Private sector engagement in large scale solar power deployment in Sri Lanka: Role of green climate fund

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Abstract

Sri Lanka has strongly understood the importance of mitigation of climate change and various measures have been taken. To tackle the climate change, after ratifying Paris Agreement, Sri Lanka has pledged to reduce her greenhouse gas emission in the energy sector by 20% (16% unconditional and 4% conditional) by 2030 based on the BAU scenario. Simultaneously, the government introduced its new energy policy and strategies in 2019 with a vision of achieving carbon neutrality by 2050. This paper survey related key government documents, policies, reports, and academic articles to investigate opportunities for the private sector to invest large scale solar power deployment (10 MW or above) and to get support from climate finance under article 6 of the Paris Agreement. It has found, growing concern on the environment, energy security issues and increase import expenses for fossil fuels are the main influencing factors to move renewable sources. Further, government investment and FDI both have gradually decreased in the energy sector. Therefore, an alternative financing mechanism is needed. Although the private sector allowed investing in the energy sector since 1996 with the introduction of IPP (Independent Power Producers), it could not make considerable progress on involving large scale solar utility projects. This has revealed government policy is not aligning with the long term generation plan of the electricity sector. The study has also found, it needs more strategic road map, coordination with different institutions, monitoring system to enhance large scale solar contribution.

Introduction

Sri Lanka is an island located in the Indian Ocean with approximately 99% electrification with abundant natural resources.[1] At present, countries' electricity generation is in shifting from hydropower to thermal power to meet growing demand.[2] From 2010 to 2016, thermal electricity generation in the country increased by 90%, while generation from hydropower decreased by 25%. Almost all of the country's hydro potential has been already harnessed.[3] Non-Conventional Renewable Energy (NCRE- excluding mini-hydro) contribution is remained at 3%, as of 2015.[1] The installed capacity change from 1996 to 2016 within power sector is presented in Table 1. The country has rectified the Paris agreement to maintain levels of carbon dioxide emissions with the least burden to environment & signed declaration at the COP in Marrakech, Morocco to achieve 100% power from renewable by 2050.[4,5] Under the Paris Agreement (PA), the energy sector as the main contributor for GHG emission and is expected to reduce by 20% in the BAU scenario in 2030.[6] Therefore, the diversification of power generation through the deployment of NCRE is the only path for achieving this target.

Simultaneously, the Government of Sri Lanka's target to "increase the share of electricity generation from renewable energy sources from 50% in 2014 to 60% by 2020 and finally to meet the total demand from renewable and other indigenous energy resources by 2030.[7] Further, Sri Lanka launched National Energy Policy and Strategies in August 2019 with the vision "to become carbon neutrality by a complete transition of all the energy value chains by country by 2050".[8] The joint report issued by Asian Development Bank (ADB) and World Bank (WB) pointed out this is achievable in the power sector by commissioning large scale wind, solar and biomass power plants.[6] A recent study conducted to analyse the environmental consequence of 2050 if energy mix of the country totally from Renewable Energy (RE) sources, suggested that compared to wind, solar as more promising technology.[9] So, solar power would have to play one of the key roles in the transition to carbon neutrality in the future.

Sri Lanka as a tropical country which is located within the equator belt hence solar radiation is available throughout the year abundantly without any

Table 1. Cumulative installed capacity different technologies 1996-2015

Technology	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016
Total installed capacity	1409	1764	2411	2818	3140	3368	3293	3443	3847	4018
Peak demand	978	1404	1748	1955	2163	2146	2164	2152	2283	2453
Major Hydro	1117	1117	1207	1207	1207	1357	1361	1377	1377	1384
Oil Thermal)	266	453	1115	1390	1690	1695	1575	2213	2028	2052
Small hydro	20.5	20.5	84	175	194	227	256	288	307	338
Wind*	–	–	–	30	33	73	78	128	124	128
Solar		–	–	–	1.4	1.4	1.4	1.4	1.4	24
Biomass		–	2	12	12	10	16	20	20	21

Source: Energy Balance 2016, 2015, 2014, 2005,1995

* Exclude wind power developed CEB plant at Hambanthota 3 MW

significant seasonal variation. Meanwhile, the cost of solar power in the world market is significantly declining.[10] Therefore, deployment of solar in utility-scale has a large potential to develop with innovative technological developments such as floating solar, solar thermal power plant with massive economic benefits including foreign exchange savings.[11] The RE plants including solar are different than conventional plants since the initial capital requirement is comparatively higher although it consumes lower maintenance costs.[12] Therefore, financial requirement can be identified as the main obstacle for the development of RE including solar. Consequently, it has to find a new and innovative approach to attract more financial resources.

United Nations Framework Convention on Climate Change (UNFCC) made arrangements to establish Green Climate Fund (GCF) in 2009 as a mechanism to help as a paradigm shift in the universal response against climate change.[13] Also, developed countries have pledged to provide 100 billion US$ annually to developing countries to face climate change impacts from 2020.[14] Further, Paris Agreement (PA) has created a background to find innovative methodologies for developed and developing countries to meet their National Determined Contribution (NDC) target by investing in RE with support from the private sector. Since there is no allocated quota for countries, every country will make their strategies to get more benefits from climate finance, so it might lead to creating competition among countries.

Sri Lanka has established several policies and strategies to face climate change challenges including Climate Change Policy by 2012 and the establishment of Climate Change Secretariat by 2008.[4] The objective of this study is to investigate opportunities for the private sector to invest large scale solar power deployment (10 MW or above) and to get support from climate finance under article 6 of the Paris Agreement. The study will be limited to explore GCF funds and its private sector facility. This article is extensively based on literature reviews including key government documents, policies, reports, and peer-reviewed academic articles.

Climate change, climate finance and renewable energy

Climate change has identified a major global threat to be faced with immediate actions. Green House Gas (GHG) has identified the main factor behind climate change. Further, the causes and impacts of climate change are having a deep link with energy security and economic growth.[15] Although, developed countries contributed more to release GHG emission with industrialization, higher energy consumption and burning of fossil fuels, present it needs a collective approach to face successfully climate change, irrespectively countries' development level. Since climate change mitigation heavily relays on reduction in CO2 emissions, future economics has to be based on a sustainable energy system while maintaining appropriate per capita energy consumption to reach desired economic growth and fossil fuels energy-based economics has to transit with alternatives. Therefore, developing countries have to jump over dirty to clean technologies to adopt 'modern technologies' founded by developed countries to keep lower GHG emissions.[16]

Renewable energy deployed in power generation is although insignificant at a global level, it is growing rapidly. At the national level, RE resources could identify as 'common–pool resources' which can locally be harnessed to provide stable and sustainable energy provisions.[17] Further, the use of RE sources would reduce the dependency of imported energy sources such as fossil fuels simultaneously increase domestic energy security while saving foreign exchange with massive indirect economic benefits. In article 2 of Paris Agreement (PA) is different from previous approaches since it urged 'stabilising the global average temperature rises to well below 2°C above pre–industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre–industrial levels, recognising that this would result in significant reductions regarding the adverse impacts of climate change'.[18] Further, PA emphasis the requirement of drastic cut of GHG emissions hence RE deployment has identified key measures to achieve climate mitigation target.[19] Although, PA based on a volunteer and corporate approach mechanism without any legal bindings, it observes rapid ratification by countries.

According to PA countries need to submit their target to reduce of CO2 emissions called National Determined Contribution (NDC).[15] With this bottom–up approach, PA needs commitments to reduce GHG in both developed and developing countries.[20] Therefore, countries are allowed to work together to meet the target set under PA such a way to take global actions with local solutions. Further, countries NDC is mainly focused on commitment to limit GHG emission which provides opportunities to deploy more renewable energy and having the corporate and collective regional initiative to exchange technical or capacity–building support to take collective actions.[13] To achieve PA objectives, to mobilize sufficient finance has identified the focal requirement and the main criterion to judge its success.

The term, climate finance, was used for the very first time through the UNFCCC in 1994[21,22] and the aim of climate finance is the promotion of green growth and, consequently, a reduction in GHG emissions (Nakhooda & Watson, 2013). There are no universally accepted definitions for climate finance and the UNFCC defines climate finance as "Climate finance aims at reducing emissions, and enhancing sinks of greenhouse gases and aims at reducing vulnerability of, and maintaining and increasing the resilience of, human and ecological systems to negative climate change impacts."[21,23] It further stated that climate finance could include public and private financial resources which are used for addressing global climate change issues and the financial flows channelled to developing countries from developed countries for the same above purposes. Therefore, climate finance can identify as including all types of financial resources from public, private or other alternatives mechanisms. After that, climate finance is playing a major role on a global scale to promote clean energy transitions (mitigation) and to adapt with the impacts of climate change (adaptation).

The green climate fund (GCF)

Although there are some financial mechanisms to support climate change impacts under UNFCC, by 2009 GCF established under Article 11 of the UNFCC

and expected to be one of the biggest funds for climate finance with a multilateral funding approach including both private and public.[24] The fund has two key objectives namely 'transformation toward a low-carbon future (the Paris Agreement)' and 'to get the involvement of both developed and developing countries'.[24] Therefore, GCF has to play a significant role in implementing PA objectives. Further, the fund promotes a country-driven approach and strengthens engagement at the country level through effective involvement of relevant institutions and stakeholders[25] with a plan to mobilize $ 100 billion annually from 2020 from public and private sources.[26] Up to August 2018, GCF has mobilized 3.5 billion US$ for 74 projects and 52% finance received from the private sector.[26]

Private Sector Facility (PSF) which provides direct and indirect finance for climate change could identify an innovative and special feature of the GCF. Perhaps the most novel aspect of the Fund is its deliberate focus on engaging the private sector, notably through the Fund's Private Sector Facility (PSF), which is designed to enhance innovation and leverage, and address barriers to private sector investment in developing countries, including a lack of awareness of options for addressing climate change, a lack of capacity and expertise, and underdeveloped capital markets.[27] The GCF will support developing countries through both projects based and programmatic approaches that are in line with national strategies and plans, including reducing GHG emissions.[28] The types of climate finance available vary from grants and concessional loans to guarantees and private equity. This is one key characteristic of the GCF, which makes it the key player in climate financing currently.

Countries have little or no experience in working with emerging mitigation tools under market-based frameworks with PA that can be led to missing some important opportunities.[19] Even past experience with implementation of Clean Development Mechanism (CDM), few developing countries namely Brazil, China, India, Mexico, and South Africa have able to attract the majority of investment, while other developing countries have failed to attract considerable CDM projects.[19] In connection to this, investigation of how could facilitate and integrate existing development opportunities with climate change mitigation activities in developing countries very important. The next section will examine Sri Lankan solar sector opportunities to use GCF private sector facility as financial instruments to deploy large scale utility power plant.

Climate change policies and climate finance in Sri Lanka

Sri Lanka has established several policies and strategies to face climate change impacts effectively.. Among them, the establishment of Climate Change Secretariat (2008) to coordinate relevant climate change matters and enactment of Climate Change Policy (2012) are major events.[29] Climate change is considerably impacted on the local economy and the International Finance Corporation (IFC) stated "Without significant investment in climate resilience, the country could lose about 1.2% of annual GDP growth per year by 2050 due to climate change'. IFC has also estimated the total requirement for climate-smart investment for the country between 2018 and 2030 as US$ 18 billion and US$ 2.5 billion out of it will

use to achieve NDC targets.[30] Therefore, it is very clear that climate finance could have to play the main role in implementing the country's NDC's.

The country does not maintain any registry for keeping details on climate finance / or related activities and " lack of clarity on what constitutes climate financing and a lack of a proper system of evaluating projects financing climate action is a major gap in analysing the status of climate financing".[31] Further, the country has introduced a plethora of climate-related policies, plans and strategies yet not have a clear and well-defined framework for access to climate finance or even strategies to meet the NDCs through climate finance. Under this condition, Sri Lanka received 38 million US$ from GCF and 259 million US$ from GEF to implement climate-related projects.[31] So far, according to the GCF database country does not receive any financial support to climate change mitigation projects. Therefore, it is suggested to have attention to make an integrated approach among climate change and power sector stakeholders together.

Climate change mitigation and renewable energy in Sri Lanka

Sri Lanka commits to reduce 20% of her GHG emission during 2020-2030 periods based a BAU scenario according to the NDC target under PA.[28] NDC mentioned power generation from RE including major hydro will increase from 50% to 60% by 2020 and expect to add 115 MW by solar by 2020.[28] Further, it is expected to add 500 MW by short term through solar deployment and further expand by 2030 by solar rooftop and solar park.[28] There can be seen a number of policies and strategies have been made regarding climate change mitigation commitments. All these policies and strategies have recognized the importance of RE to contribute to global climate change mitigation objectives. Sri Lanka has been able to provide 99% electrification through the national electricity grid.[1] The installed capacity is 4043 MW by 2017 and forecast for demand increase is around 7%.[1] Further, it can be noticed that the country is gradually transforming to produce more electricity by thermal resources and it implicated that 27% increase of per capita CO2 emission 27% from1 996 to 2011.[32] If the present trend of capacity adding for power generation is continued, RE contribution is bound to shrink further. Therefore, implementation of large scale RE projects can be identified as key strategy to meet 20% RE target by 2020[33] which can further use to achieve carbon neutrality by 2050 as government plan. Therefore, as tropical country solar energy has to play a significant role in the context of large scale power plants.

Solar energy is becoming one of the most prominent alternatives to fossil fuels and according to the technical point of view, solar energy potential is beyond the global energy demand.[34] As an example, Israel, the country also located within Sun Belt same as Sri Lanka has found that electricity requirement of Israel could meet alone from solar energy and adopting more solar not only be the faster de-carbonization option but also a cheaper path to meet 2°C goal.[35] However, in spite of the existing technical potential, the current growth of the solar energy market and the contribution of solar energy to the global energy supply mix still insignificant. This can observe in Sri Lanka too by comparing potential to generate energy from RE

Table 2. Renewable potential for different technologies in Sri Lanka

Energy	Resources	Theoretical Potential	Technical Potential	Already Developed
PJ	Biomass	97	59.77	0.59
	Hydro	33	30.46	21.91
	Wind	242	57.07	1.31
	Solar	35174	32.17	0.01

Source: MOP(2015)

sources with developed capacities which is shown in Table 2. Although, Sri Lanka has developed very little power from solar comparing her technical capacity, by the year 2017, global electricity generation capacity from solar is 402.5 GW and it is a 29% increase comparing to 2016.[36] Table 2 included potential of different renewable resources of the country and it has developed only 0.01% from its available capacity. As clean energy with lower environmental impacts, continues declining in generation cost, solar could play significant role in Sri Lanka power sector in the future.

Solar power potential in Sri Lanka

Sri Lanka is positioned very close to the equator; therefore solar radiation is abundantly available throughout the year without seasonal variation. A study conducted by the National Renewable Energy Laboratory (NREL) of the USA has estimated solar radiation as 4.5–6. kWh/m2/day for two–thirds of the land area of the country (Renn et al., 2003). Solar Radiation map produced by NREL, findings for Direct Normal Irradiance (DNI) and map of Sri Lanka have shown in Figure 1 and Table 3.[38] Figure 1 shows solar radiation variation among different provinces of the country. According to the data and map, after eradicating 30 years of civil war in in Jafna, Kilinocchi and Madakalapuwa districts located un Northern and Eastern provinces, solar power deployment oppor–tunities have significantly increased. The development of energy storage technologies would provide solutions to the intermittent nature of solar. Therefore, the role of solar energy is crucial in achieving zero– emission power generation by 2050.

According to the country's' long term generation plan 2018–2037, to avoid construction of 900 MW coal power plants will result to reduce CO2 emission by 17% with additional present value cost of US$ 153 million during the planning horizon.[1] Therefore, large scale solar power plants will give strong support for the achievement of carbon neutrality policies. Also, to introduce third primary sources for the power sector to stabilise production cost and diversify fuel is prominent facts to reduce imported oil depen–dency.[39] It will be a heavily political decision but without a third source, following of intentional oil prices trend by Sri Lankan electricity prices is inevitable.[39] The recent price decline of world solar power and batteries, pump hydro technology and Solar thermal technology can keep expectation to solar become as country's third option. But, the contribution of solar for electricity generation is still lower comparing to other technologies. The existing statutes in operation project–wise are tabulated in Table 4.

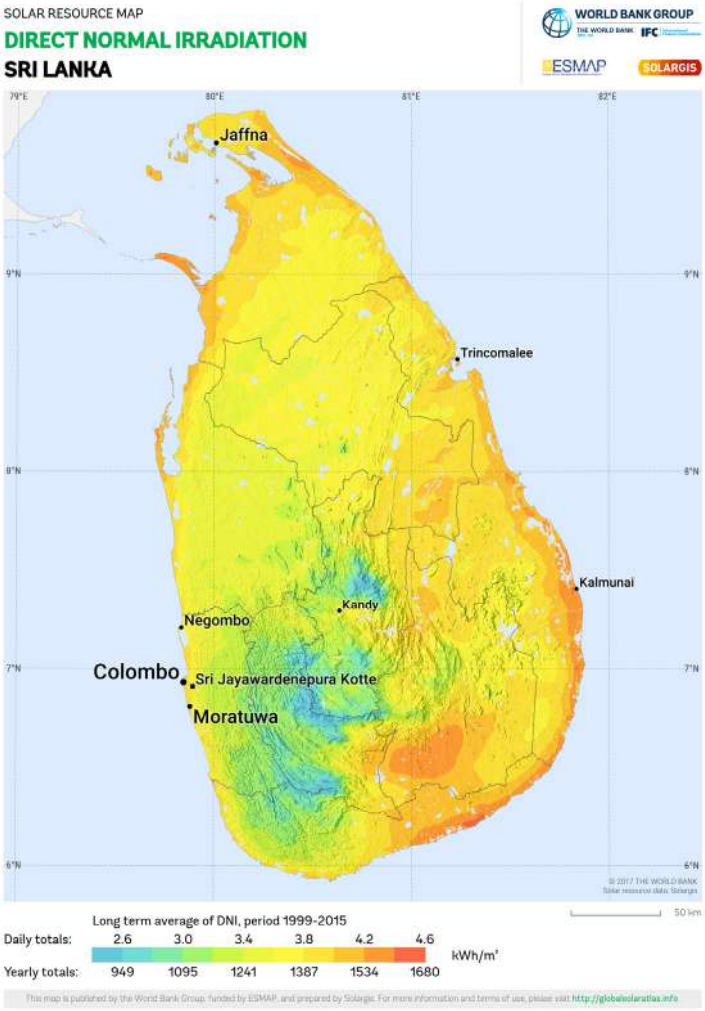

Figure 1. Sri Lanka solar radiation map

Table 3. Annual average direct normal irradiance in selected places in Sri Lanka

Area	Hambanthota	Mannar	Putthalama	Jafna	Trinco	Anuradapura	Vavnia	Baticalo
Annual average DNI Kwh/m^2/day	5.37	5.9	5.88	5.2	4.93	4.53	4.54	4.36

Source: (Prasath, 2017)

Table 4. Projects in operation

Project type	No of projects	Capacity
Mini Hydro	194	368.53
Wind	15	128.45
Biomass	12	37.09
Solar	8	51.36

Source: CEB (2019)[41]

Sri Lanka: Solar power opportunities in large-scale

It is expected to a significant reduction of solar PV cost with higher growth[30] and it will be resulted to improve its cost competitiveness with conventional fossil power sources. Simultaneously, the cost of batteries are also declining hence it will solve the issue of intermittence. Now, the practical and very large scale-PV systems (VLS-PV) of 50, 100 and 200 MW size solar farms are appearing in many countries.[30] For example, China is currently building a 200 MW solar farm in Gobi desert.[36] National Solar Atlas of Sri Lanka and Solar Resource Map has completed by Sustainable Energy Authority of Sri Lanka (SEASL) and published by 2014.[40] The existing utility scale solar plants larger than 10 MW are presented in Table 5. According to the map, there can be identified number of places where can establish large scale utility solar plants.

One of the best solution to add large power to the national grid is an implementation of the solar park[40] and even the country can introduce "smaller solar parks to support smaller industries and export zones"[7]. Mannar Island with shaded land where is located in Northern Province has also identified an ideal place to construct a large solar power.[18] Further, the country has planned to build 100 MW floating solar plant on Maduruoya reservoir.[1] Also, there is huge potential to expand floating solar with exiting reservoir system since the country is maintaing 73 large reservoirs with covering surface area of 70,850 ha. Further, feasibility study conducted in Northern Province has found Concentrated Solar Power plants and pump hydro plant can be used to solve the intermittency issues with solar energy.[38] Therefore, large scale solar deployment opportunities can play crucial role in Sri Lankan power sector. Siymbalanduwa in Monaragala, Pooneryn, Hambantota, Northern & Eastern regions have identified as a suitable location for solar park developments under Long Term Generation Plan 2020-2039.

Why do need private sector?

Electricity generation and distribution are mainly managed by government-owned utilities including Ceylon Electricity Board (CEB) and CEB is undergone huge financial loss from 2009 and it is recorded 100 billion Sri Lankan rupee (0.7 billion US$ by 2015.[6] Further, government investment and FDI both have gradually decreased in the energy sector.[39] Therefore, investment capacity for large scale power generation is limited by CEB with her huge financial obligations to various partners including loan payment.[6]

Table 5. Details on existing utility scale power plants

Project	Capacity	Date	Developer	Lender
Baruthakanda	10 Mw	2016/ Oct	Laughs	Sampath bank
Vavuniya	10 Mw	July/ 2017	Wind Force	Hatton National Bank
Hambanthota	10 Mw	Dec/2016	Sagasolar Power	DFCC, BOC, HNB,EIB
Baruthakanda	10 Mw	2016/ Oct	Laughs	DFCC bank

Source: (CEB, 2019)

Discussions on power sector reforms were started from 1997 and suggest providing fully commercial freedom to establish market competition within the sector. But, Sri Lank power sector still consists as vertically integrated utility structure, a single buyer model that can consider similar to structure with very little or no market competition.[39] Although the private sector is allowed to generate electricity as Independent Power Producer (IPP), competition can be seen only during the bidding stage of IPP thermal plants.[39] The report further mentioned, "private sector involvement in the generation since 1996 is not a success story in Sri Lanka".[39] The contribution to power generation by the private sector and government is presented by Table 6.

In the context of solar power electricity generation for the future, a long term generation plan in Sri Lanka has included annual solar addition till 2037 (CEB, 2018) and the Asian Development Bank and the World Bank have estimated solar power contribution need to achieve 100% power RE by 2050.[1,6] The capacities plan in both reports with the financial requirement is tabulated in Table 7. Although RE sector is initially success with small hydropower, considering solar it has to scale up rapidly to reach its potential. Therefore, it is necessary to get private sector support with international finance arrangement to meet the projected solar deployments and to achieve government vision on carbon neutrality by 2050. But, the country has not yet attracted private sector participation in a utility-scale solar power plants or taps the finance from a global or regional level climate finance source including GCF.[39]

Table 6. Comparison of electricity generation by government owned company and private sector in Sri Lanka

		2011 (GWh)	2013 (GWh)	2016 (GWh)
Government*	Hydro	4017	6008	3496
	Oil	2531	1326	2327
	Coal		1469	5068
	Sub Total	6548 (57%)	8803 (74%)	10891 (76%)
Private	IPP	4255	1977	2202
	Other RE	717	1178	1208
	Sub total	4972	3155	3410

* The plants owned by Ceylon Electricity Board which is a company 100% owned by the government.
IPP: Independent Power Producers engaged in thermal generation from 1996 and in 2013, 7 operators,
Sources: Long term generation plan 2018-2037, CEB (2017)

Table 7. Solar capacity addition under LGTP 2018-2037 & 100% power from RE scenario by 2050 with finance need

Year/Capacity	2020	2022	2024	2026	2028	2030	2032	2034	2036	2037
*Solar (MW)	200	61	110	159	159	109	109	109	55	104
*Finance (US$ million)	225.6	61.7	104.6	130.4	130.4	93.6	93.6	93.6	46.8	93.6
** Solar (MW)	392	329	277	379	296	594	678	1108	862	465
** Finance (US$ million)	2016 to 2030 to implement this plan 1600-1850 is estimated						2030 to 2040 to implement plan 3000 to 3200 is needed			

*Planned capacity addition by solar power plant and finance requirement according to CEB generation plan 2018-2037, ** Solar capacity & finance need annually to achieve 100% power from RE sources by 2050, ADB-WB joint report

Discussion

The Ministry of Energy has initiated multiple steps through a number of policies and regulations to create favourable environment to enhance RE production with the private sector.[11] All solar power plant is constructed and maintain by the private sector but there is no any solar plant with capacity higher than 10 MW. Although, country has developed solar resource map, land allocation and relevant grid infrastructure development are not taken place.[32] This can identify one of the major obstacle to construct larger solar plants. Further, constrained for developments are mainly based on social factors rather than technical.[12] Therefore, large scale solar implementation has to adhere with proper scientific assessment.

However, fully exploit of large scale solar would depend on the meeting of financial requirement and streamlined approval process. Simultaneously, technical limitations for grid absorptions of solar power have to be addressed. The tariff for 10 MW solar plant under competitive bidding is 7.7 US cents/kWh[1] which is comparatively lower than oil–based power generation. It implies, large scale solar plants as very effective option for meeting the countries power requirement. Therefore, private sector can have crucial role in investing and introducing of new technologies such as concent–rated solar plants and floating solar plants in the market. Hence, creating a more enabling environment for accessing GCF is required. It will also support to attract funds from private sector facility under GCF.

It has found the information a gap, lack of coordination, institutional weaknesses and resource mobilization inadequacy are the main constraints to response climate change.[29] Also, Sri Lanka has not yet established its own climate change fund to secure financial sources for actions.Under the Paris Agreement, Sri Lanka pledge to reduce GHG emission unconditionally by 4% at 2030 based on BAU scenario. Without a strong internal funding source, however, these targets do not seem to be achievable.[31] In Sri Lanka, climate change mitigation has identified important but adoption is prioritized since believe it is inevitable. Therefore, more attention and policies have focused on adaptation activities rather mitigation. Hence, increasing capacities of institutions such as climate change secretariat, improving awareness and introduction of supportive policies would help to attract more funds from GCF.

Conclusion

The success of private sector participation in power sector in Sri Lanka has proved in small hydropower generation.[39] It could justify the possibility to use the private sector participation for the deployment of large–scale solar plants in Sri Lanka. In order to increase possibility, nations should provide evidences that clarifies the long–term opportunity of investing in RE technologies.[7] There is also a need to strengthen the role played by the Sustainable Energy Authority of Sri Lanka in facilitating renewable energy sector investments. Also, policies should be incorporated with action plans or a monitoring mechanism to ensure its implementation. Further, solid policy framework which is guided by a proper pump line of adding annual solar power

capacity to meet NDC would enhance accessibility GCF. Furthermore, road map to integrate solar power to the national grid (grid infrastructure development to absorb more intermittence power), clear policy on competitive bidding, and sound institutional frame-work would create more enabling environment to invest by private sector. To achieve this, improve inter-departments coordination, remove overlapping functions among stakeholders with clearly define roles and responsibilities are vital. In conclusion, Climate change policies have to identify and address both environmental and investment challenges simultaneously to get maximum support from GCF.

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