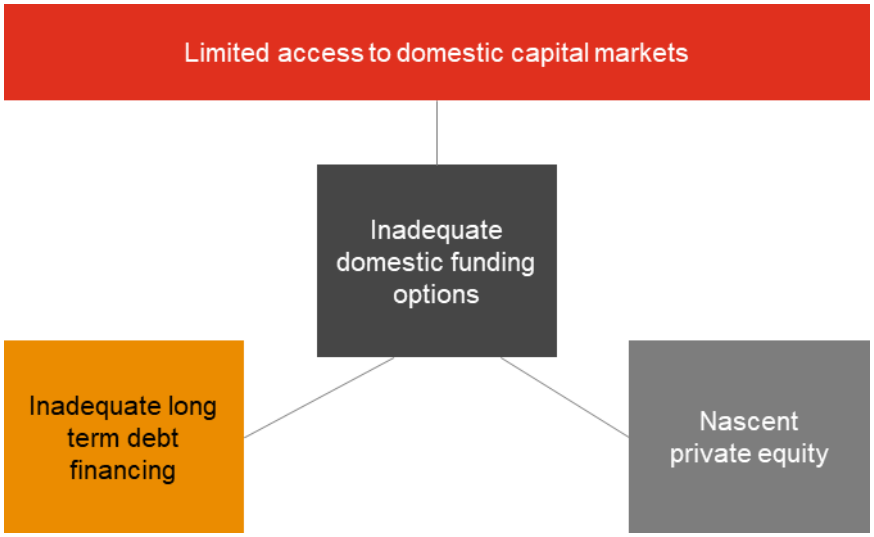
[53] http://documents1.worldbank.org/curated/en/409841491616912802/pdf/Project-Appraisal-Document-PAD-P159429-BD-IPFF-II-MARCH-18-2017-003-03172017.pdf

[54] https://www.adb.org/sites/default/files/linked-documents/52362-001-so.pdf

listed on the Dhaka Stock Exchange. Most of the lending is done only for very short-term periods. Further, the private equity and venture capital industry in Bangladesh is at a nascent stage. Therefore, the power companies typically fund the projects through loans from multilateral agencies or through accumulated earnings. However, long-term multilateral loans are constrained by sector and country limits and accumulated earnings are often limited. Hence, companies often resort to financing long-term project with short-term financing, thereby causing asset liability mismatches. Figure 18 shows the issues in financial market of Bangladesh in three sub-heads.

To spur economic growth and enable the country to achieve middle-income status, Bangladesh's capital market should be larger and deeper to encourage enough private sector investment. Although the government has been receiving funds from international development partners to finance power projects, it will not have enough headroom to borrow beyond a certain limit as governed by the fiscal responsibility. The government should consider an appropriate mix of public and private sector power projects for future investment to avoid potential adverse impact on the country's debt sustainability.

Figure 18: Issues in Financial Market of Bangladesh for CETs



5.2.3. Taxation

Taxation structure and incentives plays a major role in the growth of renewable sector in any country by increasing investments, attracting public and private players, foreign players and institutions' and thus adding the growth the country.

In Bangladesh, foreign participation is allowed up to 100% investments in all sectors except four restricted areas, i.e., (1) arms and ammunition and other defence equipment and machinery, (2) forest plantation and mechanized extraction within the bounds of reserved forests, (3) production of nuclear energy, and (4) security printing and mining. The remittance of dividends is allowed after approval by the Bangladesh Bank.

The corporate income tax for companies attract various taxes as below:

Table 23: Corporate Income Tax - Bangladesh

Applicable Tax on	Domestic Private Players
Capital gains	15%
Branch tax rate	35%, plus a 20% tax on remitted profits
***Corporate income tax rate**	25% – 45%

*Tax for publicly traded companies is 25%; for insurance companies, banks and foreign institutions (except merchant banks), it is 40%. However, if the company is publicly traded or received specific approval from the government in 2013, the tax rate is 37.5%. Other sectors like tobacco manufacturing and mobile phone companies are taxed at 45%. For all other companies, including foreign companies, it is 35%.

Incentives are levied on revenues for certain facilities such as income from an infrastructure facility set up in Bangladesh, the business of information technology enabled services, and exports of handicrafts and industries established in export promotion zone, provided certain requirements are met. Area based tax incentives are also available to industrial undertakings set up in specified regions.

Dividends, interest, royalties and fees for management services, technical services or technical assistance paid to a non-resident company are subject to a 20% withholding tax. For resident company, dividends are subject to 20% withholding tax while no withholding tax is charged on interest. Royalties are subject to 10% withholding tax. Fees for management services, technical services or technical assistance are subject to 10% withholding tax for payments less than BDT 2.5 million, otherwise it is 12%.

Table 24: Withholding Tax - Bangladesh

Withholding Applicable Tax on	Residents	Non-residents
Dividends	20%	20%
Interest	0%	20%
Royalties	10% / 12%	20%
Fees for technical services	10% / 12%	20%

To promote renewable energy installation in country, the GoB has given 100% tax exemption in January 2020 to all the power generation organization, excluding coal-based companies. Power generation companies, starting operation before 31st December 2022, will enjoy full tax exemption on income from their power generation business till 2034. Tax exemption is also given to power generation business on interest payable against foreign loans. Royalties, technical know-how and technical assistance fees payable by power companies will also be exempted.

To increase investment in the power sector, all the foreign employees in power generation business will be given tax exemption on their salaries for three years from their first date of arrival in the country. These policies and steps will further encourage investors including renewable energy producers for investing in the country. Furthermore, to avoid double taxation of income or gains arising in one territory and paid to the establishments in another territory, Bangladesh has

concluded more than 30 tax treaties.

5.3. Bhutan

5.3.1. Market Size, Sustainability And Returns

Bhutan's power sector contributes significantly to the national economy: 34.15% of total export earnings, 19.45% of domestic revenue and 8% of GDP. Bhutan's total installed capacity is 1,623 MW (2018), out of which majority is contributed by hydropower only (1,614 MW). However, the installed hydro capacity represents only 6% of its techno-economic feasible hydropower potential (26.6 GW)[55].

Total electricity generation in 2017 was estimated at 7,729 GWh, which far exceeds the domestic requirement of 2,243 GWh/year. During monsoon season, surplus hydropower from run-of-river is exported while during lean months (November – March) owing to reduced flow in the rivers, the country relies on energy imports. A significant portion of total electricity generation is exported to India, which has increased to 5,700 GWh in 2017 from 1,460.5 GWh in 2000, i.e., 74% of the total generation. As electricity demand is more than the supply in winter, the country resorts to imports from India with an overall import of around 92 GWh in 2017.

Other forms of energy like biomass, biogas, wind and solar are limited to pilot projects and provide small scale solutions. They are primarily being used to replace kerosene and LPG used for heating appliances. Diesel generators account for only 8 MW, and wind energy for a further 0.6 MW.

Bhutan Sustainable Hydropower Development Policy 2008 covers most of the aspects of hydropower development, including institutional structure, project solicitation, fiscal incentives, project investment, etc. The policy aims to mobilize funds and attract public and private investment in hydropower sector. Further, Alternative Renewable Energy Policy, 2013 (AREP), is aimed to develop and increase share of renewable energy in the country. The policy has defined total renewable energy (excluding hydropower) target of 20 MW by 2025 - 5 MW of solar PV, 5 MW of wind and 5 MW of biomass. However, more ambitious targets have been laid out in the five-year renewable energy master plan, which is a series of national economic development plans created by the government of Bhutan as detailed in Table 25 below[56]:

Table 25: Renewable Energy Master Plan - Bhutan

Technology	Capacity by 2025 (MW)			
	AREP Case	Low Case	Base Case	High Case
Small Hydropower	*	37.2	67.5	110
Wind	5	2.4	5.1	7.8
Solar PV	5	2	6.1	11.9
Biomass	5	0.6	1	8.1
Others	5	NA	NA	NA
Total	20	42.2	79.7	137.8

*The AREP does not indicate a target for small hydropower

[55] Renewables Readiness Assessment by IRENA, Kingdom of Bhutan, December 2019

[56] DRE-MOEA, 2016b

In rural areas, the policy aims to ensure an extensive use of distributed renewable energy projects while replacing kerosene and firewood for heating, cooking and lighting. On the other hand, in urban areas, the policy aims to optimize the usage of grid-based power through the promotion of dispersed energy generation options. It also aims to encourage renewables in both urban and rural settings through measures including technical and financial support and direct funding for small scale projects.

Project Tariff and Returns:

BEA determines the tariffs for distributed and grid connected projects, along with subsidies to cover lifetime project costs. Large hydro projects are not included under this policy. Recently, in 2019, the government of Bhutan and India has finalized a tariff of USD 0.058 per unit for a period of 35 years for a 720 MW Mangdechhu hydropower project.

Incentives[57]

Historically hydro power projects in Bhutan have been developed by the government agencies with public funding and with additional support from the development partner countries such as India, Netherlands, Japan, Norway and Austria. Bhutan has lately focussed on promoting and incentivizing the private sector to fully participate in RE projects. Key incentives offered are as listed below:

- Investments in large hydropower projects (150 to 1,000 MW) are open for joint ventures with Bhutanese companies or eligible for 100% FDI.
- Private project developers are exempted from the payment of corporate income tax for a period of 10 years from the commercial operation date of the hydropower plant. Investors, who wish to develop projects in remote areas, will be eligible for an additional five years' tax holiday.
- Project developers are also exempted from the payment of all import duties and Bhutan sales taxes on the import of plant and equipment during the construction period, and further, no sales tax or duty is to be levied on the export of electricity.
- Investors in the manufacturing and integration of clean energy products in Bhutan are exempted from income tax for a period of ten years.

5.3.2. Financing Channels, Institutions and Tools

The financial sector of Bhutan largely depends on five commercial banks and three non-bank financial institutions (a pension fund and two insurance companies). The government of Bhutan is greatly reliant on the development partner grants and loan to fund the government expenditures, around two-thirds of which comes from India[58]. The government is looking to hydropower exports as an alternative solution to increase the revenue generation sources. However, the government will have to find new revenues to fill in this gap and reduce its funding on development partners.

Major investments in power sector happen primarily in hydropower projects. Large hydropower projects are usually funded by a mixture of debt and grants by partner governments. Projects such as Tala (1 020 MW), Chukha (336 MW) and Kurichhu (60 MW) have been funded by the government

[57] Rapid Assessment GAP analysis Bhutan

[58] https://www.adb.org/sites/default/files/publication/190216/sawp-044.pdf

of India with a mix of grants (60%) and loans (40%).[59] The Basochhu hydropower plant (64 MW) has been financed by the government of Austria.

MDBs and Government Funding

With the growth in deployment of large and medium size hydropower projects, new models of project funding are being employed. The joint venture model is being used for as many as ten hydropower projects at different stages of deployment. In this type of model, part of the funding is raised as company debt and the remainder is covered by the national and foreign government entities. Bhutan's DGPC entered a joint venture with India's Tata Power for the development of the 126 MW Dagachu Hydropower Plant under a PPP model. The project was financed by the ADB, Austria's Raiffeisen Bank and the National Pension and Provident Fund of Bhutan (NPPF) (Roychoudhury and Srinivasan, 2016).

Banks and NBFCs

Royal Monetary Authority of Bhutan (RMP) and Bank of Bhutan are major banks in Bhutan. Banks have exposure primarily to housing (25%), personal loans (19%) and hydro sector (16%). Low asset quality ratio and high NPL (11% in 2018) further limit the lending capability of banking sector. This is primarily because most of the funding is used for hydropower sector, which is booming and financed by deep pockets in India and elsewhere with an average loan tenure of 15 years with 1-2 years of a grace period.

Also, due to the absence of robust credit rating system, banks rely mostly on collaterals to cover the default, which further adds constraints in the infrastructure funding. However, in an assessment of financial sector development carried out by ADB, it was revealed that banks cannot seize collateral in a timely manner when borrowers default because of an inefficient judicial system that favours the borrowers at the expense of creditors[60].

Major Hydropower Projects in Bhutan

Currently, there are five major run-of-river hydropower projects operational in Bhutan: Tala (1,020 MW), Chhukha (336 MW), Dagacchu (126 MW), Basochhu (64 MW) and Kurichu (60 MW). The Dagachhu run-of-river scheme, which began commercial operation in 2015, is a milestone project in many ways.

The project is the first in Bhutan to export power exclusively to India; Tata Power has signed a PPA for 25 years. It exports all electricity generated at the site to India. Dagachhu was also the first cross-border project registered under the UN Clean Development Mechanism (CDM).

Dagachhu also marks the first public– private partnership in infrastructure investment in Bhutan. Druk Green Power Corporation, the state-owned utility, owns 59% equity in the project, Tata Power Company of India owns 26% and the remaining 15% is held by the Pension and Provident Fund of Bhutan. Total project cost was around USD 200 million, out of which USD 80 million loan was funded by ADB.

[59] https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Dec/IRENA_RRA_Bhutan_2019.pdf

[60] https://www.adb.org/sites/default/files/publication/190216/sawp-044.pdf

Capital Market:

Stock exchange - the Royal Securities Exchange of Bhutan – has been established in 1993 with 22 firms being traded as on 2014. Also, the government began issuing Treasury Bonds in 2009, but it does not maintain an active treasury bond market. Instead, it prefers to borrow directly from the state-controlled banks, which complicate monetary policy by constraining monetary operations. In conjunction with the thinness in the corporate bond market, this practice creates a shortage of high-quality liquid assets. This is especially a problem for insurance companies and pension funds, as long-term financial instruments to finance their long-term liabilities are insufficient.

5.3.3. Taxation

Taxation structure and incentives play a major role in the growth of renewable sector in any country by increasing investments, attracting public and private players, foreign players and institutions' and thus adding the growth the country.

In Bhutan, Corporate Income Tax (CIT) rate is 30% on net profits and is payable by those entities registered under the Company's Act of the Kingdom of Bhutan, 2000. However, in January 2020, Corporate Income Taxes (CIT) has been reduced to 25% on state-owned corporations. Also, GST of 7% has been introduced under Goods and Service Tax Bill 2020, which will replace all indirect taxes like sales tax, customs duty and exercise duty.

Fiscal incentives such as income tax exemptions for 10 years (extendable to 15 years for strategic or poverty alleviation related reasons), exemption from custom duties and sales tax on imported equipment and exported electricity further encourages investors, project developers, manufacturers and system integrators.

5.4. India

5.4.1. Market Size, Sustainability and Returns

India has made impressive progress in recent years in increasing the access to electricity and implementing clean energy technologies. India is now at 5th global position for the overall installed renewable energy capacity[61]. Equivalent to 36% of total installed generation capacity (i.e. 372 GW) is from clean energy sources: 12.3% from hydropower projects and balance 23.7% from other clean energy sources including solar, wind, small hydro, biomass and waste to energy. In the last four years, i.e., from FY 2016 to FY 2020, installed clean energy generation capacity has increased at a CAGR of ~17%[62]. In terms of future expansion, India is the host of world's largest clean energy program to install 175 GW till 2022 and 450 GW till 2030.

During the last three years, between April 2017 and January 2020, clean energy projects have attracted investments of USD ~18.4 billion[63]. As per India's Economic Survey 2018-19, to achieve such huge targets, the country will require funding of around USD 76 billion by 2022 and USD 250 billion between 2023-30. Therefore, on annualized basis, investment opportunities of over USD 30 billion are expected to emerge in the next decade and beyond, around three times the current levels, clearly indicating a huge and untapped investment potential.

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61 Ministry of New and Renewable Energy, India

62 Central Electricity Authority of India

63 power and renewable energy minister R K Singh's written reply in Parliament in February 2020

(Please refer to the next page for the details on renewable energy investments in the last 3 years)

Table 26: Details of Investments in Last 3 years (million USD)

	Avg. Invested capital cost per MW (in Mn USD)	Total Investment during 2017-18 (in Mn USD)	Total Investment during 2018-19 (in Mn USD)	Total Investment during 9M 2019-20 (in Mn USD)
Solar	0.56	5,201	3,627	3,083
Wind	0.97	1,813	1,440	1,827
Small Hydro	1.39	147	149	109
Biopower	0.97	537	403	82

The Indian clean energy sector is dynamic, and it has historically managed to organize policy environment in the country by actively reviewing and revising the framework. Few important policies responsible for CET growth are National Electricity Policy, 2005; National Tariff Policy, 2006; Integrated Energy Policy, 2006 and their subsequent amendments. The government has initiated major reforms in 2020 including the proposed Electricity (Amendment) Act, proposed National Renewable Energy Policy and Tariff to further develop the sector and set extensive guidelines.

Tariff and Return

India has seen significant decline in solar and wind energy tariffs in last few years, primarily due to the reduced equipment costs, improved accessibility of funds, increased government incentives and introduction of competitive bidding. The tariff for solar projects has fallen sharply from USD 0.17 per unit (through feed in tariff) in 2010 to USD 0.037 per unit (through reverse bidding) in 2020: a sharp 77.8% fall in 10 years. The tariff for wind power projects has also followed a similar decline - USD 0.38 per unit in 2020 after the introduction of reverse bidding in 2017.

The tariff for other clean energy projects (biomass, waste to energy and hydropower) is validated and determined by the Electricity Regulatory Commissions on case-to-case basis to ensure the financial viability of the projects and enough returns to the project developer. Almost each state in India has its own tariff regulations in line with the CERC tariff order.

Incentives

In the early years of projects, fiscal benefits in the form of tax breaks, such as accelerated depreciation (AD), helped in lowering the burden on solar and wind developers. Wind developers who had not claimed AD benefits in past years were offered alternative Generation-Based Incentives (GBI), which provided additional financial incentives per unit over the applicable tariff. In case of solar energy, the MNRE used to offer VGF support to the solar projects, auctioned under the earlier regime of National Solar Mission. However, with the increase in competitiveness of RE tariffs, the government has lowered the upper limit for AD tax benefit for solar and wind projects from 80% to 40%, effective from FY 2017–18[64]. GBI for wind generation has also been withdrawn and VGF support has been phased out by SECI. Although, there are a few other incentives offered

[64] Ministry of Finance, Government of India, Key Features of Budget 2016-17, 2016

for the new projects being implemented such as:

- Ministry of Power recently has extended waiver of inter-state transmission charges available to solar and wind power projects. All grid connected projects, commissioned before 30th June 2023, will not require to pay any inter-state transmission charges for a period of 25 years.
- Renewable power enjoys must-run status while scheduling the electricity supply to match the demand. While receiving injection requests into the grid from generators, the transmission operators follows the merit order principle and generally prioritize the lowest-cost sources for dispatch. However, RE power is exempted from such priority and injection of electricity is scheduled when requested by RE generators.

5.4.2. Financing Channels, Institutions and Tools

Government and MDB Funding, Grants

The Indian government has played a key role in mobilizing funds for clean energy projects. Initial efforts were concentrated on building a corpus of funds—the National Clean Energy Fund, now known as the National Clean Energy and Environment Fund (NCEEF)—from the proceeds of coal cess (carbon tax on coal).

At present, the solar and wind energy projects are capable of attracting huge private capital, multilateral agencies such as the World Bank, ADB, and KfW typically have investment portfolios focused on other segments like solar rooftop, biomass and decentralized solar projects. They provide long-term debt capital (tenor of 15–18 years) for these projects. For example, KfW provided debt funding for India's Green Energy Corridor project. World Bank and ADB have offered dedicated lines of credit to public sector banks in India for on-lending to the rooftop solar sector.

Domestic Banking

RBI has suggested to lend at least 40% of the net credit of banks to the priority sectors. Therefore, to increase lending in clean energy sector, it has been classified under priority sector since 2015.

Domestic banks, non-banking financial companies (NBFCs), and debt funds are the major sources of funding for CET projects. Private sector banks and NBFCs accounted for the largest share of debt (~60%) to utility-scale solar and wind projects in the debt origination stage itself. However, to improve the project return, operational projects are often refinanced with low-cost debt within 2-3 years of achieving commercial operation.

RBI has set a limit on exposure of commercial banks, NBFCs and debt funds to a single borrower and a group company engaged in the infrastructure project development, including clean energy projects, to restrict the consolidation of funding. Further, in accordance with the FEMA Act, 100% FDI has been allowed in NBFCs under the automatic route since 2016. This has enabled venture capitalists as well as foreign banks to make investments in Indian NBFCs.

As per the RBI, public sector banks have the highest Non-Performing Assets (NPAs), most of which are in the power, transport and the telecom sectors. In one of the stress tests conducted for scheduled commercial banks by RBI, it was found that most severe shock to the power sector will increase the banking system NPAs by around 68 basis points. Even though the NPA improved to

9.1% in March 2019 from an earlier 11.2%, Indian lenders have the highest percentage of bad loans as compared to the emerging economies including Brazil, China, Indonesia, Philippines and Turkey.

Domestic PE Funds

In India, PE funds can be set up as an Alternative Investment Fund (AIF) and are registered as either a company, trust or an LLP under Companies Act 2013. However, the trust structure is typically followed due to its tax advantages. The AIFs are governed by the SEBI (Alternative Investment Funds) Regulations, 2012. These regulations permit AIFs to invest in 'debt,' which may include loans. PE funds preferably invest in operational projects compared to projects in construction stage.

In India, Asset Under Management (AUM) of PE and VC funds was USD 48 billion in 2019 and total investment of USD 26.3 billion from approximately 793 deals was observed in 2018. Typically, PE funds expect to make an average internal rate of return (IRR) of 16% to 20% from the CET projects. Funds that invest in other infrastructure sector expect a higher IRR of 22% to 28%.

Domestic Insurance Funds

In India, insurance funds are governed by the Insurance Act 1938 (the Insurance Act) and Insurance Regulatory and Development Authority Act 1999 (the IRDA Act). They provide debt in clean energy and infrastructure sector either through short, medium- or long-term loans or any other direct financial assistance for an average duration of more than 10 years. Insurance funds also invest through Equity/ Preference Shares/ Convertible Debentures at face value. An estimate by IRDA indicates that life insurers invest approximately 15% of their fund in infrastructure firms.

External Commercial Borrowings (ECBs)

Presently, ECBs are being raised in India through three tracks as below[65]:

- **Track-1:** Medium term foreign currency denominated ECB with minimum average maturity of 3 to 5 years. NBFCs, project development companies, holding companies and Core Investment Companies (CICs) etc. are eligible for such ECBs
- **Track-2**: Long term foreign currency denominated ECB with minimum average maturity of 10 years. InvITs and Real Estate InvIT (REIT), along with all eligible entities under Track-1, can raise such ECBs.
- **Track-3**: Indian Rupee (INR) denominated ECB with minimum average maturity of 3 to 5 years. All eligible entities, under Track-2, are allowed to under such ECBs.

Capital Market

The capital market in India comprises of the equity and debt segments and is governed by Security and Exchange Board of India (SEBI). India's equity markets have flourished exponentially in terms of number of listed companies/stocks, trading volumes, market capitalization, investors and resources mobilized. On the other hand, the debt market, historically, has largely been dominated by the Government Securities, while the corporate bond market has remained comparatively undersized.

[65] ECB Guidelines from Reserve Bank of India

In FY 2020, Sterling & Wilson Solar, part of Shapoorji Pallonji Group and a solar EPC player, raised around USD 405 million in its IPO by bringing outside investors.

Foreign Investments

The Indian CET industry has attracted numerous foreign institutional investors (FII) due to various reasons such as maturity, lower risks, predictable yields, medium to high returns and presence of large size projects. It currently offers higher risk-adjusted excess returns than other markets of comparable size, such as the US or China. CET is also more attractive than other infrastructure sub-sectors, particularly fossil fuel power generation, in terms of incentives, cash flow variability and profit margins. This is partly due to increase in capital costs and cess applicable for fossil fuel plants.

Foreign entities are allowed to invest in an unlisted or listed Indian clean energy development company under automatic route with a minimum lock-in period of 1 year, as per FDI regulations. SEBI registered Foreign Venture Capital Investor (FVCI), with specific approval from the RBI, can invest in Indian energy and infrastructure sector. It is regulated by SEBI (Foreign Venture Capital Investors) Regulations, 2000. FVCI can acquire units of a Venture Capital Fund (VCF), a Category I Alternative Investment Fund (Cat-I AIF), units of a scheme or of a fund set up by a VCF or by a Cat-I AIF.

Another tool to raise funds from foreign investors is a foreign currency convertible bond (FCCB). It is a quasi-debt instrument and acts like a bond having regular interest and principal payments, but these bonds can be converted into stock (equity shares) at the option of the bondholder. FCCBs are required to be issued in accordance with the guidelines of the RBI and SEBI, keeping in view the ECB and FDI norms and various schemes and regulations with respect to Issue of securities.

The list of foreign investor includes majorly Singapore based GIC Holdings, Abu Dhabi Investment Authority, SoftBank, Brookfield, CPPIB and CPDQ from Canada, ORIX (Japan), Sembcorp and APG (Holland), among others, all of whom have decided to invest in the India renewables growth story. The Private Equity (PE) arms of Goldman Sachs, JP Morgan and Morgan Stanley have also entered the sector and reaped decent returns.

5.4.3. Taxation

Taxation structure and incentives play a major role in the growth of renewable sector in any country by increasing investments, attracting public and private players, foreign players and institutions' and thus adding the growth the country.

In India, renewable energy devices and parts for their manufacturing are supported by a lower GST rate of 5%, while inputs to thermal generation are charged between 5% to 18%. At the end of 2019, the government proposed to waive the coal compensation cess.

The applicable corporate tax is 15% (plus surcharge of 10% and applicable health and education cess of 4%) for the domestic companies engaged in the business of generation of electricity for the FY 2020-21.

The obligation of withholding tax on a few payments by both resident and non-resident payer of income is briefed in the next page:

Table 27: Withholding Tax - India

Withholding Tax on	Tax rate (%) for payment to resident company	Tax rate (%) for payment to non-resident company
Specified type of Interest	10%	5%
Non-specified type of Interest	10%	20%
Dividend income on shares	10%	20%
Dividends for units of mutual fund	10%	NA
Cash withdrawal from bank or banking company	2%	NA
Long term capital gain	10%/20%	10%/20%

Typically, clean energy IPPs in India procure equipment and services from overseas for project development. In this scenario, contract structuring from a tax perspective helps these companies to achieve major tax efficiency upfront. India has signed double tax avoidance agreements (DTAAs) with almost all countries and limited agreements with eight countries. The said treaties provide for the income that would be taxable in either of the contracting states, the conditions for taxing and the exemption from tax as applicable. However, under the current Indian tax legislation, most dividend income from Indian companies that is subject to Dividend Distribution Tax (DDT) is exempted from income tax hence, the treaty tax rates on dividends are not relevant.

5.5. Maldives

5.5.1. Market Size, Sustainability and Returns

The country has 247 MW of total installed capacity, of which only 10.85 MW is from renewable sources of energy. Most of the CET installed capacity is in the form of solar diesel-hybrids. The CET in the country has grown at a CAGR of around 28%. Most of the CET presence in the country is on account of Solar PV. Wind projects have been primarily being installed on pilot basis.

In 2009, the Maldives' Ministry of Economic Development announced, as part of a national carbon neutral plan, set a mandatory target to generate minimum 60% of total electricity from solar power by 2020. The target was later revised to 70% of total energy from CETs by 2030 and 100% by 2050[66]. This was backed up by the announcement to install 51 MW of Solar Capacity by 2023. However, the actual on ground achievement is not in line with the targets. Furthermore, the actual capacity of RE generation targets has not been defined in the RE policy documents. Power capacity of 144 MW, which is installed by Resort islands, is managed independently by the government, and further 20 MW is installed on industrial islands.

It is unclear whether there are specific policies/regulations framed in the state to promote active private sector participation in the country's power sector. In 2010, Hitachi Plant Technologies Ltd took 20% stake in state owned MWSC, a company, which provides for integrated utility service model for water, wastewater and electricity in Raa Dhuvaafaru.

[66] https://www.irena.org/IRENADocuments/Statistical_Profiles/Asia/Maldives_Asia_RE_SP.pdf

The MEE has come up with Maldives Energy Policy and Strategy, 2016. Though the policy mentions promotion of renewable energy sources, it is inadequate in defining clear quantifiable targets for CETs. Further, the policy does not provide any specific incentives but has a provision to introduce innovative financing mechanism to promote CETS in the state.

Tariff and Project Return

The CET projects have so far been funded by a combination of Climate Investment Funds (CIF) from multilaterals agencies in the form of grants and soft loans, along with co-financing from government and private equity investors. Project appraisal reports on CIF based solar projects indicate an Economic Internal Rate of Return (EIRR) of 25.5% along with equity IRR of more than 10% for private equity investors.

5.5.2. Financing Channels, Institutions and Tools

Multilateral Funding and Foreign Aid

The investments in CETs in the country have been driven primarily by grants from multilateral agencies under CIF. Recently, the World Bank has sanctioned a fund of USD 30 million under the project for Accelerating Renewable Energy Integration and Sustainable Energy (ASPIRE). Additional co-financing amount is expected to be sponsored through government and non-government contributions.

These funds shall be used to support the government in increasing the solar PV capacity through private sector participation from independent power producers. Furthermore, these funds also include a component to support deployment of Battery Energy Storage System (BESS) along with solar PV in Addu City and other islands. This would enable a high penetration of solar PV in the power system while ensuring reliable supply in a cost-efficient manner.

Table 28: Climate Investment Funds - Maldives

Clean Investment Funds	Loan Amount (Mn USD)	Grant Amount (Mn USD)	Co-Financing Amount (Mn USD)	Fund	Year
TAF: Support to Scale Up Renewable Energy in the Maldives	--	0.3	--	IBRD	2020
DPSP III Accelerating Renewable Energy Integration and Sustainable Energy (ARISE)	27	3	92	IBRD	2020
Preparing Outer Island Sustainable Electricity Development Project / Technical Assistance: Capacity Development of the Maldives Energy Authority	--	12	112	ADB	2014
ASPIRE Program	--	11.68	58	IBRD	2014
Technical Assistance: Republic of the Maldives Capacity Development of the Maldives Energy Authority	0.28	--	0.44	ADB	2014

Apart from the investments in Solar, the country is actively looking to harness multilateral funds in the WtE space as well.

ADB has approved USD 73 million package to develop WtE facility in Maldives. It has also approved a USD 73.39 million concessional loan and grant to the Government of Maldives to develop a waste treatment facility using WtE technology and disposal infrastructure for the Greater Malé region[67]

Additionally, ADB has approved financing of USD 105 million package to the state under Preparing Outer Islands for Sustainable Energy Development Project (POISED) in 2020 to transform the existing energy grids on the archipelago into a hybrid renewable energy system. The POISED project is aimed at installing energy management and control systems, energy storage; and improvements in distribution networks, in order to significantly reduce the need for diesel to generate electricity.

Banks and NBFCs

There is an established Central Bank in Maldives known as the Maldives Monetary Authority (MMA). MMA is also the regulatory body for banking operations in the state. Around 5 commercial banks including HSBC operate in the state. These banks follow normal international banking practices and offer Letter of Credit (LC) facilities and other financing, primarily serving the tourism sector and import-export trade. There are constraints on Long-term domestic financing in the country such as the small project sizes, limited bankability of projects (by international standards) and limited corpus of the domestic banking system limit the lending to CET projects.

Capital Market

Maldives Stock Exchange (MSE), first opened in 2002 as a small securities trading floor, was licensed as a private stock exchange in 2008. The state legislature passed the Securities Act in January 2006 and the government created a Capital Market Development Authority (CMDA) to regulate the capital market. The MSE functions under the CMDA. At present, the only investment opportunity available to the public is a limited number of shares in the Bank of Maldives and five state-owned public and a foreign insurance company.

The CMDA has well laid out procedure for public placement of conventional as well as Islamic equity. The markets also have provision to list debt instrument such as Sukuk and corporate bonds.

Foreign Investments

The Ministry of Economic Development encourages the investment in projects that promote the use of renewable energy in Maldives. Foreign investments in Maldives have primarily included resort management, but also comprise of other sectors such as telecommunications, accounting, banking, insurance, air transport, courier services, and some manufacturing. There is no country specific restriction on foreign investment and the country allows foreign investment in all major sectors; apart from few specific sectors restricted for locals. Generation, Distribution and Supply of electricity are not included in the restricted list of foreign investment.

Foreign investment in the country can take place through two routes. There are two regimes, under

[67] https://www.adb.org/projects/51077-003/main#:~:text=ADB%20Approves%20%2473%20Million%20Package,the%20Greater%20Mal%C3%A9%20region...

which a foreign party can invest in the Maldives[68]:

- Normal regime, governed under the Foreign Investment Law; and
- SEZ regime governed by the Special Economic Zones (SEZ) Act.

FDI flows to Maldives accounted for a record level of USD 565 million in 2019, an increase from USD 539 million in 2018 (+5%). The Maldives are the third recipient of FDI among Small Island Developing States. In the last 5-7 years, the FDI in power sector is mainly observed from China.

5.5.3. Taxation

Taxation structure and incentives play a major role in the growth of renewable sector in any country by increasing investments, attracting public and private players, foreign players and institutions, and thus adding the growth the country.

Since November 2014, Goods and Services Tax (GST) is 12% on the value of goods and services supplied in Maldives. However, electricity supplied from powerhouses registered with MEA is exempted from the payment of GST. Companies, partnerships, individuals and all people; who are the resident or carrying out business in Maldives, would be subject to taxation under the newly proposed Income Tax Act, which would replace the Business Profit Tax Act. The taxations applicable under the same is as follows:

- Bank profit tax at 25%
- Profit of companies, partnerships and other persons at 15%
- Profit from sources outside Maldives at 5%

For all type of non-resident businesses, a non-resident withholding tax of 10% is charged on income from dividend, interest and insurance premiums.

5.6. Nepal

5.6.1. Market Size, Sustainability and Returns

Due to unreliable and inadequate supply of poor-quality electricity, the power sector in Nepal is majorly underperforming and adds development constraint in the country's growth. The energy sector is still dominated by traditional sources, where wood as fuel accounts for majority of total energy consumption. As of 2019, around 89% of the population has access to electricity, but the supply is of poor quality and unreliable. Though its per capita electricity consumption has increased from 63 kWh per annum in 2000 to 177 kWh per annum in 2018, it remains among the lowest in the world. Nepal's per capita electricity consumption is one-twentieth of the global average.

Against a peak electricity demand of 1,320 MW, the total installed generation capacity in Nepal has been 1,182 MW in FY 2018–2019, almost equally divided between the Nepal Electricity Authority (NEA, 100% owned by the Central government) and Independent Power Producers (IPPs) - the latter mostly in the form of small hydropower projects developed using local investments. NEA owns 621 MW (generating 34% of total sold electricity) and private investors own 560 MW of the total installed capacity (generating 29% of total sold electricity). The remaining requirements

[68] Doing Business in the Maldives Guide released by The Ministry of Economic Development in 2015

were satisfied by importing electricity from India (38% of total electricity sale, maximum import of around 596 MW). As per the World Bank, 93.9% of population had access to electricity till 2018[69].

The electricity generation capacity in Nepal is rapidly increasing. In terms of the recent progress in hydropower development, survey licenses for 302 projects with a total capacity of 15,885 MW have been already issued, out of which 172 projects have secured generation licenses and the construction is ongoing for total capacity of 4,642 MW. Power purchase agreements have been completed for 244 projects with total capacity of 4,138 MW. Further, development of solar projects is gaining momentum (21 projects with an estimated capex of around USD 0.6 billion under various stages of development).

In Nepal, Electricity Act of 1992 was developed to manage the hydropower regime and to standardize and safeguard electricity services. It addressed the issues related to duties and taxes, licensing, royalties, land acquisition and tariff fixation. Hydropower Development Policy 2001 was developed to specify the governing rules related to generation, transmission, and distribution functions for the creation of an independent power systems operator for the hydropower sector[70]. Water Resources Act 1992 was framed to prioritize the use of water for hydropower over the cottage industries, navigation and recreation.

To address the worsening power situation, the government also approved the National Electricity Crisis Resolution Action Plan in 2008 and develop long-term strategies including construction of thermal power plants, increasing power imports from India, controlling the theft of electricity and expanding transmission capacity. The government also formed a task force in 2008 to prepare a road map for developing an additional 10 GW of hydropower generation capacity in 10 years and prioritized production of hydropower over production for export. Rural Energy Policy of 2006 was framed to reduce the power deficit. The policy was focused on the installation of biomass technologies, off-grid micro hydro systems for rural electrification (which can be connected to the national grid whenever necessary), and white light-emitting-diode and photovoltaic-based solar lights to replace kerosene lamps.

In 2015, the GoN has approved a PPP policy to promote the private sector participation in sectors including energy, telecom, urban and rural environment. To support the project developers and expedite PPP projects, PPP policy also provided the space for a VGF and project preparation facilities. However, guidelines for VGF are yet to be established.

In February 2016, the government submitted its INDC to the UNFCCC Secretariat, indicating its full commitment to making efforts to implementing its INDC and thereby contribute to the global efforts of reducing greenhouse gas emissions[71]. Some of the salient features include:

- By 2050, Nepal will reduce its dependency on fossil fuels by 50% and achieve 80% electrification through renewable energy sources.
- Under the Nepal Rural Renewable Energy Programme, Nepal aims to achieve the following targets, reducing its dependency on biomass

[69] https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=NP

[70] https://www.adb.org/sites/default/files/publication/356466/nepal-energy-assessment-road-map.pdf

[71] Nepal Energy Sector Assessment, Strategy, And Road Map, ADB March 2017

Table 29: Nepal Rural Renewable Energy Programme Targets[72]

Technologies	Targets
Mini and Micro Hydropower	25 MW
Solar Home System	600,000 systems
Institutional Solar Power System (solar photovoltaic and solar pump systems)	1,500 systems
Improved Water Mill	4.000 numbers
Improved Cooking Stoves	475,000 stoves
Biogas	130,000 household systems, 1,000 institutional and 200 community biogas plants

Tariff and Project Returns

Despite having huge potential to implement hydro power projects in Nepal, the historical tariffs have been recorded slightly on higher side and the costs of power supply have also been much higher than the tariffs[73]. The average cost of power supply in Nepal USD 0.12 per unit whereas the average tariff has been estimated at USD 0.11 per unit. However, a few of the recent private sector hydro power projects have seen drastic reduction in the tariffs, i.e., Chilime and Piluwa power projects have signed PPA with NEA at US cents 6.9 per unit and US cents 5.9 per unit respectively. The private players typically expect 16-20% returns on the equity investments in large scale hydro projects.

Average historical FIT tariff rate solar power projects in Nepal observed at around USD 0.10 per unit. Economists say at this price, it is challenging for any private investor to invest in this sector. Since 2016, as per the directives of solar guideline by the MEA, any interested solar developer could sign PPA at a posted rate of USD 0.10 per unit (NRs 7.30 per unit) with NEA. As of now, two numbers of developers have signed PPA for a total of 6 MW on a take or pay basis at the posted rate.

Incentives

In 2018, NEA had invited international bid as per ADB's procurement guidelines for setting up of Grid-tied PV solar projects through Tariff Based Competitive Bidding Process. NEA has received financial grant support of USD 20 million from Climate Investment Facility/Scaling Up renewable Energy Project (SREP), of which USD 18.5 million is being utilised for VGF purpose. The two main objectives of the VGF support are: to support NEA to achieve grid parity prices and to promote private sector participation in grid-tied PV solar.

5.6.2. Financing Channels, Institutions and Tools

The GoN has traditionally been the source of financing for infrastructure projects in Nepal. Approximately 60% of the total requirement are fulfilled through capital expenditure of national accounts. Despite increasing allocation towards infrastructure, the government funding is not sufficient to meet the country's growing economic and infrastructure needs as well as fully develop

[72] Nepal Rural Renewable Energy Programme Targets

[73] Hydropower Pricing in Nepal, Developing a perspective

the hydropower potential if the country.

MDBs and Government Funding

ADB, the governments of Denmark and Norway, the European Commission, the European Investment Bank, the Japan International Cooperation Agency (JICA), KfW, the Netherlands Development Organization, the United Nations Development Programme, and the World Bank are among main development partners in Nepal's energy sector. Out of which ADB, JICA, KfW, the Government of Norway, and the World Bank have been the most active in the on-grid subsector while other institutions are more involved in off-grid development. Apart from funding, these development partners regularly coordinate and support for establishing an enabling institutional and regulatory framework across the country.

Support from Development Financial Institutions (DFIs) has been significant in developing the sector. In 2018, ADB and World Bank have funded USD 126.46 million and USD 77.60 million respectively (which is around 55-60% of the total funding to the state)[Error! Bookmark not defined.]. enerally, DFIs funding is for long-term, spread across a repayment period of more than 30 years excluding moratorium periods.

ADB has been the leading partner in Nepal's power sector, focusing in particular on on-grid support for the NEA's expansion of generation, transmission, and distribution capacity, with six loan projects and one grant amounting to USD 521 million and 21 technical assistance projects amounting to USD 13.7 million since 1999[74]. Two hydro power projects funded by ADB along with other agencies are:

- The Kali Gandaki - Hydroelectric project of 144 MW generation capacity commissioned in 2002, co-financed by ADB and JICA
- Tanahu Hydropower Project – Hydropower project of 140 MW generation capacity, co-financed by ADB, JICA, the European Investment Bank, and the Abu Dhabi Fund in 2013.

Banks and NBFCs

The banking and financial services sector in Nepal is highly dominated by 31 Commercial banks (Class A), 87 Development Banks (Class B), 79 Finance companies (Class C), 21 Micro Credit Development Banks (Class D) and Infrastructure Development Banks. The number of total banks and financial institutions licensed by NRB is 229. Most of the funds in Banks and Financial Institutions (BFIs) are of short-term nature and are preferably used for short term lending.

Commercial banks are considered as the engine of growth of any sector of an economy. Unfortunately, commercial banks have very minimum exposure to investment in infrastructure and energy sector in Nepal. Despite 169 Banks and Financial Institutions (BFIs) in operation, the total infrastructure exposure of the BFIs is USD 5.25 bn, which is 17% of the total loans and advances. Infrastructure project developers are offered term loans at 10-12% and are generally backed by collateral or/and personal guarantees[Error! Bookmark not defined.]. BFIs sectoral exposure limits and lending imits restrict them to extend support to these players.

[74] Nepal Energy Sector Assessment, Strategy, And Road Map, ADB March 2017

Table 30: Key Limitations in Lending by BFI

Key Limitations	
Sector wise loan portfolio*	<=40% of total loan portfolio
Lending to hydro and tourism sectors	At least 15% of total credit
Limit to lending to single entity	Up to 25% of core capital

*Exempted for hydropower, transmission and cable car construction – 50%

Capital Market:

Despite the escalating need for long term capital funds, the capital market in Nepal remains relatively underdeveloped, limiting the investment from capital markets. The country has one stock exchange, the Nepal Stock Exchange (NEPSE), which is regulated by the Securities Board of Nepal (SEBON). Equity market comprises 198 listed entities at the securities exchange and is dominated by BFIs (80%).

Bond markets are less developed with listings by the Government Development Bonds and Corporate bonds raised by BFIs. The bonds are held by a small number of institutional investors and are rarely traded in the secondary market. Furthermore, majority of the trading is for equities (around 95%), remaining being for mutual fund units and corporate bonds. Less-developed bond market could be attributed to (i) lower or negative returns compared to the government securities or fixed income instruments (ii) absence of corporate ratings (iii) no price discovery instruments (yield curves) for bonds.

5.6.3. Taxation

Taxation structure and incentives play a major role in the growth of renewable sector in any country by increasing investments, attracting public and private players, foreign players and institutions' and thus adding the growth the country.

In Nepal, the applicable corporate tax for business like banks, financial institution, telecom and insurance (non-life), in both resident and non-resident entities, is 30%; for trading and service entities it is 25%; while for manufacturing activities, it is 20%. Standard Value Added Tax (VAT) of 13% is levied on provision of goods and services in Nepal. A standard tax of 25% on all types of capital gains is also imposed on all the entities and investors.

The entity having license to generate, transmit or distribute electricity shall be provided concession, if the commercial operation commences before 2024 April. Provisions shall be applicable for electricity generated from solar, wind or organic material and would be allowed 100% exemption up to 10 years and 50% rebate in subsequent 5 years. Furthermore, hydropower projects are exempted from VAT for the import of construction equipment, machineries and its spares parts.

The income derived by the foreign investors from investment in SEZ, (source of income from the use of foreign technology, management service fee and royalty) is exempted from the tax payment. Other infrastructure industries such as domestic tea production, processing industry, dairy industry, and garments industry are also given 50% tax incentives for growth and development. Also, Royalty Tax in Nepal is 15% applicable for all foreign entities.

To avoid double taxation, Nepal has also signed Double Tax Avoidance Agreement (DTAA) with 10 countries including China, India, Mauritius, Sri Lanka, Bangladesh, Pakistan, Thailand, Austria, Norway, Qatar, and South Korea. Tax on dividend and interest income is applicable as briefed in Table 31.

Table 31: Taxes on Dividend and Interest - Nepal

Income	DTAA not present	DTAA present
Dividend	5%	5%
Interest	15%	10%

5.7. Pakistan

5.7.1. Market Size, Sustainability and Returns

Pakistan has faced severe energy crisis in the last decade due to the demand and supply gap of electricity. The power deficit had reached as high as 7 GW in 2012. However, in the last 5 years, the overall power scenario has improved due to the newly added generation capacity. The contribution of clean energy sources is also increasing noticeably as a result of efforts made by the federal government, especially by the Alternative Energy Development Board (AEDB). Though the contribution of hydropower in power generation has improved from 26% in 2017 to 31% in 2020, the contribution of other clean energy sources (wind, solar and bioenergy) in electricity generation is still very low, at around 2.5% in 2020. In 2020, the installed generation capacity of other clean energy sources such as wind, solar and bio energy is around 4%[75].

The first policy to promote CET implementation in the country came out in 2006 as Alternative and Renewable Energy Policy 2006 (RE Policy 2006); which covered solar, wind and small-scale hydropower projects. Later, bagasse, biomass and waste-to-energy were also added as CET via an addendum in 2013. Despite having policy environment in place for more than a decade, the implementation of CETs has not been picked up on large scale. The recently introduced policy for Alternative and Renewable Energy, 2019 (ARE Policy 2019) further provides the roadmap to exploit full potential of ARE in Pakistan and promotes transition from the traditional procurement methods of cost plus and upfront tariffs to competitive bidding. The ARE Policy 2019 has set targets to have at least 20% of its generation capacity as clean energy technologies by 2025 and 30% by 2030 (20X25 and 30X30 target). However, individual targets for each CETs are not clearly defined.

Project Tariff and Returns

The early stage CET projects (majorly wind projects) have upfront tariff, determined by NEPRA at very high levelized tariff of 12-14 US cents per unit in 2014 (exchange rate 100 PKR/USD). However, in recent times, the tariff is reduced. The following projects indicate the latest tariff trends for wind and solar power projects being executed in the country:

- NEPRA in 2019 had approved levelized tariff of 4.87 US cents per unit for the period of 25 years for a 13.4 MW wind power projects in Sindh by Burj Capital (exchange rate 120 PKR/USD)[76].

[75] Pakistan Economic Survey 2019-20

[76] Tariff Order by NEPRA

- In 2019, AEDB approved the issuance of Letters of Support (LoS) to 11 wind power projects of a total capacity of 550 MW. The approved levelized tariff of all these projects ranged between 4.7 to 4.8 US cents per unit (exchange rate around 155 PKR/USD)[77].
- NEPRA, in its tariff order dated 11 February 2020, has approved levelized tariff of 3.76 US cents per unit for the period of 25 years for a 50 MW solar power project, installed in Bostan of Baluchistan district by Enertec Holding Company on BOOT basis (exchange rate PKR 155.35/USD)[78].

NEPRA estimates the return on equity invested in MW-scale clean energy projects such as solar and wind in the range of 15-17%[79].

5.7.2. Financing Channels, Institutions and Tools

MDBs and Government Funding

World Bank via IFC has been active in funding the CET projects since the time when the first wind power project of 50 MW had been established in the country. Other MDBs such KfW via its subsidiary DEG (Deutsche Investitions- und Entwicklungsgesellschaft), ADB etc., are also providing funds in the form of loans and grants to the provincial governments to implement solar, wind and mini/micro hydropower projects to promote sustainable energy.

IFC has agreed to provide funding of USD 320 million for 6 wind energy projects (with a total capacity of 310 MW). It has further committed USD 86 million from its own account and USD 234 million will be mobilized from other lenders including DEG and local banks Bank Alfalah, Bank Al Habib and Meezan Bank.

Banks and NBFCs

SBP runs a scheme for financing CET projects (solar, wind, hydro, biogas, bagasse cogeneration, and geothermal). So far, six banks namely, JS Bank, Bank of Khyber, Habib Bank, Faysal Bank, Meezan Bank and Bank Alfalah have come up with their products under this scheme and are engaged majorly in funding the utility scale (1MW – 50 MW) hydro and wind projects; which follow the requirements by the relevant government department/ authority.

The same scheme is also applicable to all Islamic Banking Institutions (IBIs) and DFIs authorized by SBP, e.g., Meezan bank is offering Diminishing Musharakah and Ijarah-based financing structures for CET projects. In 2015, Meezan Bank served as Sharia' adviser for the Tapal Wind Energy Project, 40MW, USD 41.9 million (exchange rate PKR 155.35/USD) and funded around 8-10 hydropower and wind power projects in last 5 years[80].

Since the inception of the scheme, the total outstanding funds under this scheme have reached USD 100 million (exchange rate PKR 155.35/USD) for around 220 projects of aggregate capacity addition of 292 MW.

[77] Press release by AEDB

[78] Tariff Order by NEPRA

[79] Concept paper on determination of rate of return for power sector by NEPRA

[80] Islamic Finance Facility for Renewable Energy by State Bank of Pakistan

In Pakistan, 21 Non-Bank Finance Companies (NBFCs) have licenses to conduct the investment advisory and asset management services. Project financing for power sector and infrastructure sector from NBFCs is negligible in the country. Lending NBFCs includes leasing companies, investment finance companies, housing finance companies, discount houses and non-bank microfinance companies[81].

PE Funds and FDI

To facilitate the domestic private investments and deploy various types of investment funds, the SECP has rationalized regulatory requirements under "Private Fund Regulations 2015" and has amended them as required. As per the framework, PE and VC funds along with other funds such as hedge fund, alternative funds and debt fund, etc. can also be launched under the name of Alternative Funds.

In relation to the foreign investments, Pakistan has a relatively friendly legal environment for FDI. The Board of Investment (BOI) acts as a specialized investment promotion agency to promote private investments and facilitate local and foreign investors in project implementation. Historically, the US has been one of the largest sources of FDI under Trade and Investment Framework Agreement (TIFA) of 2003. However, since the last few years, China has emerged as the single largest FDI contributor in Pakistan (more than 58% of Pakistan's total FDI in FY 2018 under China Pakistan Economic Corridor (CPEC) agreement of 2015). According to the statistics from SBP, the FDI in power sector in 2019 was around USD 90 million, largely in conventional power generation projects[82].

Capital Market

The capital market in the country is regulated by a financial regulatory agency 'The Securities and Exchange Commission of Pakistan (SECP) and governed by the Securities Act and other regulations. The market is relatively small and at a nascence stage of development. Total number of listed companies on the stock exchange is around 530 only, of which only 17 are engaged in the overall power sector. For instance, hub energy is a listed IPP engaged into hydropower generation among other businesses.

Lately, the presence of Islamic financing in the country's debt market is increased as a result of various initiatives by the government and Islamic Development Bank to replicate the successful Sukuk model of Malaysia. Sukuk has been known as one of the best Shariah-compliant debt instruments for liquidity needs and is highly tradable with low level of market risk. Pakistan is active in issuing both foreign and domestic sovereign Sukuk since 2005 and the government sector has dominated the sector till date. For example, Neelum Jhelum hydropower company raised the funding of USD 954 million in 2016 by Sukuk with a 10-year tenor and a sovereign guarantee by the Pakistani government. However, the corporate sector is slowly employing this as tool to increase their liquidity management. For example, K-Electric, largest power sector company in Pakistan, raised USD 217 million in 2015 by Sukuk. Capital market as a tool to raise funding for utility scale CET projects is still not established.

[81] Pakistan Economic Survey 2019-20

[82] 2019 Investment Climate Statements for Pakistan by US Department of states

5.7.3. Taxation

Taxation structure and incentives play a major role in the growth of renewable sector in any country by increasing investments, attracting public and private players, foreign players and institutions' and thus adding the growth the country.

In Pakistan, any profit and gain from any electric power generation project, including CET projects, set up in the country are exempted from tax. The domestic companies engaged in power generation using CETs attract various taxes as shown below:

Table 32: Withholding Tax as Applicable for Domestic Players - Pakistan

Applicable Tax on	Domestic Private Players
Capital gains (via sale of shares, modaraba and other specified securities)	Standard rate of 15%. But exemption if shares were acquired before 1st July 2013 or holding period >24 months
Interest income	10%/ 15%
Dividend distribution	Standard rate of 15%; however, 7.5% if dividend is a pass-through item to be reimbursed by authority as a part of power purchase agreement

Also, a first-year allowance of 90% of the cost of plant, machinery and equipment are available to encourage private investment in CET projects. Non-resident companies, which do not have permanent establishment in the country, attract the following taxes on their investments.

Table 33: Withholding Tax as Applicable for Foreign Players - Pakistan

Applicable Tax on	Foreign Players
Interest income	10%
Dividend distribution	Standard rate of 15%
Repatriation of funds	No restrictions on repatriation of income or capital

Additionally, Pakistan has active tax treaties with 66 countries to avoid double taxation of income or gains arising in one territory and paid to the establishments in another territory. If a reduced rate is available in a tax treaty with respective country, such reduced rate would be applicable instead.

5.8. Sri Lanka

5.8.1. Market Size, Sustainability and Returns

An island country, Sri Lanka, with a land mass of 65,610 km^2 and population of 21.4 million can be referred to as a densely populated country with 326 persons per km^2. According to the World Population Review, it is ranked 40th in the world. As defined by the World Bank, Sri Lanka has entered the upper middle-income category of countries for the first time in 2019[83].

[83] World Bank's classification of countries by income levels

Historically, the country has remained dependent majorly on hydro power to fulfil its electricity demand. In 1995, more than 95% of electricity was generated using hydropower. However, with economic growth and increased demand of power, the share of conventional power sources such as imported oil and coal has increased in the last two decades. Based on the latest available statistics by Ceylon Electricity Board (CEB), 41% of total electricity is generated from hydropower and 4% from Non-Conventional Renewable Energy (NCRE), especially from the utility scale solar, wind and biomass projects[84].

In Sri Lanka, SLSEA is mandated to assist in the formulation of the national energy policy and to promote clean energy development through private investment in the country. Since its establishment in 2007, it has conducted resource assessment for wind, solar and biomass and identified potential to implement various CET projects. The authority has also set up a guideline for renewable energy project development and its approval process.

The National Energy Policy and Strategies published in August 2019, has set a goal to reduce the dependence on fossil fuels to below 50% of the primary energy supply and to reduce the specific energy consumption across all the end-uses by 20% by 2030, compared to 2015.

It is observed that on an average there has been an annual private investment of approx. USD 138 million in the overall power sector[85]. Considering approximately 4% contribution of CET in energy mix of the country, one can derive that the historical investment in the CET by private players is very low. Based on the latest available statistics, around 90% of the CET projects (except hydropower plants) operational in 2018 are under PPP route and have involved private players.

Tariff and Return[86]

Before 2016, the utility-scale RE capacity was awarded on a first-come-first-serve basis and the applicable tariff differed according to the capacity of the project: FIT was applicable for the projects below 10; whereas the tariffs for the projects over 10 MW were negotiated between the developer and the government. In addition, projects above 25 MW required the provision of a free equity stake to the government. This method of tariff determination and capacity allocation changed to a competitive auction method in 2016.

In 2016, under the 'Soorya Bala Sangramaya' program to install solar power projects of around 1 MW each across the country, the bids were received for as low as US cents 7.14 per unit (LKR 11 per unit).

Average solar and wind tariffs in Sri Lanka today are in a range of US cents 6-9 per unit and the PPAs are executed typically for 20 years with CEB by the project developer[87]. Private sector players involved in solar and wind project development for a MW scale project typically realised 13-16% returns on the equity investments.

5.8.2. Financing Channels, Institutions and Tools

Most of the NCRE projects (solar, wind, biomass and waste to Energy) in Sri Lanka are financed by domestic lenders and developed by domestic investors. This is primarily due to the small scale of

[84] Ceylon Electricity Board

[85] World Bank PPI database for Sri Lanka for the period 2010-2018

[86] Accelerating Renewable Energy Investments in Sri Lanka – Drivers, Risks and Opportunities

[87] Mercom India Analysis

NCRE projects and the risk allocation under the PPA, which seems more acceptable to domestic investors compared to international investors. Under the PPA, key risks like payment security risk, political risks and termination risks are allocated to the project developer in contrast to the international best practice.

MDBs and Government Funding

Key MDBs actively present in the CET space are JICA, KfW, Agence Française de Développement (French Development Agency), Kuwait Fund for Arab Economic Development, the Islamic Republic of Iran, the World Bank, and the USAID. For example, Uma Oya hydropower plant is financed by the Islamic Republic of Iran while JICA is supporting the Upper Kotmale Hydroelectric Project.

ADB Division, which is also relatively very active, receives funds from ADB in the form of grants, loans and receives technical assistance to develop and implement sustainable energy initiatives. China and Asian Infrastructure Investment Bank Division of Sri Lanka receive grant and interest free loans from China (CDB, EXIM Bank); majorly for hydropower, dendro (fuel wood) and biomass projects.

Banking System

In Sri Lanka, public sector dominates the banking industry with eight state-owned banks. The country's banking sector is relatively stable with low levels of nonperforming loans (NPLs), particularly in the case of infrastructure project loans, which are often backed by treasury guarantees. Very limited banks and FIs are involved in financing of clean energy projects including Bank of Ceylon, Peoples Bank, Commercial Bank of Ceylon, National Development Bank, Hatton National Bank (HNB) and DFCC Bank.

Other than the commercial banks, 14 specialized banks are licensed by the Monetary Board with the approval of the Ministry of finance. These are different from the commercial banks; since they are not authorized to accept demand deposit from public (current account). However, they do maintain savings and time deposits. Also, they are not authorized to deal in foreign currency. The Government is planning to discontinue licensing of such specialized banks after 2021 and convert them to commercial banks. At present, there are 27 finance companies (NBFCs) registered with central bank. Most of them are engaged in hire purchase, leasing and real estate business. In a nutshell, the commercial banks have a share of around 48%, finance companies of around 42.5% and licensed specialized banks of 9.5% in the banking sector.

Commercial banks like HNB and DFCC have recently financed multiple small-scale renewable projects. However, when it comes to the large-scale projects, Sri Lanka's banking system does not have enough liquidity to support the quantum of the required funds even after syndication. Broadlands Hydro Power Project (Under Construction project, 35MW), Industrial and Commercial Bank of China (ICBC), for example, provided 85% funding and the balance was obtained from HNB. In general, the commercial banks expect a return of 13-15% [base PLR (around 10%) + spread (3-5%)] from a short to medium term loan to any power project.

Capital Market

Sri Lanka has implemented number of capital market development plans in the past. At present, the Securities and Exchange Commission (SEC) and the Colombo Stock Exchange (CSE) drives the capital market of the country under the Securities and Exchange Commission Act and its amendments.

The capital market is at a nascent stage of development. Almost all the securities in the market are Treasury bills and bonds. In 2019, only 17 listings of corporate debentures by nine institutions were recorded in the primary market[88]. Also, the maturity period of debenture issuance is observed, majorly, of five years. Since last few years, the financial sector (around 80% of the total value of debentures issuance) has been the chief player in the debenture market. The secondary market for corporate debt is also less active. In fact, the foreign participation in primary market transactions is low. A total foreign inflow of USD 29.7 million was recorded during the first ten months of 2019[Error! Bookmark not defined.].

PE Funds, Pension Funds, Insurance Funds and FDI

Presently in Sri Lanka, private equity investment is not very common in power sector, as the ticket size for investment is not big enough in line with the existing scale of CET projects implementations. Besides, the domestic corporates are not seen open to explore private equity investments and share the ownership.

Sri Lanka has 3 pension types:

- Public sector - Public service pension scheme
- Private sector- Employee Provident Fund (EPF) and Employee trust fund
- Informal sector - Farmer's pension and social security benefit scheme (FMPS), Fishermen's pension and social security benefit scheme and Self-employed persons pension scheme (SPPS)

Among the above, the EPFs are mandated to invest in capital intensive projects and housing segment. FDI in Sri Lanka is governed by the Exchange Control Act and External Commercial Borrowing scheme. Hundred percent FDI is permitted in most of the sectors except for a few such as pawn broking, coastal fishing, etc. FDI investments in the overall power sector have constantly decreased over the years, reducing to USD 1.1 million in 2017 from USD 45 million in 2013[89].

Carbon Credit Scheme

To support local clean projects to benefit from climate finance, a voluntary carbon credit scheme, i.e., Sri Lanka Carbon Crediting Scheme (SLCCS) has been established. Under this scheme, companies involved in generating clean power from hydro, solar, etc. sources can earn Sri Lanka Certified Emission Reduction Units (SCERs). Companies can offset their own emissions using these units or trade their carbon credits with other companies. However, the program has not picked up fully due to lack of demand for carbon credits.

5.8.3. Taxation

Taxation structure and incentives plays a major role in the growth of renewable sector in any country by increasing investments, attracting public and private players, foreign players and institutions' and thus adding the growth the country.

In Sri Lanka, the tax regime is comparatively simple. The electricity generation companies using clean energy sources are exempted from any tax. The withholding tax rate is 14% on interest

[88] Financial System Stability Review 2019 by Central Bank of Sri Lanka

[89] https://www.cbsl.gov.lk/sites/default/files/cbslweb_documents/publications/annual_report/2017/en/14_Appendix.pdf

income, dividend income and royalty. The corporate capital gain tax rate is at 10%. The applicable corporate tax rate in Sri Lanka is briefed in the Table 34 in the next page.

Table 34: Corporate Tax – Sri Lanka

Institutions	Domestic Companies
Unit trust and Mutual Funds	28%
Banking Finance / Insurance	24%
SME with turnover less than LKR 500 million	14%
Construction, Manufacturing, healthcare	28%

5.9. Summary

A framework and the benchmark for best practice are defined for analysis and the same has been detailed in Appendix A.1 for reference. Based on the framework and the analysis of the report, gap in terms of maturity under three major heads: 1) Market Size, Sustainability and Returns 2) Financial channels and tools, and 3) taxation and other qualitative parameters in section 5, are identified for each country. It is summarized and relatively ranked in high, medium and low maturity levels subsequently based on the benchmarks defined in Appendix A.1.

5.9.1. Market Size, Sustainability and Returns

Evaluation	Parameters	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri - Lanka
Market Size	• Investment in CET % of Annual GDP • Annualized investment required for target Capacity % of GDP (annual)	Low	Med	Med	Low	Low	Low	Low	Low
	CAGR of past growth in CET installation (5 years)	Low	Low	Med	High	High	High	High	Low
	Target set vs achieved (available for both 2025/ 2030 and 2050)	Low	Low	Low	High	Low	Low	Med	Med
Market Sustain-ability	Regulator (industry structure, authority for RE in place)	Low	Med	Med	High	Med	Low	High	High
	Bundled and Unbundled Power Sector	Low	Med	Med	High	Med	Low	Med	Low

Evaluation	Parameters	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri - Lanka
	Power sector Legal framework (Electricity Act, Competitive Bidding for all (Generation, Transmission, Distribution, Inter-state transmission system, Accelerated tax depreciation, etc.)	Med	Med	Med	High	Med	Med	Med	Med
	Electrification level with grid connected	Low	High	High	High	High	Med	High	High
	RE policies (Clean energy policy, Open access regulation, FIT/ Competitive bidding, Net Metering, Technology related policies, Tax holidays, Accelerated tax depreciation)	Med	Med	Med	Med	Low	Med	Med	Low
Project Return	Tariff	Low	Low	Med	High	Med	Med	Med	Med
	Payback period	Med	Med	Med	High	Med	Med	Med	Med
	Risk premium	Low	Med	Low	High	Med	Low	Med	Med

5.9.2. Active Financing Channels and Tools

Evaluation	Parameters	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri - Lanka
Active financing channels	CET projects financing channels - maturity level	Med	Med	Med	Med	Low	Med	Med	Low
Active financing tools	IDA/ Grants/ MDBs	High	High	High	High	High	High	High	High
	Banks / NBFCs/ FIs	Low	Med	Med	High	Low	Med	Med	Med
	External Credit Agency (Like EXIM bank in India)	Low	Med	Low	High	Med	Low	Med	Low
	Private Equity / VC Funds	Low	Low	Low	Med	Med	Low	Med	Low
	Capital markets	Low	Low	Low	Med	Med	Low	Low	Low
	Institutional investors (Insurance funds, Pension funds,	Low	Low	Low	Med	Low	Low	Low	Low

Evaluation	Parameters	Afghanistan	Banglad esh	Bhutan	India	Maldives	Nepal	Pakistan	Sri - Lanka
	Sovereign Wealth Funds)								

5.9.3. Taxation and Other Qualitative Parameters

Evaluation	Parameters	Afghanistan	Banglad esh	Bhutan	India	Maldives	Nepal	Pakistan	Sri - Lanka
Taxation	Domestic players	Med	High	Med	Med	Med	Med	Med	Med
	Foreign investors	Med	High	Med	Med	Med	Med	Med	Med
Others for qualitative	Innovative instruments (Masala bonds, InvITs, Asset saucerization etc.)	Low	Low	Low	High	Med	Low	Low	Med
	Enablers (Letter of Credit, Credit Guarantees, Insurance etc.)	Low	Low	Low	High	Med	Low	Low	Med
	Financing tools/incentives etc. based on ESG (Environment, Social, Governance) aspects	Low	Low	Low	High	Med	Low	Low	Med

Categorization	High	Medium	Low
Representation	High	Med	Low

The identification of the gaps and their categorization help to understand the areas of improvement in order to develop conducive financing environment in each SAARC member state. The recommendations to overcome the gaps are discussed in the upcoming section.

6. Recommendations and Conclusions

6. Recommendations and Conclusion

6.1. Conclusion

The demand for electricity in the SAARC Member States has been steadily increasing due to rapid urbanization and industrial growth. With various factors including rising concerns over climate change, the need to procure electricity from clean energy sources becomes inevitable. Though small-scale projects benefit the rural areas, SAARC Member States can reap more benefits through the implementation of utility-scale projects, as it helps cater to the electricity requirements of a larger population.

The SAARC Member States have already initiated deploying utility scale CET projects based on the technical potential and commercial viability. However, the barriers confronting a full-scale transition to clean energy lie not just with technology adaptation but also with the challenges to avail affordable long-term financing. Historically, multilateral development agencies and respective country governments have played a crucial role by funding a part of the initial project cost. It is required to attract more private investments to further deploy CET projects in each SAARC member state.

Institutional investors like pension funds, insurance companies, and renewable infrastructure funds – together can play a critical role in scaling up clean energy investments. Such investors can fund major parts of the project for a longer period at lower interest rates. Investment from the private sector has helped some of the SAARC Member States like India, Bangladesh, etc. to fast track clean energy transition.

The report concludes with the proposed recommendation for SAARC Member States to overcome the challenges in CET project financing. As majority of the utility-scale CET projects are considered as infrastructure projects by each SAARC Member State, these recommendations are equally applicable for all utility scale CET technologies.

6.2. Recommendations

6.2.1. Push For Clean Energy Policies, Institutional and Regulatory Environment

All the emerging technologies have a maturity life cycle from R&D to commercialization. A well-designed holistic policy helps to accelerate this journey. Policymakers should develop a comprehensive policy dedicated to each CET, at both central and provincial levels. A single window clearance for any CET project as against the multiple approvals from various authorities may be explored by each SAARC member state. Also, legal, policy and regulatory risks emanating from cross-border trade may be dealt with by setting up a common framework among all the SAARC Member States.

Also, policy advocacy for other functions of the overall power sector like power transmission, distribution, trading, etc. catalyse the implementation of CETs. The government bodies and policymakers should work towards strengthening the power sector country wide to make the sector attractive for investors and increase the ease of business. The SAARC Member States may explore the following specific recommendations:

Afghanistan

- Strategy and plan to be developed to meet targets setup in 2015
- Develop specific policies and targets for hydro power, wind and solar energy, and biomass power
- Guidelines (or Schemes) for promoting specific business models like solar or wind power parks, hybrid solar and wind power projects
- Open up the power sector for the private companies and encourage the private participation
- Streamline and standardize the bidding process and prepare uniform bidding documents at country level for all renewable projects
- Dedicated governmental agency or authority focusing on bidding and commercializing the CET projects to be institutionalised
- Further to promote renewable projects, policies like open access and net metering and other incentive mechanism to be developed for residential, commercial and industrial consumers as necessary

Bangladesh

- Develop specific policies and targets for each hydro power, wind and solar energy, and biomass power
- Draft policy for Feed-in-Tariff mechanism (FIT) to be finalised and implemented across the country for wind renewables
- Authorities may target for timely closing of competitive bidding for RE projects
- Regulatory issues related to environmental approvals to be resolved on priority
- Open access policy can be developed so that the consumer can choose from number of competitive power companies rather than being forced to buy power from the local utility monopoly
- Land parcels may be identified by the government and respective authorities for developing renewable projects before the bidding happens or the project is awarded
- Authorities need to completely unbundle and create separate legal entities for generation, transmission and distribution of power.

Bhutan

- Synchronizing the AREP and renewable energy master plan in terms of types of CETs being promoted and their target
- Operationalize the REDF laid up in the AREP 2013. Identifying potential sources of funding for it can be a critical start point
- Considering the terrain and limited scope of large scale non-hydro projects, policies such as net metering and incentive mechanism to be established to promote distributed generation in the country. Authorities need to completely unbundle and create separate legal entities for generation, transmission and distribution of power.

India

- India needs to plug in the gaps in execution of awarded CET projects in terms of faster land acquisition, transmission connectivity, etc. As reported by CEA in August, 2020, total of around 39 GW projects seems to be stuck/delayed due to various reasons like COVID-19, transmission issues, land acquisition issues, absence of PPA/PSA and financial closure.
- With increasing share of CET projects in electricity generation, India should implement stringent regulations to maintain grid stability and put in additional efforts to modernize the national grid to sustain the intermittency of solar and wind power.
- Efforts to improve financial health of the debt-ridden Discoms to ensure timely payments to the CET projects. The major highlight in this area is a proposed scheme for privatization of the Discoms.

Maldives

For Maldives, its unique islandic geography requires the country to adopt different approaches than the rest of the SAARC Member States. As large-scale utility CET project are not feasible here, the government agencies and policymakers shall focus to implement decentralised CET projects and optimize the available clean energy resources using hybrid CET projects along with energy storage solutions. Also, one comprehensive policy and guideline along with well-defined incentives for CETs may help investors and private players to gain confidence in the sector development. The government may explore to reduce the subsidy expenditure incurred towards the public utilities for the purchase of imported fuel and reallocate the fiscal savings towards CET developments.

Nepal

In Nepal, apart from Hydro power, none of the clean energy resources is exploited for power generation at utility scale. The following steps may further be taken by the government to promote renewable energy in the country.

- The country may develop specific policies and targets for other sources of energy including wind and solar energy and biomass power.
- The Government has approved the PPP policy with the objective to increase investment from private sector. Additionally, guideline on VGF should also be clarified indicating clear provisions on areas, where the government should extend financial support to facilitate project development.
- Considering the terrain and limited scope of large scale non-hydro projects, policies such as net metering and incentive mechanism to be established to promote distributed generation in the country.
- Like Bangladesh and Bhutan, authorities need to completely unbundle and create separate legal entities for the generation, transmission and distribution of power.

Pakistan

- The ARE 2019 has set cumulative target for capacity addition for clean energy technologies. The Country should also develop specific targets for each hydro power, wind energy, solar energy, and biomass both at national and provincial levels to ensure better

implementation. The proven CET potential can be considered while deciding such specific targets.

- Pakistan should focus to enhance and strengthen coordination among the ministries, agencies and institutions in order to accelerate CET implementation, reduce the delay in securing LoS, LoI from AEDB.
- Central Regulator NEPRA should take measures to ensure the stakeholders honour its commitments, agreements and obligations, to enhance its credibility.
- Currently, the solar and wind power projects are being awarded using market driven competitive bidding. However, it is recommended to streamline and standardize the bidding process and prepare uniform bidding documents at both federal and provincial levels.
- Pakistan should take steps to encourage more globally active private players and IPPs to participate in the CET implementation. It is observed that the IPPs present in the country today are majorly domestic and from Middle East and China.

Sri Lanka

- Sri Lanka needs to implement the pending initiatives related to unbundling of the CEB and create separate legal entities for generation, transmission and distribution of power. This will eventually increase transparency and accountability across functions and bring down the power procurement cost by reducing the current conflict of interest associated with the integrated functions.
- The power sector regulator, PUCSL, has not been able to reflect the cost in the tariff structure, and operates without a road map. The country should initiate the tariff reforms at the earliest.
- Regulatory review of new projects and PPA and align the PPA with internationally accepted terms to attract foreign players.
- Resolve the shortcomings in the FIT determination for CET projects by PUCSL and eventually move towards competitive tariff regime.

Additionally, like in India, Renewable Purchase Obligation targets may be given to distribution companies of each SAARC member state to purchase or produce a minimum specified quantity of their requirements from Renewable Energy Sources and penalty to be levied in case of default.

Though Bhutan and Nepal are meeting overall renewable targets, they are still lagging behind in expanding other CETs. Also targets set in Afghanistan, Bhutan, Nepal and Pakistan for CETS are too small compared to the overall power requirement in respective countries. A well-designed policy framework with a focus on growth of specific technologies and attuned to specific national contexts should be developed in these Member States. The long-term stability of policies and targets is the key to ensuring investor confidence and sustained growth. An updated National Renewable Energy Policy can also offer an opportunity to adopt more ambitious renewable energy targets than the existing targets set in their respective renewable policies. A strong and well-designed renewable energy policy framework that is guided by clear targets and supported by robust institutions, laws and regulations, can signal the political commitment of respective governments to the public, investors, international institutions and other relevant stakeholders –

thus enabling a meaningful introduction of CETs in the country.

The SAARC Member States should prepare a long-term generation expansion plan, CET development plan and associated transmission and distribution plans. However, actual implementation of various elements of the plan have been fallen short of the recommended implementation process so far. This gap has caused significant economic impacts related to higher cost and prices on reliability of the sector.

Each SAARC member state may establish a strong policy analysis and implementation framework for the electricity sector to examine and implement policies on trade-off between conventional and renewable energy sources for power generation and financial and economic impacts of these choices.

6.2.2. Explore Alternative Innovative Means of Financing

CET projects in emerging countries are often constrained by real or perceived investment risks. To de-risk the CET projects and improve the bankability, SAARC Member States shall explore other innovative means of financing such as sovereign guarantee, partial credit guarantee, InvITs, green bonds etc. as briefed below:

A Sovereign Guarantee represents commitment by the government that an obligation will be satisfied if the primary obligor defaults. Usually sovereign guarantees come at a cost known as guarantee fees and it is related to payment defaults, but they can cover all kinds of obligations and commitments, e.g., Rewa Solar park in India[90].

Letter of Support is a little diluted version of a sovereign guarantee. The Ministry or government body of the country may still issue a document that does not have the same strength as a formal guarantee but that provides sufficient comfort to the stakeholders of the project. For example, LoS by AEDB to 11 wind power projects of a total capacity of 550 MW IN Pakistan in 2019[90].

Partial Credit Guarantee (PCG) is a potential way to cover part of the debt service default by the CET project as borrower regardless of the cause of default for a specific period of the debt term for a public investment. PCG boosts creditworthiness of the CET developer company. The PCG extended by IFC can mitigate currency risk with the guarantee structured to cover only the debt service due during the estimated time of currency inconvertibility. For example, In Bangladesh, GuarantCo provided an innovative financing structure in May 2019 - combining PCG with a liquidity extension guarantee with an objective to mitigate both payment default risk and liquidity risk for Standard Chartered Bank for a 20MW solar power plant[91].

Green Bonds are being widely accepted as a long-term debt instrument by stakeholders across the CET sector like project developer, financing institutions, governments and government agencies. Two international green bond standards have become dominant - the Green Bond Principles and the Climate Bonds Standard. There also exist the standards at regional level (upcoming for EU) and national levels in countries like India, China, and Japan[92].

InvITs are a platform like structure, in which assets of different nature are pooled. Sum of the investments from a numerous investors are employed in the pool. In India, Tata Power Renewable

[90] IRENA (2020), Renewable energy finance: Sovereign guarantees
[91] https://guarantco.com/portfolio/
[92] : IRENA (2020), Renewable energy finance: Green Bonds

Energy Ltd (TPREL), a wholly owned subsidiary of Tata Power Company Limited (Tata Power), is planning a renewable energy InvIT, and in a process to approach various investors. InvITs offer benefits to all the stakeholders of the CET sector:

- Sponsors/Developers: It helps in reducing debt, providing easy access to capital, monetizing of existing assets by pooling multiple projects in a single entity, shifting towards the asset light model and thus supporting the business in focusing on core expertise.
- Government: By providing alternative sources of finance, it improves the liquidity in infrastructure sector, and thus, supports in building infrastructure of the country at a rapid speed.
- Investors: Due to the reduction in ticket size, it opens an opportunity for retail investors, it reduces the uncertainties and allows investors to generate fixed and stable returns, and thus act as panacea for investors like pension and insurance funds.

Based on the gap analysis performed in each SAARC member state in section 5.9, following Table 35 summarises the impact of these innovative tools on mobilising investments in each SAARC member state in next 2-5 years period. This is based on the primarily routes of funding for CET projects and credit rating of each SAARC member state.

Table 35: Impact of Mobilising Alternative Investments Tools in SAARC Member States

Impact of mobilising Alternative tools	Sovereign guarantee	PCG	Green bonds	InvITs
Afghanistan	High	High	Low	Low
Bhutan	High	High	Low	Low
Bangladesh	High	High	High	Low
Nepal	High	High	High	Low
India	Low	Low	High	High
Pakistan	High	High	High	Low
Sri Lanka	High	High	Low	Low

These innovative financing tools can be adopted by any of the SAARC Member States at any stage of development for all types of CET projects.

6.2.3. Increase the Penetration of SAARC Development Fund Across SAARC Countries

SDF has approved USD 60 million of debt to four projects; only in Nepal and Sri Lanka. However, SDF cannot only increase its investment in Nepal and Sri Lanka, but also increase its horizon to other countries like Bangladesh, Afghanistan, and Pakistan in clean energy projects.

6.2.4. Strengthening Financing Institution to Increase the Funding In CET Sector

The long-term liabilities of institutional investors, such as pension funds, insurance companies match with the long-term nature of infrastructure projects. Thus, infrastructure might be an interesting asset class for them, which could offer opportunities in terms of not only in return but

also in portfolio diversification due to their low correlations to other asset classes and inflation protection.

As discussed earlier, investment by PE funds, pension funds and insurance funds (both foreign and domestic) etc. in the countries like Bangladesh, Sri Lanka, Bhutan, Afghanistan, Maldives are in very nascent stage primarily due to the restrictions by regulators on investment, policies not developed, lack of corporate governance infrastructure, etc. For countries like Bangladesh, Sri Lanka, Bhutan where domestic pension funds corpus is too small to cater the investment, policies need to be developed on central level to incorporate private employees in central pension funds, and thus to increase investment in pension funds. Additionally, the following few recommendations have been detailed below:

For Afghanistan, Bhutan and Nepal, credit rating may be assigned by global rating agencies like Fitch, Standard & Poor, etc. These credit rating is used by pension funds, sovereign wealth funds, and other investors to gauge the credit worthiness of country, and thus, having a positive impact in reducing the country's borrowing costs.

India

- Domestic debt market and the banking system in India are active in clean energy technology implementation. However, Government and RBI should focus on addressing underlying challenges of Asset-liability mismatch and increasing NPA in infrastructure space to ensure healthy inflow of funds from Indian banks and FI into CET sector.
- India has attracted investments from both domestic and foreign PE funds/ pension funds/ insurance funds in CET sector. As the plain CETs are commercially proven in India now, going forward, the government should also promote private investments in new technologies like energy storage, hybrid solar-wind power projects, etc. Offering subsidies/reliefs for ventures/partnerships/joint ventures can be one of the routes to promote and commercialize the new technologies.

Pakistan

- SECP and SBP should promote PE and pension funds (both domestic and foreign) to invest more in CETs and government should explore relief measures like tax benefits, default guarantee to CET projects, etc.
- As Islamic Banking is widely accepted in Pakistan, SBP and government should promote the adoption of Islamic banking for clean energy projects on large scale. Islamic Financing Facility for Renewable Energy (IFRE) is one such effort in the direction by SBP.

Sri Lanka

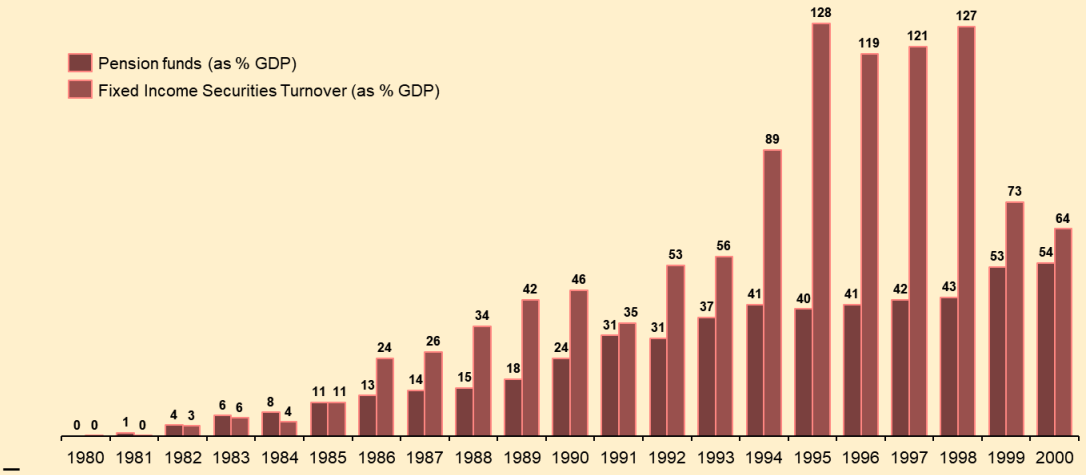
- As the banking system of the country does not have enough liquidity to fund a large-scale CET projects, Sri Lanka can explore to establish tie-ups/ arrangements with the EXIM banks of neighbouring countries or with the SDF.
- Just like in capital market, rules and regulations to develop the corporate governance standards and enhance transparency in companies' financial statements should be incorporated to reduce the risk for such institutions and make debt investment less dubious. Additionally, following few common steps are to be implemented across the SAARC Member States to strengthen financial institutions:

- Policy should be developed and actions to be taken to facilitate the establishment of a specialized market intermediaries such as fixed-income brokerage houses, bond research analysts, or credit rating agencies to facilitate secondary market transactions in bonds such that market opportunities are reported to potential investors.
- Regulations should be eased so that insurance and pension funds can be invested more in infrastructure bonds.
- The development and adoption, by the government, of a pension reform policy that includes an approach to ensure mandatory pension schemes for private players so that government pensions are adequate, affordable and sustainable. Growth of mandatory pensions encourages flows to capital market. Pension sector reforms in Chile are an example of impact of mandatory contributions. (Refer Case Study on Chile Pensions below)

Chile Pension Reforms (1980-2000)

- The 1981 Capital Markets Act created a system of private pensions (AFP – Administrators de Fondos de Pensiones) where mandatory contribution led to the creation of a new class of institutional investor, with long-term domestic investment and risk profile suitable for bond market investment
- Deepened domestic capital markets, allowed the government to extend debt maturity profiles and reduce its' debt's foreign currency components, helping to improve financial strength and resulting in Chile being rated investment grade since its first rating in 1993

Figure 19: Chile Pension Sector and Bond Market as % GDP (1980-2000)



Source: Capital markets in Chile: From the financial repression to financial deepening, Rodrigo Cifuentes, Jorge Desormeaux and Claudio González, Central Bank of Chile

Developing Financing Institution for Funding in CET Sector

Like Power Finance Corporation (PFC) in India, Bangladesh Infrastructure Finance Fund Limited (BIFFL) and Infrastructure Development Company (IDCOL) in Bangladesh, etc, a financing institution dedicated to fund CET projects may be developed in each SAARC member state. Recently in 2019, Nepal Infrastructure Bank Ltd. (NIFRA) has been established in Nepal to fund primarily infrastructure projects with a focus on green projects such as solar, hydro, cable car, etc.

Developing of similar institutions may be evaluated in other SAARC Member States like Afghanistan, Bhutan, Nepal, and Pakistan to ease the financing in overall clean energy projects, which are characterised as high-risk projects.

6.2.5. Develop Capital Market to Increase the Fund Availability for SAARC Countries

Capital markets play an important role in financial intermediation and resource mobilization, specifically for raising risk capital and long-term financing for infrastructure projects. Well-functioning capital markets can reduce the private sector's dependency on bank financing.

As discussed in section 5, based on the maturity of development, the capital market in SAARC Member States can be divided primarily in three buckets: High, Medium and Underdeveloped. None of the capital markets in SAARC Member States are highly developed. Also, the existing Bond market is largely dominated by the government securities and rarely traded in secondary market. Private sector generally does not trade these securities because either the returns are high in fixed deposits with banks or in other government saving schemes. Capital Markets in India and Maldives fall in medium category while in other countries, it is underdeveloped.

In recent times, the governments in SAARC Member States have shown strong ownership of reforms that enable capital market development in countries. To develop the capital market in Afghanistan, Bangladesh, Bhutan, Nepal, Pakistan and Sri Lanka, the following recommendations are provided:

- To make the price discovery method more effective, Securities Regulators should prefer IPO book-building procedures rather than fixed price method. Also, IPO lock-in-period should be reduced to 1 to 2 years for licensed private equity investors
- To increase assurance on reliable information, regulatory and policy compliance, safeguarding of assets, achievement of objectives, functional efficiency, and integrity by evaluating and improving the effectiveness of reputational risk management, and the internal control and governance processes, separate Internal Control Division to be formed within the securities and exchange commission, and thus scaling up the operations within the systems
- Securities regulator should issue risk-based capital rules for intermediaries and set clear milestones and a timeline for rectification for undercapitalized intermediaries. This will ensure market intermediaries, such as brokers and dealers, hold capital in proportion to the level of risks that the entities are exposed to from different types of market activities, maintain financial stability of the market intermediaries and limit the build-up of systemic risk. Regulators should also adopt and initiate the implementation of a capital restructuring plan for intermediaries. Enforcement actions may include obliging noncompliant entities to submit reconstruction plans, and potentially suspending the licenses for entities that continue to be noncompliant
- Securities regulator should installation updated ICT system for electronic reporting by listed companies and intermediaries; electronic internal communication system and case-tracking system for investigations and enforcement cases. This will strengthen the administrative capacity of securities and exchange commission with digital enterprise resource planning, while the regulatory information system will enable regulated entities to submit documents online and ensure more efficient risk-based supervision

- Securities Regulator should issue rules for the operation of exchange traded funds. This will promote a robust mutual fund industry by providing opportunities for passive investments by institutional and retail investors through exchange-traded funds. Policy related to short-sale shall also be introduced to mainstream short-selling as typical market practice by securities dealers. This will raise market awareness of the practice of short-selling and will be replicated for a new framework for future short-selling of government securities. The short-selling rules will support market makers provide vital liquidity and ensure efficient price discovery for exchange-traded funds through arbitrage.

The maturity and development of the bond market are imperative for the growth of financial market, which in turn has substantial positive spill-over effects in an economy. It has the potential to develop and mitigate the challenge of long-term funding mismatch faced by the bank-dominated financial sector. A vibrant bond market is also necessary for reducing financial sector fragility and providing much-needed long-term capital for CET projects financing in SAARC Member States.

6.2.6. Increase Tax Incentives to Stakeholders Across Renewable Power Value Chain

Tax incentives to institutions, corporates, investors and stakeholders across power value chain in clean energy technologies can be given in various forms such as tax holidays to business in clean energy generation, transmission and distribution; reduction in corporate taxes for power equipment manufacturers; exemption or reduction in taxes on dividend income, interest income, capital gains, royalties, repatriation of taxes for foreign and domestic entities investing in clean energy technologies, etc. Also, dis-incentivizing the fossil fuel further promotes the investment in renewables. During initial stage of growth, some of the countries like Nepal, India, and Bangladesh have incentivized the clean energy business by giving tax exemption, which may be followed by other neighbouring countries to encourage clean energy development.

In *Afghanistan*, BRT exemption on interest income, accelerated depreciation for capital goods and civil infrastructure, nominal tax on imported goods are there to spur investment in infrastructure. However, to further promote the investment, complete tax holidays for large scale clean energy utilities, tax exemption or reduction on tax on generating revenue, interest payable against foreign loans, royalties, technical know-how and technical Assistance may also be given.

Recently, *Bhutan has* introduced of GST, under Goods and Service Tax Bill 2020, and reduced CIT to 25%. Also, income tax exemptions for 10 years and exemption from custom duties and sales tax on imported equipment and exported electricity encourage the investors, project developers, manufacturers and system integrators. However, to further promote the investment, complete tax holidays for large scale clean energy utilities, tax exemption or reduction on tax on generation revenue, interest payable against foreign loans, royalties, technical know-how and technical assistance shall also be given.

Bangladesh has given 100% tax exemption to all the power generation organizations, except coal-based companies on generation revenue, interest payable against foreign loans, royalties, technical know-how and technical Assistance fees payable by power companies, etc.

India has laid out 10-year tax holiday policy (which ended in Mar'17), exemption from banking charges, wheeling charges and cross-subsidy surcharge, accelerated depreciation and cess on fossil fuel power plants.

In Maldives, incentives like GST exemption on electricity supplied from powerhouses registered with MEA, accelerated the depreciation for capital goods and civil infrastructure, nominal tax on imported goods are available.

Nepal has incentivized power sector business by giving 10-year tax holiday to organization in clean energy business: generation, transmission and distribution and equipment manufacturers;

In Pakistan, tax exemption is given to profits from electric power generation and a first-year allowance of 90% of the cost of plant, machinery and equipment is available to encourage private investment in CET projects.

In Sri Lanka, tax exemption is given for electricity generation companies using clean energy sources are exempted from any tax.

Additionally, in Maldives, Nepal, Pakistan and Sri Lanka, to further promote the investment, complete tax holidays for large scale clean energy utilities, tax exemption or reduction in tax on generation revenue, interest payable against foreign loans, royalties, technical know-how and technical assistance are recommended to further encourage the private investments in CET sector.

6.2.7. Enhance Intra-regional Cooperation Among SAARC Member States

Scaling of RE sector across each SAARC member state has been due to the implementation of attractive polices, support from regulatory framework that promotes private investment, etc. SAARC Member States should collaborate with relevant departments of each country in the field of solar, wind, hydro, biomass respectively to develop and enact effective policy and supportive regulatory mechanism for their countries. Also. Intra-regional trainings and seminars are to be conducted to strengthen and enhance the capability building of professionals, regulators, authorities and students.

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Appendices

Appendix A: Appendices

A.1. Appendix

A detailed financing structure has been constructed to analyse the financing conducive environment for each SAARC member state.

Market Size, Sustainability and Returns

Evaluation	Parameters	Rating Methodology
Market Size	Investment % of GDP - Annualised investment required for target Capacity % of GDP (Annual)	Percentage of Investment of GDP (Relative ranking) • High - Top three countries with the highest Investment % of GDP • Medium - Next three countries with relatively lower Investment % of GDP • Low - Last two countries with the lowest Investment % of GDP
	CAGR of past growth in CET installations (5 year)	• High: 5Y CAGR >10% • Medium: > 5Y CAGR 7% to 10% • Low: > 10Y CAGR Less than 7%
	Target set vs Achieved (Available for both 2025/ 2030 and 2050)	• High - More than 50% of last 5-year target achieved and Future target (for 2025 or 2030 defined) • Medium - Future target (for 2025 or 2030 or 2050 defined) but only More than 20% of last 5-year target achieved • Low - Less than 20% of last 5-year target achieved, Future target (for 2025 or 2030 or 2050 not defined also
Market Sustainability	Regulator (Industry Structure, Authority for RE in place)	• High -Both Independent regulator and Authority/ Agency to promote CET are present • Medium - Either of Independent regulator or Authority/ Agency to promote CET is present • Low - Independent regulator not present, Authority/ Agency to promote CET not present
	Bundled and Unbundled Power Sector	• High - Unbundled Power sector (Generation, Transmission, Distribution Unbundled) • Medium- Any of Generation, Transmission, Distribution Unbundled • Low - Generation, Transmission, Distribution all Bundled

Evaluation	Parameters	Rating Methodology
	Power sector Legal framework (Electricity Act, Competitive Bidding for all (Generation, Transmission, Distribution, Inter-state transmission system), Accelerated tax depreciation etc.)	• High - Polices and incentives in place and implemented (IF Authority for Power in place and very well implemented) • Medium -Policies and incentives in place but not implemented (IF separate authority for Power is not in place but structure defined who will ultimate authority) • Low -Policies not there (IF no structure defined who will ultimate authority)
	Electrification Level with grid connected	**% Consumer Electrification (Relative ranking)** • High - Top three countries with highest electrification level • Medium - Next three countries with relatively lower electrification level • Low - Last two countries with lowest electrification level **Per Capita Consumption (kwh/per person / year)** • High - >1500 • Medium - > 500 • Low - <500
	RE Policies (Clean energy policy, Open access regulation, FIT/ Competitive bidding, Net Metering, Technology related policies, Tax holidays, Accelerated tax depreciation)	• High - If all 7 Polices and incentives are in place and implemented (Including clean energy policy, Hybrid policy, FIT/Competitive bidding) • Medium -If more than 4 Policies (Including clean energy policy, FIT/Competitive bidding) and incentives are in place but not implemented • Low -If less than 4 Polices are there and not implemented (Everything else fall in this category)
***Project Return**	Tariff	• High - < 6 US cents /unit • Medium - < 12 US cents/Unit • Low - More than > 12 US cents/unit
	Payback period	• High - 1 to 8 years • Medium - 8 to 12 years • Low - More than 12 years
	Risk premium	• High - Credit Rating more than "A" • Medium -Credit Rating more than "B" • Low - Credit Rating less than "B" / No Credit Rating available

Active financing channels and tools

Evaluation	Parameters	Rating Methodology
Active financing channels	CET projects financing channels - maturity level	Refer A.1 below
Active financing tools	IDA/ Grants/ MDBs	Refer A.2 below. Repeat the assessment for each 5 tools separately. Categorize each based on results of tests as given in A.2
	Banks / NBFCs/ FIs	
	External Credit Agency (Like EXIM bank in India)	
	Private Equity / VC Funds	
	Capital markets	
	Institutional investors (Insurance funds, Pension funds, Sovereign Wealth Funds)	
	Enablers (Letter of Credit, Credit Guarantees, Insurance etc.)	
	Financing tools/incentives etc. based on ESG (Environment, Social, Governance) aspects	

Taxation

Evaluation	Parameters	Rating Methodology
Taxation	Domestic players	Refer A.3 below. Repeat the assessment for both domestic and foreign players and arrive at a category.
	Foreign investors	
Others for qualitative	Innovative instruments (Masala bonds, InvITs, Asset saucerization, etc.)	The details in are shared in statements around presence and its implementation. No ranking for these
	Enablers (Letter of Credit, Credit Guarantees, Insurance etc.)	
	Financing tools/ incentives, etc. based on ESG (Environment, Social, Governance) aspects	

Sub-section A.1, A.2 and A.3 are further detailed as below

Sr. no.	Evaluation	Parameters	Rating Methodology
A.1	**Assessing the maturity of financing channels**	Government + Multilateral	Low
		Government + Multilateral + Banks	Medium
		Government + Multilateral + Banks + Private investors	Medium
		Government + Multilateral + Banks + Private investors + Pension Funds / Insurance funds	High
		Government + Multilateral + Banks + Private investors + Pension Funds / Insurance funds + Other Institutions (PE/ FDI/ ECB etc)	High
The given combinations lead from less matured market (where govt and MDBs funds most of the CETs) to matured market (where private investors drive the competitive market). Select category based on the suitable combination of channels prevailing in the country			
A.2	**Assessing the maturity of financing tools**	Regulations	• High - Policies and incentives in place and implemented • Medium -Policies and incentives in place but not implemented • Low -Policies not there
		Investment restrictions	• High - No investment restriction on Energy sector and Renewable is priority sector • Medium -Investment restriction on Energy sector but Renewable is priority sector • Low -Investment restriction on Energy sector and Renewable is not priority sector
		Cost of Funding/ Return expectations	• High - Cost of funding/expected return < 10% • Medium - Cost of funding/expected return <12% • Low - Cost of funding/expected return > 12%

Sr. no.	Evaluation	Parameters	Rating Methodology
A.3	**Aspects of taxation**	Tax on capital gains	• High - Zero or < 10% • Medium - < 20% • Low - >20%
		Tax on interest income	• High - Zero or <10% • Medium - < 20% • Low - >20%
		Dividend distribution	• High – Zero • Medium - < 20% • Low - >20%
		Repatriation of funds	• High - Zero or < 5% • Medium - < 10% • Low - >10%

Thank you