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₹ 1495 (Indian subcontinent)

This book is an attempt in honour of Professor Partha Ghosh by bringing together contributions of scholars who have been closely associated with him in different capacities in India and abroad. Keeping in view the major facets of his academic and personal interests as well as his seminal contribution to the South Asian Studies, the book has tried to accommodate select essays on issues related to economy, politics and society of South Asia.

Do A Book

ACADEMIC FOUNDATION
NEW DELHI T: +91-11-23245001-04 | MANESAR T: +91-124-4215070-71
www.academicfoundation.org

ISBN 978-93-327-0527-2
9 789332 705272 57995

Do A Book

Understanding Transition in South Asia
Economy, Politics and Society
(Essays in Honour of Partha S. Ghosh)

Editors
Anasua Basu Ray Chaudhury
Vikash Kumar

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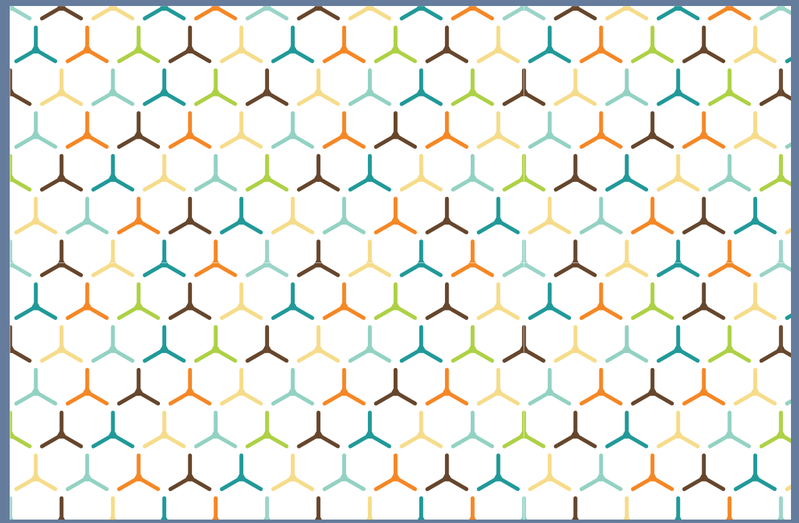

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www.academicfoundation.org

First published in 2020
by

AF PRESS

No. 35, Sector 7,
IMT Manesar,
Gurugram - 122050.
Phones : +91-124-4215070 / 71.
E-mail : booksaf@gmail.com
www.academicfoundation.org

Understanding Transition in South Asia: Economy, Politics and Society
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ISBN 9789332705272

Typeset, printed and bound by PrintShoot, Gurugram.
www.printshoot.com

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Foreword

I am pleased to offer these introductory remarks in connection with the publication of Understanding South Asia: Economy, Politics and Society, a Festschrift for Professor Partha S. Ghosh, a renowned social scientist and a wonderful human being from India with contributions from his friends, colleagues and academic fellow-travellers. This volume is a collection of scholarly articles on South Asia to honour Professor Ghosh.

I have had the privilege to know him for the last two decades through his erudite writings and through my unforgettable interactions with him several times, either in Kolkata, or in Delhi. Through his systematic research, he has produced a number of significant volumes on South Asian history and politics. He has provided academic leadership in many prestigious academic institutions, including the Indian Council of Social Science Research (ICSSR), Centre for South Asian Studies, Jawaharlal Nehru University, Omeo Kumar Das Institute of Social Change and Development (OKDISCD), Guwahati and Indian Council of World Affairs (ICWA) in different capacities.

Professor Ghosh has written extensively on South Asian politics, particularly on migrations, ethnicity and religion. His personal and professional achievements have been elucidated by the editors in the introduction that vividly captures a snapshot of his excellence.

I had the benefit of knowing this academic at a time, when Professor Ghosh was probably most prolific in writing his best books. And, I noticed with utter surprise of mine how such a

widely read person could be so humble and well-mannered. He always encourages younger scholars even in their bad days. In other words, apart from his countless contributions to the understanding of South Asia, Professor Ghosh has been a tireless mentor, reading and commenting on the work of peers and students and giving encouragement to younger scholars. Intellectual openness ranks among his most contagious qualities. He seems to me to be a complete human being. After all, one becomes a human being through one's interaction, love, and friendships with others. His energy and commitment to excellence, engagement, and ethics is contagious. He is a true professional and the embodiment of honest research. To my humble understanding, Professor Ghosh's dedication to intellectual comprehensiveness and to disciplinary thoroughness should be rejoiced. Let the celebration begin. This is to wish him stable health and contentment.

Sabyasachi Basu Ray Chaudhury
Vice-Chancellor
Rabindra Bharati University, Kolkata

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GIRIJESH PANT and POOJA SHARMA

Energy Transition in South Asia

Issues and Challenges

South Asia is the leading consumer of energy, out of which hydrocarbon accounts for a predominant share. However, it is neither richly endowed with hydrocarbons nor has been able to harness its potential comprehensively. Consequently, with economies gaining pace, it has become an energy-deficit region, meeting most of its demand from imports. The import dependence varies from 100 per cent in the case of Maldives to about 25 per cent in the case of Bhutan. In the case of large countries like India, Bangladesh and Pakistan, it is more than 80 per cent of their hydrocarbon demand. This high dependence makes the region vulnerable to the twists and turns of the global market, thereby creating a sense of insecurity. Like other oil import-dependent countries, energy has been securitised in South Asian energy discourse as well. However, hydrocarbon poor South Asia is richly endowed with renewable sources of energy. If it could harness its potential, then not only could it meet its own needs but could export as well. Surely that will make the region energy secured, besides it will also open up horizons for value chain business contributing to economic growth and employment generated in the economy. In the past, attempts to move to renewable energy did not yield results largely on the ground of cost and technological limitation. Today, with revolutionary changes in technology, it has become possible to produce solar and wind energy at grid parity rate,

making them a feasible alternative. The need for moving to an alternative has become imperative not only to enhance supply to meet the energy poverty of the region but equally to reduce carbon emission to address the environmental concern. The Paris Agreement has made it obligatory for countries to move to low carbon economy with targets and date line popularly described as Intended Nationally Determined Contribution (INDC).

Energy transition thus is high on the global and national agenda. South Asia is no exception to it. However, there is no uniform path to transition because every country has its ecosystem, and there is no one size that fits all. Each country has to invent its path reflecting on the convergence of multiple factors drawing from the local and global milieu. In the case of South Asian countries, apart from availability, accessibility becomes equally crucial in the transition path. Unlike a hydrocarbon-based system which is highly centralised, renewable energy provides the option to conceive a decentralised mode thereby closer to meet the accessibility requirements of South Asian countries. Even though each country has to invent its path, there are common issues which they share. In this chapter, an attempt is made to look at the issues and challenges that South Asian countries are encountering in their transition path. Since energy transition is driven by global ecological concern, it is heavily influenced and determined by the global processes. The global flows of finance and technology are critical in its making. Equally important is the institutional support for its governance. South Asia energy transition thus is not only driven by local dynamics but also by global collaboration and cooperation. In other words, the transition path in South Asia has to be conceptualised as part of a global transition project because failing of any country to meet its target has obvious

implications for global targets. In the case of South Asia, which is one of the big emitters of carbon, the global stakes are relatively high.

I

Energy Transition: the Global Perspective

Energy transition became part of the global agenda primarily due to environmental concerns though at the national level it is largely motivated by the supply side of the equation. The prospects of global warming impacting global communities and consequently threatening the existence of low lying habitat, made it part of the global common. This was further reinforced by the UN declaration of sustainable energy for all.[1] According to the Energy Transition Commission 2016, there are two options to cut down energy emission, namely, decarbonising energy supply. The first option emphasises on enhancing the share of zero-carbon sources of energy like renewable by changing the energy mix through policy intervention. The second method proposes to decarbonise energy making it environmentally friendly and reducing its demand by adopting more efficient technology by end-use consumers (Energy Transition Commission, 2017). Both options depend upon technological breakthroughs. The energy market today has mature technology to provide cost parity between fossil fuel and renewable and peaking of energy demand. However, technology is controlled by those countries that have invested in this sector. Thus the

1. Sustainable development is not possible without sustainable energy. Nearly one person in five on the planet still lacks access to electricity. Twice that number, almost three billion people rely on wood, coal, charcoal or animal waste for cooking and heating. This is a major barrier to eradicating poverty and building shared prosperity. For details see http://www.un.org/millenniumgoals, last accessed on 30 July 2019.

availability of technology has become a necessary condition for the energy transition in countries like that of South Asia. It is precisely for this reason that the Paris Agreement Article 10 has envisaged a framework for technology development and transfer among the countries. The technological breakthrough is not confined to fuel substitution only. It is likely to transform the organising principles of the energy market. The prospects of digitalisation of energy are expected to bring fundamental changes in global energy systems. It is argued that "the combination of the five Ss: software, semiconductors, sensors, solar and storage" is driving the emerging energy revolution which places people to the centre of the energy system (Reid, 2016). In this context, the World Economic Forum to share the prognosis,

> The digital transformation of energy systems—smart meters, energy management systems, automated demand response or microgrids—could also help people everywhere access a reliable and affordable source of energy. Two-way communication between energy producers and consumers, as well as the increasing number of prosumers—those who both produce and consume energy—means that distributed energy resources can be dispatched to those areas that need it the most. That could include areas encountering supply shortages and grid stability issues, or those where renewable resources provide only an intermittent energy supply (WEF, 2016).

The transformational changes are revising producer-consumer relationship, which is termed as prosumer. It is clear from these developments that new technology not only has made renewable cost-effective but also accessible to remote and rural areas, addressing the accessibility aspect of energy security. The issue thus boils down to the access to new technology and development of local technological

capacities. This implies technological collaboration and investment in capacity building.

The Paris Agreement does recognise the need for financial support to developing countries to move on the transition path. It has made a strong case for financial assistance from multilateral agencies like the World Bank, International Finance Corporation (IFC) and the Asian Development Bank (ADB) (Christianson, et al. 2017). According to the IRENA report, to meet the target of Paris Agreement of raising the share of renewable in primary energy to 65 per cent by 2050 as against 15 per cent in 2015, an investment of $25 trillion, i.e., three times of the current investment needs to be made. It observes that while private financing accounts for the bulk of the investment in renewable energy sources, institutional investors must be drawn into the renewable energy sector at scale. As a result, divesting from fossil-fuel installations and making them stranded assets involves risk. Public finance sources, which are available in the form of concessional finance, create and enable conditions, as well as guarantee and scale up to other risk mitigation instruments. They must also be used in a more targeted manner to spur new investment, especially in emerging economies that are currently lagging (IRENA, 2018a). Another study by IRENA reveals that governments, banks, insurance companies, pension funds and startup projects are major investors in the arena of renewable energy investments. In the aftermath of the financial crisis, public institutions played an especially critical role in providing capital that was otherwise unavailable from private sources. Corporate lending is one of the prominent instruments used by banks for renewable energy investment. The study further argues that given the complex nature of barriers to an investment like economic,

political, legal, technical, a robust national policy is essential to create a market attractive to the financier.

> In developing countries, strong Renewable Energy (RE) policies have proved easiest to justify in markets that are highly dependent on energy imports, ... given that RE investment has followed broader FDI trends, countries which have a poor framework for FDI, in general, cannot expect to attract overseas RE infrastructure finance. The macroeconomic reforms necessary to attract FDI more broadly will also enable increased foreign investment in RE. In general, governments should seek to mobilise RE finance in two comprehensive ways: first, by setting overarching regulatory and incentive frameworks that shift investment into RE on a macro level; and second, by using targeted public funding to fill or overcome specific financing gaps and barriers (ibid.).

Global financing plays a vital role in energy transition not only in terms of volume but also as a source of technology and process of technology diffusion.

Energy Transition: Political Economy!

In the context of developing countries like that of South Asia, the energy transition is not confined to a mere change in energy mix but goes beyond; hence, it plays out with its issues of the political economy. It is imperative that the distribution of cost and gains incurred in transition and transformation is balanced by the principle of energy justice. This means that transition and transformation need to push for correcting the prevailing energy injustices of a highly centralised energy system. In other words, factoring of energy justice impinges upon the organisational principle of the energy regime. It also raises the issue of ownership and distribution of the energy system. Some leading questions stemming out from the transition to be addressed include—what is the proposed

organising principle of harnessing energy from the resource; what should be the policy regime and the sources of financing the renewable energy investments; whether and how carbon-based regime can address the issue of injustice; how renewable can deal with the issue of energy justice and so on.

The transition trajectory in the countries where transformation is on anvil shows a strong shift in favour of renewable energy in a decentralised setting. In

> Germany, citizen cooperatives have long been investing in the production of renewable energies, and some are now looking at how to buy back the energy grid from the energy companies.... In France, Spain, Croatia and even Greece citizens have started to invest in renewable energy cooperatives (EASME, 2015).

It is argued that with renewable gaining share in the energy mix particularly in the power sector, distributed generation systems are going to play a vital role in addressing the issue of energy poverty by providing sustainable energy resources. The sustainability lies in its decentralising nature and moreover it is plausible since the cost of decentralised energy technologies is falling.

> Energy distribution does not necessarily need to be through major power plants and large grids. It can be more decentralised. That's a major change that might have an even bigger impact on the developing than the developed world because it makes investments much lower to build up a functioning energy system (Renssen, 2016).

Thus, while is some markets, structural change is reflecting more in terms of transition than a transformation in others, the market is reaching at the threshold of transformation. In countries like South Asia, transition weighs more in favour of the changing energy mix, thereby pursued in the distributive framework of centralised grids. Even global collaborations

and financial supports lean more for improvising central grid systems. Ironically, the experience of these countries suggests that the centralised grid has been unable to tackle the issue of energy poverty, especially in the rural setting. The apprehension cannot be dismissed that in meeting the targets, the government would focus more on a strengthened centralised grid. This, however, is at variance with the emerging trend in favour of a decentralised, decarbonised and democratic energy regime.

The next era of energy distribution is one that won't be controlled by the power companies, but one in which customers and utilities work together to create a greener, stronger, and more reliable energy network. The technology is here, and now, and with a cooperative effort, a new electrical energy structure is possible (Meyer, 2016).

Paris Agreement and Imperatives of Transition in Energy Mix in South Asia

All South Asian countries have set targets and time line in consonance to their commitment to the Paris Agreement. Bhutan, the mountainous country has resolved to implement INDC from 2020 to control its emission of greenhouse gases which is not desired to exceed the carbon sequestration by the forests, estimated at 6.3 million ton of carbon dioxide. It will maintain a minimum of 60 per cent of the total land under forest cover for all the time. Efforts will also be undertaken to maintain a forest cover of around 70.46 per cent through sustainable forest management and conservation of environmental services. Bhutan is determined to pursue ecologically balanced sustainable development coupled with the development policy of Gross National Happiness (GNH). Nepal, another mountainous country of the region, is highly dependent on biomass and

fossils fuel for its energy needs and aims at achieving 80 per cent electrification through renewable energy sources with appropriate energy mix, reducing its dependency on fossil fuels by 50 per cent. Being most vulnerable to the consequences of climate change, Bangladesh is a founding member of the Climate Vulnerable Forum (CVF) which made a unilateral declaration to shift to 100 per cent renewable energy by 2050 without any preconditions. This obviously would require a robust and dynamic transition policy. As will be discussed in the following section, Bangladesh has crafted a policy regime which promotes a public-private partnership business model. Pakistan is highly susceptible to the adverse impacts of climate change and placed among the top ten most climate-affected countries in the world as declared by Global Climate Risk index formulated by German watch. The country intends to bridge its deficit in the power sector by increasing the share of renewable energy. The target to get 5 per cent of the total generation from renewables by 2030 is expected to be increased to at least 15 per cent in the coming years (Climate Scope, 2017). Being an island country, Sri Lanka is highly vulnerable to the adverse effects of climate change. It has put forward highly ambitious voluntary goals to produce 100 per cent of their electricity through renewable by 2050. India, the largest consumer of energy in South Asia, has placed a comprehensive transition strategy to move towards low carbon systems. It has proposed to enhance the share of renewable in the power sector beyond the Paris Climate Accord target. India proposes to raise the share of power to 57 per cent by 2027 while Paris accord calls for 40 per cent by 2030. The high targets set by the South Asian countries can be achieved only if they have appropriate energy regime to harness the rich resource endowment of renewable.

II

Renewable Energy in South Asia: Potentials and Initiatives

Though South Asia is richly endowed with sources of renewable energy, there is a huge potential that remains untapped. Table 1 provides a synoptic view of potentials in different sources from different countries of the region. All countries are not equally endowed with all forms of resources.

Nepal alone has a huge hydropower potential of 83,000 MW, and even if energy demand increases at a rate of 10 per cent, domestic demand will reach only 3500 MW by 2025. This presents a lucrative opportunity for Nepal for energy trade that will also help in enhancing energy security in the South Asian countries as a whole. Similarly, the massive solar power potential in India and wind power potential in Afghanistan can help the South Asian region go a long way in fulfilling its energy needs (Shukla et al., 2017).

A brief profile of these resources in the region substantiates the point.

Table 1

Renewable Energy Potential.

Country	*Solar power potential (kWh/m2/day)*	*Hydro power potential (MW)*	*Wind power potential (MW)*
India	5.0	150,000	102,778
Sri Lanka	5.0	2,000	24,000
Pakistan	5.3	59,000	131,800
Afghanistan	6.5	25,000	158,000
Bangladesh	5.0	330	–
Nepal	4.0	83,000	–

Source: Shukla et al., 2017.

The challenges to energy transition can be better appreciated by looking at the profile of the region in terms of initiatives and performance. Each country has visualised and conceptualised its roadmap differentially. Thus, a country-wise analysis of the initiatives will provide a better insight than the aggregation of the region.

Afghanistan

The country has a huge potential of hydro power, estimated at 23000 MW of energy; 125 sites have been identified with the potential of over 600 MW of electricity. It has approximately 158,500 MW installed capacity that is 5MW /km^2, 31,600 km^2 windy land area or approximately 5 per cent of the total land area (UNECE, 2016), and around 300 sunny days in one year or other words 3,000 hours of sun, in terms of solar energy. This implies, on an average, approximately 6.5 kWh/m^2 solar radiation is available per day. Roughly, 85 per cent of Afghanistan's energy needs are met by traditional biomass, mainly wood and dung (ibid.).

The government has offered several investment incentives such as energy farms on long-term land lease, 25 per cent subsidy to invest in renewable energy, various tax incentives and security assistance along with long-term Power Purchase Agreement (PPA). The Government of Afghanistan has also initiated technology development and demonstration such as pilot/demonstration programmes (stand-alone, mini-grid, grid-tied), REN parks, financial risk mitigation and mechanism to access capital.

Renewable energy initiatives have been undertaken by Afghanistan under the legal, regulatory framework. The Government of Afghanistan introduced the institution of electricity regulators under the United States Agency for International Development and Deutsche Gesellschaft fur

Internationale Zusammenarbeit (USAID /GIZ) assistance. It soon became the reform agenda for the power sector and later was included in the Afghanistan Electricity Law in 2015. Later, Renewable Energy (REN) directorate was established in the Ministry and Utility as well as independent financial institutions to finance renewable energy projects (ibid.).

Bangladesh

Renewable energy in the form of traditional biomass is the main source of primary energy in Bangladesh. The extent of potential renewable energy sources such as solar photovoltaic, solar thermal power, wind power, biogas, etc., is yet to be determined. The capacity for renewable energy development is currently very low. Solar photovoltaic (PV) systems are in use throughout the country consisting of more than 300,000 household level installations with a capacity of about 15 MW. Various solar energy programmes are aimed to scale up the solar PV system. Efforts towards promoting Solar Thermal Power or concentrating on solar power technology, which involves harnessing solar radiation for the generation of electricity have been undertaken as well (Climate Scope. 2018). Wind energy potential lies in the coastal areas and offshore islands.

Bangladesh has conceptualised its INDC with the following elements:

- Mitigation Contribution: An unconditional contribution to reducing GHG emissions by 5 per cent from Business as Usual (BAU) levels by 2030 in power, transport and industry sectors. A conditional 15 per cent reduction in GHG emissions from BAU level by 2030 in power, transport and industry sectors supported by finance, investment, technology development and transfer and capacity building.

- Adaptation: Long-term vision for adaptation in Bangladesh and synergies with mitigation measures.
- Implementation: Proposals for governance and coordination of INDC implementation.
- Support for INDC implementation: A qualitative description of plans indicative of taking action on mitigation and adaptation.

To meet its INDC target, Bangladesh has planned out a strategy to converge its various plans and policies like the Bangladesh Climate Change Strategy and Action Plan, Renewable Energy Policy 2008, the Energy Efficiency and Conservation Master Plan (E&CC Master Plan), the forthcoming National Adaptation Plan, the National Sustainable Development Strategy, the Perspective Plan (Vision 2021) and the Sixth (and forthcoming seventh) Five Year Plan, the National Disaster Management Plan and the Disaster Management Act (ibid.).

Bhutan

Bhutan is the exceptional case of being the country drawing energy from hydropower. In 2016, the country exported 1,389 MW of electricity out of the total 1,840 MW generated to India, amounting to 75 per cent of its total generation. However, excessive dependence on single-source does make the country vulnerable and poses the question of energy security. Moreover,

> the country's current hydropower assets are all run-of-the-river plants that have no storage capacity, and rely exclusively on seasonal water flows: generation output can drop to less than 20 per cent of installed capacity during the dry seasons. Enhancing energy security requires diversification of the energy mix, supplementing hydropower with other renewable resources such as wind, solar, and small hydropower; diversification of energy supply will also

> mitigate hydrological and meteorological risks. Although less cost-effective than large hydropower, the country will benefit from developing these other renewable resources via increased access to electricity in remote areas, which will enhance energy security while delivering environmental dividends (the ABD Kingdom of Bhutan, 2014).

With Climate Change as the most upcoming fear, the Bhutanese government has started emphasising on diversification away from dams. Bhutan is exploring other forms of renewable energy, promoting biogas plants, solar power plants and small hydropower plants. The government has decided to scale the first pilot project to two wind turbines, as well as explore the possibility of building a 30 MW solar energy plant in Shingkharin Bumthang district. Around 13,500 cooking stoves and 2,800 biogas plants were also installed. During the winter season, the country's energy generation normally drops to 284 MW against the total installed capacity of 1,488 MW; during this time, Bhutan has to import electricity from India. With the growing domestic demand, of late, Bhutan's hydropower exports have been falling while energy imports are increasing. Owing to the rising energy imports coupled with the fact that Bhutan is committed to the use of renewable energy, it is moving to a low carbon growth path, leading to the promotion and implementation of energy policies towards the use of renewable energy sources (Gyelmo, 2018). It has laid down the following guidelines to mitigate its commitment (National Environment Commission, Royal Govt. of Bhutan, 2011).

- Sustainable forest management and conservation of biodiversity, forest fire management and rehabilitation of degraded and barren forest lands.

- Promotion of low carbon transport system by improving mass transit and demand-side management.
- I am minimising GHG emission through the application of zero waste concept and sustainable waste management practices through enhancement of the three R principles of waste management.
- Promotion of a green and self-reliant economy, enhancement and strengthening of an environmentally compliant monitoring system, and supporting investment in new industries that are at higher levels in the value chain and green industries and services.
- I am encouraging clean, renewable energy generation, integration of low emission strategies through green buildings, sustainable construction and climate-smart cities.
- Endorsing climate-smart livestock farming practices for poverty alleviation and self-sufficiency through the expansion of biogas production, improvement of livestock breeds, organic livestock farming and eco-friendly designs.

Nepal

The thirteenth Three-Year Plan (2013/14–2015/16) has various targets for additional electricity generation by the end of the plan period, hydropower (668 MW), micro-hydro (15 MW), solar (6 MW) and wind (1 MW). By 2014, around 93 per cent of electricity was generated through large hydropower projects. A substantial proportion of the population has met their needs by smaller-scale energy system through renewable energy sources like micro-hydro,

solar and bio energy. The renewable energy potential in Nepal proves that a big market exists for renewable.

Approximately, 3,65,000 household systems use bio energy or biogas as a source of energy. Around 80 per cent population relies on biomass for cooking purposes. In the same year, Nepal announced, "Clean Cooking Solutions for All by 2017 targeting 3 million households. Micro-hydro is estimated at 100 MW, approximately 54.28 MW has been achieved by mid-2016 out of which around 15 MW were from mini-hydro. In the case of solar energy, with an average daily solar radiation varying from 3.6 to 6.2 kWh/m2, the commercial potential for grid has been estimated at 2100 MW. For wind energy, the estimated generation potential is of 3000MW, while that which is commercially viable is estimated to be approximately 448 MW (Rai, 2016).

Around 50 institutions are involved in renewable energy deployment ranging from government educational institutions, non-governmental institutions and private sectors along with their development partners. Alternative Energy Promotion Centre (AEPC) facilitates policy and planning. The development partners and NGOs actively provide capacity enhancement programmes such as awareness creation and community mobilisation at the local level and technical skill enhancement training (INDC, 2016).

The Ministry of Environment, Science and Technology and the Alternative Energy Promotion Centre was established focusing towards promotion and development of renewable energy technologies. Regarding this, the centre provides financial and technical support to local organisations for developing decentralised rural energy through technology transfer and research and development.

Pakistan

Pakistan is blessed with an abundance of renewable resources to ensure its energy needs. The plains and desert lands in the central part of the country receive substantial sunshine and solar radiation. Being geographically located closer to the equator, Pakistan receives good solar radiation throughout the country. The direct normal Irradiance (DNI) reaches the highest on its dry plateau or rock deserts. Substantial sums of DNI are available all over Pakistan. According to IRENA, efforts are made to scale up solar energy, following the completion of 400 MW of solar PV projects in 2015–2016 which included 100 MW solar PV plant installed at Quaid-e-Azam Solar Park Bahawalpur, another 350 MW installed through China–Economic Corridor Project and 1 MW solar power plant at the Federal Parliament House. Around 800 MW solar PV has been installed considering all kinds of small, medium and large solar systems like off-grid, on-grid and hybrid solar system. Import of solar panels in 2015–16 is 1000 MW (Bhutta, 2016). The wind potential in Pakistan is estimated at 340,000 MW. The gharo-wind corridor with approximately a potential of 50000 MW is the most attractive for investors due to its close proximity to major load centres and national grid.

IRENA finds that "Pakistan has no clear renewable energy target, despite the political ambition that policy makers have expressed on various occasions. To translate political will into a language that can be understood by investors, a clear target first needs to be set" (IRENA, 2018b). A framework of renewable energy policy in the form of alternative energy was spelled out in 2006, which envisaged and defined a comprehensive role of private players.

> Pakistan was among the few developing countries that devised policies to attract private-sector investment in the sector at the early stages of their global uptake. The resulting renewable energy policy in Pakistan laid down attractive fiscal and financial incentives for private-sector investors (ibid.: 24).

In fact to promote renewable energy, AEDB was created in 2003 with the objectives to develop national strategies, policies and plans for the utilisation of alternative and renewable energy resources, to act as the forum for evaluating, monitoring and certifying alternative and renewable energy projects and products and to facilitate power generation through alternative and renewable energy resources (IEA, 2013). However, the non-performance of AEDB made the government to merge it with Private Power and Infrastructure Board (PPIB) which has been in existence since 1994. It was alleged that the Auditor General of Pakistan found that "the AEDB failed to produce a single megawatt of electricity since its establishment in 2003 and is plagued with scams of Rs. 4–5 billion" (International The News, 2011).

> The establishment of the AEDB has therefore created an anomaly in the system because it has also begun operating as a one window facility for one segment of the sector, whereas in terms of its preamble its primary function should have been research and development for the growth of the alternate energy sector (Ghumman, 2017).

Apparently, Pakistan's renewable energy policy is to solicit a larger role for the private sector in the energy transition. However, the role of the state remains vital in creating an ecosystem, even if it puts the private sector as its driver.

Sri Lanka

Sri Lanka has set ambitious targets to generate 100 per cent of its electricity from renewable by 2030 (ADB, 2017*c*).

It has formed as Sustainable Energy Authority (SLSEA) to promote renewable in its energy mix. Its vision is to make the country energy secured by developing local energy resources through exploration, facilitation, research & development and knowledge management (Export.gov. 2019). The profile of the country suggests that there have been 342 MW of mini-hydro power, 128 MW of wind power, 24 MW of biomass power and 21 MW of solar power connected to the national grid. The total non-conventional renewable energy sources were 487 MW in 2016. It also contributes to supporting small units with financial facilities. Financial incentives are provided to small-scale (less than 10 MW) electricity generation using renewable energy sources such as hydropower, wind, and biomass. Various non-government organisations promoting renewable energy use such as Sri Lanka Energy Managers Association, the Energy Forum and the Bio-energy Association are supported by it (ADB, 2017c).

Broadly, Sri Lanka NDC comprises the following four areas:

- *Mitigation*: Reducing GHG emissions against Business-As-Usual (BAU) scenarios in the sectors of electricity generation, transportation, industry, waste and forestry.
- *Adaptation*: Building resilience in sectors and communities to combat adverse effects of climate change, in the areas of human health, food security, water and irrigation, coastal and marine, biodiversity, infrastructure.
- *Loss and Damage*: A local mechanism will be developed by the Warsaw International Mechanism for Loss and Damage.

- *Means of Implementation*: External support for finance, technological development and transfer and capacity building (Government of Sri Lanka, 2016).

The NDCs of Sri Lanka is to be implemented under the guidance of Climate Change Commission of Sri Lanka in coordination with the ministries. A coordinating body comprising relevant ministries is expected to provide input to NDC implementation. Sri Lanka has taken the initiative of integrated planning through the National Action Plan (NAP) and Energy Planning, which likely be extended to other sectors vertically and horizontally.

Maldives

The Maldives relies entirely on imported fossil fuel to meet its energy demand. In 2015, the total imports went up to 506,334 metric ton of fuel, out of which there was 12,385 metric ton of cooking gas, 389,968 metric ton of diesel, 38,683 metric ton of petrol and 65,299 metric ton of aviation gas (IRENA, 2015). The Ministry of Environment, Energy and Water oversees the energy, environment and water sector in the Maldives. The ministry aims at encouraging energy efficiency and alternative energy use in the country (ESMAP, 2016).

The Maldives aspires to achieve its objective of becoming the world's first carbon-neutral country in 2020 with a declaration of policy commitment in 2009. It aims at displacing its total dependence on diesel-based power generation with renewable energy alternatives. The government of Maldives has established a comprehensive policy framework for the development of renewable energy spelled in the Strategic Action Plan (SAP-2008-2013), Energy Policy 2010 and Scaling-up Renewable Energy Program

(SREP) Investment Plan under Climate Investment Funds. It has four funding programmes (IRENA, 2015).

1. ASPIRE: Accelerating sustainable private investments in RE:
   Feed-in tariff with WB guarantees to leverage private investment, PV projects in Greater Malé, PV and wind projects in 30 islands with medium to great electricity demand, Waste-to-energy in outer islands.
2. *POISED*: Preparing outer islands for sustainable energy development: PV and wind projects aiming for 20–100 per cent RE electricity ADB funded pilot projects are underway: 1.6 MW PV in Addu City.
3. Technical assistance for renewable energy scale-up capacity building: Data collection, identification of additional RE investment opportunities
4 Thilafushi Waste-to-Energy Project:

IFC funded 4 MW systems. For more effective implementation of its programme, the country is working out a detailed mapping and assessment of its solar and wind resource base with the help of the World Bank (ESMAP, 2016).

India

India has developed a vibrant and time-bound target-oriented strategy to change its energy mix in favour of the renewable. The Ministry of New and Renewable Energy is the nodal agency to steer the project. It aims to expand energy supply by deploying a national programme to increase wind, small hydro, solar and biomass-based power generation capacity. To implement its target, the government has created an enterprise—the Indian Renewable Energy Development Agency under the ministry to promote, develop and extend financial assistance for renewable energy deployment, energy

efficiency and conservation projects. India has a definite plan of action for clean energy, energy efficiency in various industries. Steps have also been laid down to achieve lower emission intensity in the automobile and transport sector.

India's Intended Nationally Determined Contribution (INDC) has the following features:

- To propagate a healthy and sustainable way of living based on the traditions and values of conservation and moderations.
- To adopt climate-friendly as well as a cleaner path towards economic development.
- To reduce the emission intensity of its GDP by 33 to 35 per cent by 2030 from 2005 level
- To achieve 40per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030 with the help of the transfer of technology and low-cost international finance
- To create additional carbon sink of 2.5 to 3 billion ton of CO_2 equivalent through additional forest and tree cover by 2030.
- To adapt to climate change by enhancing investment in development in the sectors highly vulnerable to climate change like Himalayan region, health and disaster management.
- To mobilise funds from developed countries to implement various mitigation and adaptation actions.
- To build capacities, creating infrastructure for quick diffusion of cutting-edge climate technology along with joint collaborative R&D for future technologies (UNCC, 2015).

To achieve the above objectives, the various initiatives taken are:

- Introduce more efficient, cleaner technologies in thermal power generation
- Promote renewable energy and increase the share of alternative fuel in energy mix
- Reduce emissions from waste
- Develop climate resilient infrastructure
- Implementation of Green India Mission and programmes
- Planning and implementation of action to enhance

The Government of India claims that

> it is running one of the largest renewable capacity expansion programs in the world. Between 2002 and 2015, the share of renewable grid capacity has increased over six times, from 2per cent (3.9 GW) to around 13per cent (36 GW). This momentum of a tenfold increase in the previous decade is to be significantly scaled up to achieve 175 GW renewable energy capacity in the next few years. India has also decided to anchor a global solar alliance, InSPA (International Agency for Solar Policy & Application), of all countries located between the Tropic of Cancer and the Tropic of Capricorn (UNCC, 2015).

Indian initiatives are seen as great opportunities by the private player as an emerging market, for global agencies like IEA and World Economic Forum, India is today at the centre of the global energy transition. Its transition pace is one of the key drivers of global pace.

III

Barriers to Transition: Finance and Technology

The two critical issues that the countries of South Asia face as a barrier in their journey to renewable energy are the finance to invest and the technology which is compatible with the local ecosystem and competitive to substitute the

hydrocarbon-based energy system. Given the asymmetrical size of market and landscape, the capacity building processes in South Asia are not comparable. Yet brief profiling of it could provide the possibilities of their mutual engagement in promoting transition processes. India, for instance, has made huge progress in the solar sector and is providing a lead as demonstrated by the establishment of the International Solar Alliance. It is a platform for the collaborative venture in sharing and developing technology by promoting innovative partnership.

Financing of the energy transition in Afghanistan is heavily dependent on external financing as is evident by the fact that 63 per cent of its FY 2017 budget is funded by development partners including 100 per cent of the development budget (Amin, 2017). Consequently, Multilateral Development Banks (MDBs) like the World Bank and the Asian Development Bank (ADB) have been major players in promoting renewable energy. Asian Development Bank has recently committed to financing as grant the first 20 MW on-grid solar photovoltaic plant with an investment of $44.76 million.

> The new on-grid solar power generation project, which is the largest of its kind in Afghanistan, will not only provide access to a clean and reliable power supply but also demonstrate the viability of future renewable energy investments through public-private partnerships (ADB, 2017).

It is estimated that it will generate

> at least 43,000 MW-hours of solar power and avoid at least 13,000 tons of carbon dioxide equivalent in the first full year of operation.... Also, the project will provide power transformer and support facilities, upgrade the capacity of the existing substation, and operation and maintenance services for three years. The project will also prepare the site and substation to accommodate 10 MW of additional

> photovoltaic plant for future financing. The project may be expanded to 30 MW or 40 MW if additional financing from other development partners or the private sector is realised (ibid.).

Equally important is the role of the project in capacity building. It envisages that the project will contribute to training locals on solar photovoltaic plant design, technical evaluation, grid integration, and operation and maintenance. In Pakistan too ADB has been the one of the largest development assistance provider. It has approved Access to Clean Energy Result Based Lending (RBL) facility in 2016 for financing off-grid solar and micro-hydro to provide power for public schools, community centres, and basic health units in Punjab and KPK (ADB, 2017b). The World Bank too has been financing renewable energy project in the region in a big way. Recently, it has committed to finance two solar power projects in the Sindh region of Afghanistan and Pakistan:

> The projects will address Sindh's energy needs through the generation of solar power benefitting the entire province and support trade between Pakistan and Afghanistan through regional connectivity and private sector development along the Khyber Pass corridor (World Bank, 2018).

The World Bank is supporting a comprehensive Pakistan Solar and Renewable Energy Program with the objective "to increase the installed generation capacity of renewable energy (RE) and enhance RE development in Pakistan" (World Bank, 2017). The three million programmes are to be financed by the Green Climate Fund and the World Bank. The State Bank of Pakistan has revised its scheme to boost the transition to renewable in 2017 by providing concessionary finance to renewable energy projects. It is expected that the scheme will promote the share of renewable in Pakistan's energy mix to keep its commitment.

Bangladesh has developed a robust financial architecture to promote the financing of renewable. The central bank has played a pivotal role in this drive. On its initiative, most of the financial institutions, both banking and non-banking, have created the Green Banking Cell. According to a study, the Bangladesh Institute of Bank Management

> around 70 per cent FIs of the country are engaged in green financing activities either using their own funds or availing refinancing facilities of BB. ... BB's published data indicates that of the total green financing, over one-fifth portion were disbursed in the renewable energy projects in the year 2014, and the proportion increased to above 30 per cent in the total disbursement for the January-March 2015 quarter. Of the other forms of green financing, fire burnt brick (energy-efficient technology) and green industry (green building/construction) accounted for a significant proportion of the total. BIBM Survey data reveal that three-quarters of the total clients of green financing belong to rural Bangladesh. In terms of several clients, most green financing facilities are availed to meet the energy need of the people (Habib and Shah, 2016).

Among the external players, the World Bank and ADB have been major financiers. The former has contributed $1.6 billion in promoting generation, transmission and distribution of renewable since 2002 (World Bank, 2018b). The ADB too has been actively engaged in supporting the initiatives like the Solar Home Systems to provide off-grid power in a rural setting. This has been the flagship project illustrating the role of public-private partnership in the energy transition. Green Climate Fund has reportedly committed $20 million to support the energy-efficient cook stoves project.

Sri Lanka has proposed a very ambitious target for moving to renewable. In the twenty-second meeting of the

UNFCC in Paris, it declared its intent to move to 100 per cent power generation by renewable sources by 2050. According to a joint study by ADB and UNDP, this would require an investment of $54–56 billion, but it will save $18–19 billion by saving on imports of fossil fuels. It identifies three major categories of sources of finance—the government (central government and public sector units), private sector (group companies, independent power producers, private equity and venture capital, domestic institutional investor, insurance companies) financiers (domestic banks, non-banking financial companies, foreign institutional investors and multilateral/ bilateral agencies). The study further observes,

> These investor categories will play a pivotal role in bridging the gap between debt and equity, enabling the country to meet investment targets required to increase the adoption of RE in the power sector. While DIIs and multilateral agencies, who provide the lowest cost capital, could play a major role in debt financing, FIIs could also finance a significant portion of the equity required (UNDP and ADB, 2017).

Clearly, such huge financing requires global support besides mobilisation in the domestic market. Among the major external support, IFC is one of them contributing $100million in partnership with Commercial Bank of Ceylon to finance renewable energy projects. The objective is to encourage local companies to be the player in the transition processes (Mercom India, 2017).

India has set the target of generating 175 GW power from renewable and to make it accessible to all. It is estimated that this would require an investment between $125 to 189 billion (Sen et al., 2016). The government has created IREDA as a public limited government company which again was established as a non-banking financial institution dedicated to financing renewable energy in India. Its objectives are

to promote, develop and extend financial assistance for setting up projects related to new and renewable sources of energy and energy efficiency/conservation.[2] It has financed more than 2400 projects with a cumulative loan of more than 50,000 crores. It is funded partly through the central government but also receives funding from overseas players. It has got international assistance equivalent to ~ Rs 8000 crore from various bilateral/multilateral agencies. These include the German development bank (KfW), French development bank (AFD), Nordic Investment Bank (NIB), European Investment Bank (EIB), Japan International Cooperation Agency (JICA), World Bank, Asian Development Bank, and other international financial institutions.

Indian public sector banks to have been asked to play a promotional role. The RBI has notified that renewable energy financing is to be taken as a priority project by all public sector banks.

> As per RBI's notification, banks can now provide loans up to a limit of Rs 150 million to borrowers for solar, biomass, wind, and micro-hydel power generation, and also for renewable energy-based public utilities like street lighting systems and remote village electrification. For individual households, the loan limit has been set to Rs 1 million per borrower. Loans for generation and use of renewable energy in households are already included under priority sector. As per the new mandate, all the banks will have to lend at least 40 per cent of their net credit to the priority sector. Foreign banks with less than 20 branches have been allowed time till 2020 to reach this target. It is believed that there will be severe monitoring and penalty provisions in case of non-adherence to the norms (Upadhyay, 2015).

2. For more details, see *http://www.ireda.in/*

The State Bank of India, a leading public sector bank, with an energy loan portfolio of $1.85, is proactively engaged in promoting solar roof top projects. It has signed the SBI-World Bank Grid Connected Rooftop Solar PV programme where the World Bank will provide the funds to SBI which in turn will lend to companies. Under the scheme, the SBI has reportedly funded 43 grid-connected roof top projects worth 430 million dollars. More recently, it has extended $357 million credit to seven Indian companies to be used to develop grid connected solar top projects with a total capacity of 575MW. In April 2017, the European Investment Bank approved EU 200 million for the SBI to finance solar projects (Prabhu, 2017). Other public sector banks like PNB, Central Bank of India and private banks like Yes Bank too are contributing to this drive to renewable energy.

The size of the Indian market is very promising to global players as well. Estimates suggest that it has received $ 1.77 billion FDI in 2014–2016. It is observed that "A combination of India's ambitious energy policy and ongoing solar and wind energy tariff deflation will enable India to catalyse US$200-US$300bn of investment in renewable energy infrastructure over the coming decade" (Bermingham, 2017). Solar is central to India's energy transition, which is reflected in its initiative to create the international solar alliance. Recently, India has proposed to create a $350 million funds to finance solar projects to meet its target. Given the magnitude of financial nee, external financing becomes imperative to promote transition in India. Multilateral agencies, like the World Bank and ADB, apart from private players, are showing interest in promoting transition in India. The World Bank is financing large-scale solar park by extending a loan of $98 million and a grant of $ 2 million. Regional banks like ADB to have been contributing to financing the transition processes. It

has financed Green Energy Corridor by extending a loan of $500 million. More recently, it has co-financed with AIIB $100million loan to improve transmission line to integrate renewable into the grid (Petrova, 2017). The private foreign banks to have shown interest in solar projects in India. The Soft Bank Group of Japan intends to invest one trillion dollars by 2030 (Firstpost, 2018). It has already announced $20 billion investment, and recently it has made a debut by winning a 350 MW power project.

An overview of the financing energy transition by South Asian countries suggests that while all of them have taken the initiative to push for renewable energy, though at a different pitch, a well-defined architecture with a robust institutional frame is yet to evolve. It is significant that the business model considered for transition envisages a prominent role for the private sector and global financing. The international multilateral lending from the World Bank and ADB too are playing a critical role, though given the magnitude of finance required by these countries a more agile global financing is required. The global response in terms of FDI is limited, despite the potential of the market. It is well recognised that the enormity of the task demands to move away from conventional models to an innovative approach.

IV

In the transition to renewable energy, technology has played a critical role by cutting the cost and developing storage capacity. The viability of renewable depends upon the comparative cost of renewable technologies, the levelised energy costs (LECs) of the various grid-connected and off-grid renewable energy. With the onset of the fourth industrial revolution, the digitalisation processes are disrupting the prevailing centralised model to be replaced by the distributed

energy system. It is argued that "In contrast to earlier energy system evolutions, the arena this time is undergoing a truly disruptive transformation. We are in the middle of a complex change process not only centred around the customer but much more driven by the customer" (World Economic Forum, 2017). In its road to transition, while the South Asian countries do not have to reinvent the wheel, without a strong technological base, the region will not be able to obtain the competitive price and control over its energy regime which is essential for energy security. Besides, the region suffers from energy poverty demonstrated by the low per capita consumption. It needs energy priced to the purchasing power of the millions who are still not using power. This makes a strong case of a technological solution embedded to the local conditions. Surely, the trajectory of technological transformation has to begin with imitation but has to move forward towards improvisation and innovation to reap the full potential of energy resources for energy equity.

Recognising that one size does not fit all, the countries have embarked upon developing the R and D framework to strengthen their transition process. In Bangladesh, the government has initiated a multipronged approach drawing the private sector to bolster the technological base of renewable energy. Table 2 provides a synoptic view of different agencies working on research and development in this sector.

In Pakistan, the government has established the Pakistan Council of Renewable Energy Technologies (PCRET). Funded by the government it is a nodal agency with the basic mandate

to carry out R&D in the field of Renewable Energy Technologies for the socio-economic development of the country, as well as promote the new and existing technologies to overcome the prevailing energy shortages and replace the

Table 2

Status of R&D Activities of Different Organisations

Technology	Related organization	Remarks
Solar photovoltaic balance of systems Solar water heaters	Garmeen Shakti, Centre for Mass Education in Science (CMES). Institute of Fuel Research and Development (IFRD) Renewable Energy Research Centre (RERC), Dhaka University. IFRD. OMES	Local manufacturing of all balance of system components (like charge controlled, cable, inverter, converter etc.) are possible. Manufacturing with local design and fabrication facility possible.
Improved stoves	IFRD	Several designs have been developed at IFRD in three basic categories: Without chimney, with chimney, and with waste heat utilization.
Solar cooker-parabolic	IFRD, ANANDO (a private manufacturing & marketing company in Bangladesh)	IFRD has successfully field-tested its design which can quickly boil water on clear sunny days. Such solar cookers are now on sale at a cost of Tk. 450.00 (US$ 9.00) at IFRD. ANANDO is also manufacturing and marketing its products with imported materials and design.
Solar cooker-box type	IFRD, CMES	IFRD's design is made of locally available raw materials. The manufacturing costs of such a cooker is about Tk. 800 (US$ 16.00) excluding the cost of utensils. The cookers are now being sold at IFRD.
Solar dryer	IFRD, Bangladesh Rich Research Institute (BRRI). Bangladesh Agricultural University (BAU)	Different types have been designed and tested with locally available materials.
Solar wood seasoning plant	Bangladesh Forest Research Institute (BFR)	A simple and inexpensive and effective solar kiln has been developed for seasoning timber using solar radiation. The kilo can be constructed conveniently with locally available materials. Timbers of different species and dimensions can be seasoned throughout the year in the solar kin.
Solar passive architecture	Bangladesh Council of Scientific and Industrial Research (BCSIR)	A solar house has been designed and built in the BCSIR campus, the purpose is to keep the house warm in winter and cool in summer.
Briquetting machine	Khulna University of Engineering and Technology (KUET) Khulna BRRI	Under the RET in AsiaTM program, KUET has developed better machines with longer screw life.
Biogas	IFRD, Local Government Engineering Department (LCED). BAU	Fixed dome type plants are found to be more suitable for local conditions and disseminated with government subsidy of Taka 5000.
Wind pumps	LGED	LGED has designed and manufactured low cost wind pumps with a rated capacity of 20.0001 L of water per day at 4.0 m/s wind speed. Six such prototypes are already installed at different parts of the country.

Source: Ahmed, et al. 2014.

environmental polluting fuel sources with the green sources. An important mandate is to convey the benefits of these technologies to the common public (PCRET, 2015).

However, of late, the Council has been under critical scrutiny for non-performance. According to a parliamentary committee, the Council has failed to deliver in the last decade largely due to paucity of the fund (Shahid, 2017). According to the IRENA study on Pakistan's preparedness on transition, the technological foundation of the country is restricting it to realise its full potential (IRENA, 2018b).

The story of Sri Lanka is no different than other developing countries as far as the technological capacities for renewable are concerned. It is largely dependent on the import of technology. It is observed that

With a certain amount of technology adoption and value addition, the country engages in a vertical transfer of technologies. In terms of technology diffusion governmental organizations like Sustainable Energy Authority and NGOs such as Practical Action, actively engages in disseminating technological know-how to a larger audience (horizontal transfer) (Withanaarachchi et al., 2016).

In Sri Lanka, the renewable energy programme has been market-driven as it was initiated by the World Bank and Global Environmental Facility. It followed two principles

(i) the systems need to be the least-cost option compared to its competitor products grid-connected mini-hydro projects); or, (ii) the incremental cost of the systems need to be in-line with the incremental cost globally and have a clear declining path of these costs due to economies of scale (solar home systems and village hydro projects). These principles have contributed to an industry that is expected to grow even after external grant support is withdrawn.

However, in the absence of domestic technological capacities, renewable energy promotion is leading to the import of hardware. Since imported technology is developed to local conditions of the technology developer, it poses an issue of adaptation. It is argued that

> the ready-made TT solutions that are widely available in the Sri Lankan renewable energy sector have proven their long term un-sustainability. The concept of TT goes beyond the mere transmission of equipment or even embodied knowledge. Effective TT also involves the transfer of tactical knowledge capabilities that cannot be subjected to market-like exchange. Thus, there is a clear difference between technology trade and broad transfer of technology. Unless Sri Lanka has the proper knowledge to make informed choices among technological options, there is a risk that the efforts to promote international TT may become overwhelmingly supplier driven and geared more towards transferring available technologies rather than technologies required by the country (Withanaarachchi et al. 2015).

Among the South Asian countries, India has developed competitive technological capacities to meet the challenge of its transition to renewable. To promoting local capacities, the Ministry of New and Renewable Energy has been supporting research and development programmes in collaboration with universities and national laboratories since 1982. Its R & D strategy as spelt out by the Ministry envisages involvement of industry and scientific establishment, access to available technology to avoid reinventing the wheel, improvising the available technology and developing advancement on indigenous design in a time-line process. It is reported that the current installed manufacturing capacity for solar cells and modules is 3,164 MW and 8,398 MW, respectively. It is aimed that the indigenous manufacturing capacity is scaled up to 4–5 GW by 2020 (Kenning, 2017) interestingly more than half of it is exported.

Consequently, the government is likely to set up the Renewable Energy Export Promotion Council (The Hindu, 2017). While developing local capacities, India has been actively engaged with global players in strengthening its technological base. As the Ministry document mentions, India has signed several MOUs with developed and the developing countries to promote cooperation as an instrument of developing the technology.

> The focus of the interaction for cooperation has been to explore opportunities for exchange of scientists to share experience and for taking up joint research, design, development, demonstration and manufacture of new and renewable energy systems/devices by R&D institutions/ organisations of both countries and thereby establishing institutional linkages between institutions of India and other countries (Ministry of New and Renewable Energy, 2009).

The huge size of the market provides India with a distinct leverage in collaborating with global players. It is precisely due to the advantage of size and capabilities that India has projected itself as a global player in solar energy by establishing International Solar Alliance, a global platform for cooperation and collaboration among the sun-rich countries.

V

Energy Transition in South Asia, despite its progress, remains a challenging task.

> A successful transition to RET-based energy systems requires radical changes in the current energy regimes. Although governments play a key role in pushing such change, their ability and willingness to do so depends particularly on a range of political economy factors, which also interplay with geographical and technological ones (Isoaho et al., 2016).

From the above narrative, it appears that the governments of the region have defined their plans and strategies with institutional backup. Though largely dependent on external financing, the domestic resource mobilisation has been limited to the banking sector. The private investment remains shy, though, in India, the advantage of the market has led to companies to be the promoter of transition processes. It is interesting as pointed out in case of India that "Though the government has dramatically increased subsidies to renewables, this report finds that, in absolute terms, this support is much lower than that provided to coal, oil and gas collectively" (IISD, 2017). According to another report prepared by the Centre for Financial Accountability (CFA), coal received Rs 60,767 crore ($9.35 billion) in lending whereas renewable energy received Rs 22,913 crore ($3.50 billion) (Singh, 2018). The point is that the conflicting interest among the stakeholders playing out in defining the issues of challenge that South Asia is undergoing a transition process.

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