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

SAARC Energy Centre

April 12, 2021

Contents

SAARC Energy Centre (SEC)

SEC was established in 2005, to establish an Energy Ring in South Asia. SEC works towards satisfaction of energy demand of the member states.

About the Organisation

- 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 South Asian region.

Role in Promotion of Clean Energy in the Region

- SEC has a crucial role in pushing the clean energy sector development in SAARC member states through its capacity building program activities.
- Over the years, SEC has conducted various studies, knowledge workshops, seminars and training courses in the fields of energy, including clean energy sources.

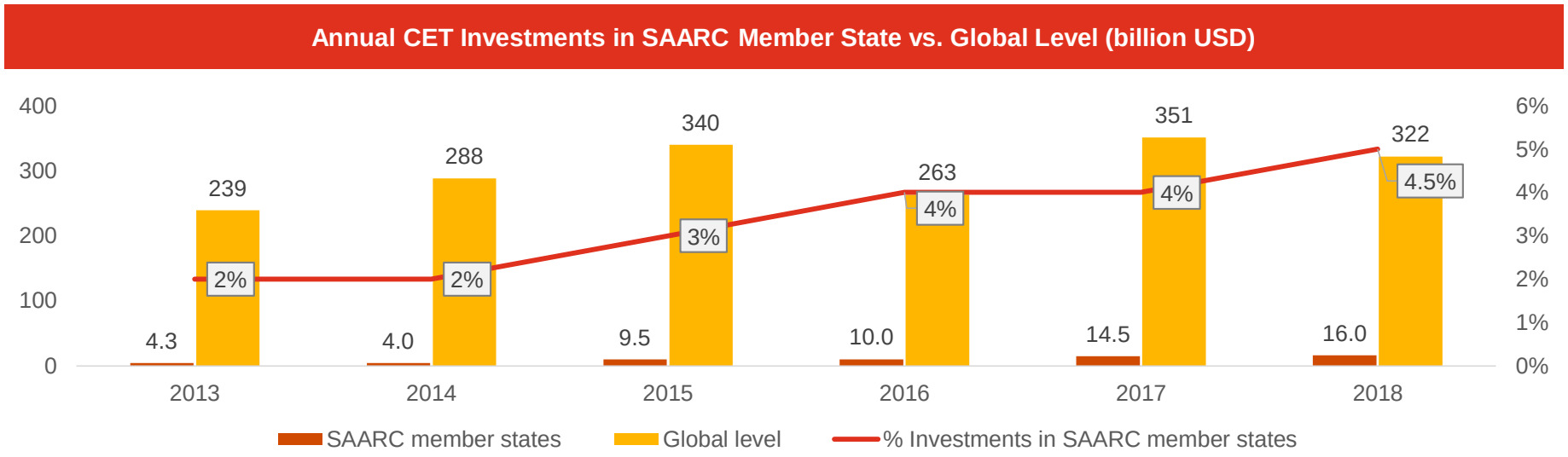
Role with Respect to the Study

- 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.

Background of the Study

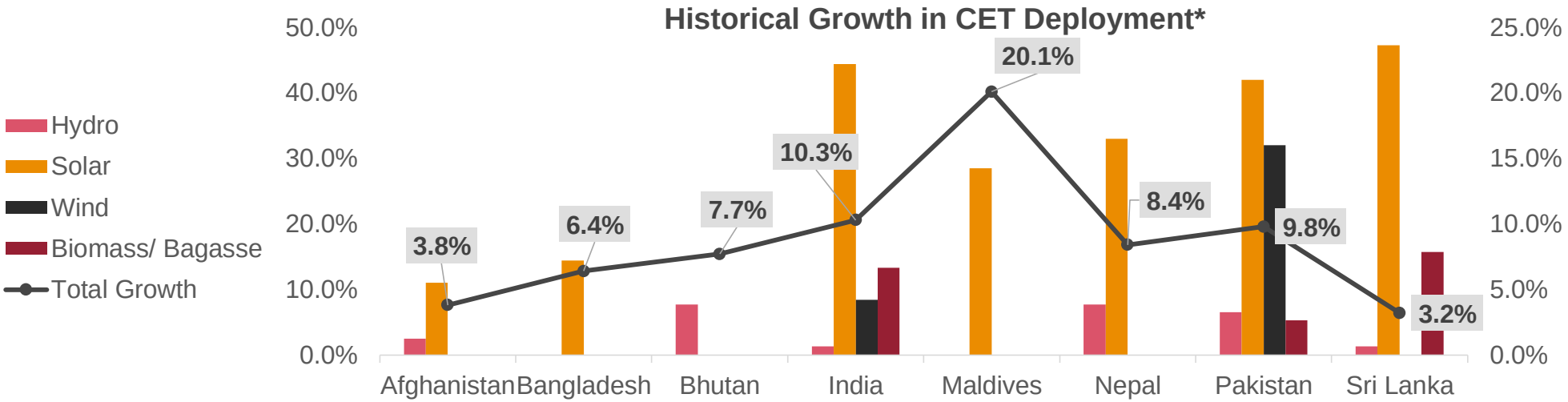
The study is focused on how to increase the availability of financial resources and to establish a conducive financial environment for deployment of utility scale clean energy projects in the SAARC member states

- 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.
- Few of the major reasons for such slow growth are: high technology costs, developing skillsets, securing long-term affordable finance etc.
- During last 3 years, the SAARC member states collectively attracted ~4% of the total investments worldwide in each year.
- India has led the investments (~84% of the total investment in South Asia during 2013-2018) followed by Bangladesh, Pakistan and Sri Lanka. Rest of the member states have seen marginal investments.



Growth in CET Deployment

In last 5 years, large scale deployment of solar power projects has seen the highest growth among all CETs followed by wind power projects and bioenergy.



**Note: Deployment <1% or no deployment case is not represented here.*

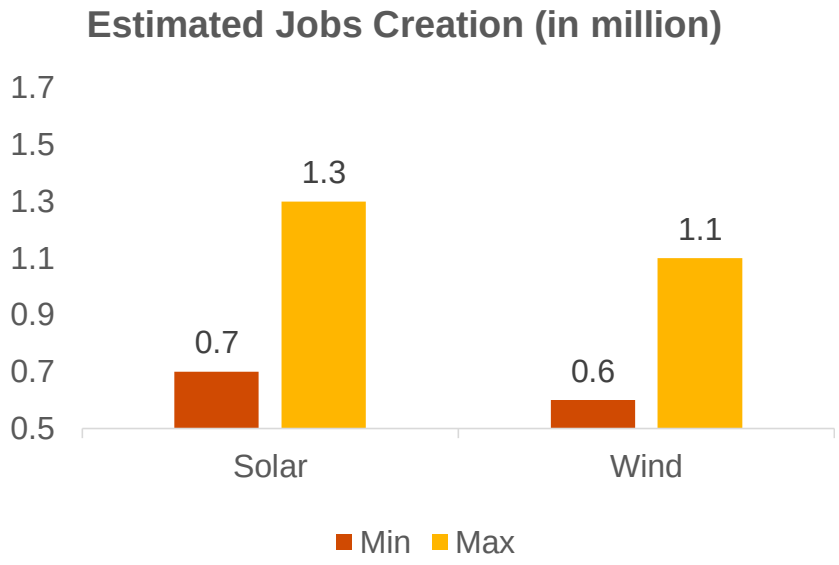
Identified Technical Potential

Technical Potential as identified (MW)	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
Hydro	23,000	60	26,600	21,135	NA	83,000	60,000	NA
Solar	222,000	2,680	12,000	748,000	24	2,100	100,000	6,000
Wind	66,000	637	760	302,000	20	NA	340,000	5,600
Biomass/ Bagasse	4,000	285	NA	18,000	NA	NA	NA	2,400
Total	**315,000**	**3,662**	**39,360**	**1,089,135**	**44**	**85,100**	**500,000**	**14,000**
	3			1		4	2	

Socio-economic and Environmental Benefits of CET

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.

- For SAARC member states, the CET addition will help on overall ESG scale by reducing the carbon footprint at country level; improving the investment flow and employment in the region.



Defining Utility Scale Projects

To define utility scale projects for the study, different countries claim and define different sizes for different technologies. For example, utility scale projects in solar have been defined in the range of 1 MW to 50 MW globally by different entities.

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

"NA" represents the limited presence of utility scale CET based on mentioned assumptions.

Project Pipeline of Utility scale CET

Tentative deployment of the proven CETs in next 10 years is estimated based on various factors for CETs such as current installed capacity, historical growth, identified potential of each CET and identified targets by each SAARC member state.

- Utility scale projects of solar and wind technologies are now matured and commercially established in countries like India, Bangladesh and Pakistan.
- 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.

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		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	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	1,000	431	360	1,735	170	2,185	1,530	4,351

Need for New Investments

The need of investment has been calculated based on the tentative capacity addition estimated by 2030 in each SAARC member state and weightage average installation cost separately for each CET.

- The average installation cost for Asia, India and China for each CET in 2019 as reported by IRENA is arrived to eliminate the vast variations of costs for project installation.
- Using the average installation cost for these three and estimated project pipeline of each country, the need of investment for installation cost by 2030 has been estimated.

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

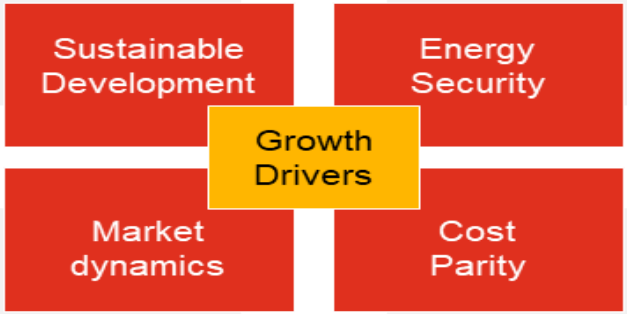
	10Y Estimation for Capacity Addition (MW)			Estimated Investment Required (million USD)		
	Hydro	Solar	Wind	Hydro	Solar	Wind
Afghanistan	2,863	1,450	1,200	3,839	1,737	1,844
Bangladesh	60	1,913	1,370	80	2,291	2,106
Bhutan	7,600	12	9	10,192	14	14
India	23,030	147,933	127,307	30,884	177,175	195,671
Maldives	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

Drivers for New Investments in CETs

SAARC member states have seen increased deployment in CET projects. Further development is expected to be driven by the sustainable development goals, ambition to achieve energy security and cost parity.

- Commitment to reduce country's emissions and achieve low carbon economy under Paris Agreement at COP 21 of UNFCCC and UN's sustainable Development Goals (SDGs).
- The strategy involves 20/20/20 targets, namely the reduction of CO2 emissions by 20%, increase of renewable energy's market share to 20%, and a 20%
- increase in energy efficiency

- To provide electricity from locally available energy sources to the 100% population has now become priority for all the countries.
- CETs can meet the current and future power demand without having any adverse impact of global dynamics



- Over 60% of Fortune 100 and nearly half of the Fortune 500 have set clean energy targets
- Investors along with optimizing returns also emphasis on responsible investing driven by environmental, social and governance (ESG) factors of the businesses.

- In many parts of the world, the electricity from new clean energy sources is now cheaper than the conventional energy sources like coal and natural gas.
- Few of the many reasons for the cost parity of certain CETs (Solar PV and Wind) are – falling material cost, low operation & maintenance, scale, zero fuel cost etc.

Risk and Challenges in CET Development and Financing

Sovereign Risk

- Credit rating of each country 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.

Volatile Foreign Exchange Market

- Volatility of the foreign-exchange market results 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.

Risk and Challenges in CET Development and Financing

CET as Part of debt ridden 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.

Risk and Challenges in CET Development and Financing

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

Financial Risk Matrix

Country-wise classification of typical financing risks involved in each CET is represented in three categories.

Identified Risk	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri -Lanka
Lack of long-term financing	H	H	H	M	H	H	H	H
Lack of project financing	H	M	H	L	H	M	M	M
High and uncertain project development costs	H	M	M	L	M	M	M	M
Lack of equity finance	H	H	H	L	H	H	M	M
Foreign exchange volatility	It is equally applicable for projects of all technologies which are externally funded							

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)

Financing Environment

Any project can be funded via two ways: borrowing capital from lenders as a loan and through equity by investing own funds or from selling a stake to investors. The broader financing environment including the financing institutions and instruments is as explained here.

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

Investor Expectations

With more CET projects coming up, various classes of investors have also shifted their focus and adjusted their risk appetite to get higher returns from solar PV, wind, and bio-energy projects. Typical return expectations from CET projects in SAARC member states by a popular class of investors are briefed here:

	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%

Benchmarking the SAARC Member States

Categorization	High	Medium	Low
Representation	High	Med	Low

A framework to benchmark the best practices is defined on three criteria. Based on the framework and the existing financing environment, gap in terms of maturity under three major heads are identified.

Market Size, Sustainability and Returns

Maturity on parameters	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri -Lanka
Market Size	Low	Low	Med	High	Low	Med	Med	Low
Market Sustainability	Low	Med	Med	High	Med	Med	Med	Med
Project Return	Low	Med	Med	High	Med	Med	Med	Med

Active Financing Channels and Tools

Maturity on parameters	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri -Lanka
Active financing channels	Low	Med	Low	High	Low	Med	Med	Low
Active financing tools	Low	Med	Low	High	Med	Med	Med	Low

Benchmarking the SAARC Member States

Categorization	High	Medium	Low
Representation	High	Med	Low

Taxation and Other Qualitative Parameters

Parameters	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri -Lanka
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

Recommendations

Push For Clean Energy Policies, Institutional and Regulatory Environment

- 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 along with financial and economic impacts of these choices.

Alternative Means of Financing

- A Sovereign Guarantee/ Partial Credit Guarantee
- Letter of Support
- Green Finance
- InvITs

Strengthening Financing Institution

- Development of Development Finance Institution
- Ease out the FDI norms
- Islamic Financing Facility for Renewable Energy

Domestic Capital Market

- Improve the maturity of the domestic capital market to enable the private sector to raise funds

Tax Incentives to Stakeholders

- Tax incentives to institutions, corporates, investors and stakeholders across power value chain

Enhance Intra-regional Co-operation

- Technology sharing, knowledge sharing, financing

Thank you …