

Green Pathway

Accelerating the clean energy transition in South Asia

While countries across the world are grappling with the clean energy transition, they differ in their motivations, starting conditions, resource bases and problems. Each country has to find its own path in the transition to clean energy. South Asian countries have much in common in terms of motivations and starting conditions, as well as clean energy transition pathways. The region is characterised by low per capita energy consumption, and the countries are focusing on accelerating energy access for their populations. Climate change and high petroleum import bills add to the woes of these countries.

South Asia has huge renewable energy potential, which can facilitate the transi-

tion towards clean energy. Over time, renewable energy has become cheaper. The South Asian countries have also undertaken various supply-side (replacing fossil fuels with renewable energy) and demand-side measures (promoting e-mobility and electric cooking) for transition to clean energy. In their clean energy transition journey, South Asian countries can benefit from mutual cooperation. These countries have promised ambitious emission reduction targets and goals at COP26 in Glasgow as well as other conferences, as a part of the Paris Agreement. There is a need to find a common path that helps all the countries in the region speed up their energy transition.

At a recent webinar on “Accelerating

clean energy transition in South Asia”, organised by USAID’s South Asia Regional Initiative for Energy Integration programme (currently being implemented by Integrated Research and Action for Development [IRADe]) and *Power Line*, Dr Jyoti Parikh, executive director, IRADe; Tarun Kapoor, former secretary, Ministry of Petroleum and Natural Gas, India; Mohammad Alauddin, chairman, Sustainable and Renewable Energy Development Authority, Bangladesh; Madhu Prasad Bhetuwal, joint secretary, Ministry of Energy, Water Resources and Irrigation, Nepal; Passang Pasang, chief engineer, Department of Renewable Energy, Ministry of Economic Affairs, Bhutan; Eng. Ranjith Sepala, chairman, Sri Lanka Sustainable Energy Authority, Sri



Lanka; Chintan Shah, director, technical, Indian Renewable Energy Development Agency Limited; and John Smith-Sreen, director, IPO, USAID/India, discussed the clean energy transition plans and targets of their respective countries, their experience so far, the issues and challenges encountered, and the role of development agencies and cross-border electricity trade (CBET) in accelerating the clean energy transition. Excerpts from the discussion...

India

In India, electricity accounts for a 16 per cent share of the energy basket, while other use cases such as transport and cooking, and industries such as cement and steel, which together account for 84 per cent, continue to utilise primary energy sources. Grid-based electricity is witnessing rapid penetration of renewable energy. As per global statistics, renewable energy penetration in the grid is 13-14 per cent, while that in transport and cooking is just about 2 per cent and 4 per cent respectively. Therefore, these areas will need special focus to accelerate the clean energy transition.

At the COP26 climate summit, India committed to building 500 GW of renewable energy capacity by 2030. Since renewable energy is intermittent in nature, balancing the grid is important to achieve this. India also plans to manufacture 5 million tonnes of green hydrogen per annum by 2030. Instead of electricity, which requires massive infrastructure projects such as transmission lines, South Asian countries can manufacture hydrogen, which can be easily transported and utilised immediately across multiple use cases.

In the e-mobility segment, it is expected that by 2030, electric vehicles (EVs) will account for at least 70 per cent of three-wheeler vehicle sales, over 50 per cent of two-wheeler sales and 30 per cent of four-wheeler sales. Further, under the National Policy on Biofuels, 2018, oil marketers are required to blend 10 per cent ethanol in petrol by 2022, which is expected to increase to 20 per cent by

2025. Similarly, diesel could be blended with biodiesel, although biodiesel is on the expensive side and not much development has been witnessed in the segment so far. In the transport sector, a large-scale transition to compressed natural gas vehicles is expected for heavy transport buses and trucks, at a faster pace than the transition to EVs. There is also potential for hydrogen blending in the transport segment. The price of green hydrogen has fallen considerably, but at \$4 to \$5 per kg, it is still expensive. Overall, the transport segment will see biofuel blends in the short run, and an eventual large-scale transition to EVs.

For cooking, the region is largely dependent on liquefied petroleum gas (LPG); however, with the higher penetration of renewables in the grid, a shift to cleaner electric cooking is possible. It is also possible to create LPG blends, such as with dimethyl ether, which is a derivative of methanol. In the manufacturing segment, the steel and cement industries, which require high temperatures, are currently dependent on coal. Changes are required in their manufacturing processes for them to switch to cleaner sources.

One way to decarbonise the Indian economy is to increase the penetration of renewable energy in the grid. This creates a need to balance the grid, for which energy storage, including pumped hydro storage, will be required. Connecting the entire South Asian region can also make balancing easier.

Bangladesh

Bangladesh has made every effort to scale up clean energy despite its limited resources and insignificant carbon footprint. It has been able to offer nearly 100 per cent electricity access, and the contribution of renewable energy in the installed capacity is around 3 per cent. The government has announced a vision to increase this to 40 per cent by 2041, at COP26. It is going to formulate an Integrated Energy and Power System Master Plan, which will reflect a detailed transition plan. Further, it is also formulating an Energy Efficiency and Conservation

Master Plan, which will set a target of improving primary energy consumption per GDP by 20 per cent by 2030. It will also include an energy management programme, an energy efficiency (EE) labelling programme, an EE building programme, an EE financing programme and an awareness raising programme.

Bangladesh has an aggregate renewable energy capacity of 780 MW, of which around 547 MW comes from solar. Although the price of solar power is decreasing, expansion of utility-scale solar power is still limited, by the scarcity of land owing to the country's high population density. Several innovative solutions such as rooftop and floating solar are thus gaining traction in the country. Notably, Bangladesh is home to the world's largest rooftop solar set-up in a single location – the 20 MW solar rooftop at the Korean EPZ, Chittagong. The other challenges that Bangladesh is facing in expanding renewable energy sources include identifying a viable business model for developing renewable energy plants and assessing the potential of renewable energy resources in the country.

To manage the intermittent nature of renewable generation, battery energy storage is a key solution. Cross-border interconnections with neighbouring countries is another option, as the wider network offers more potential for balancing intermittency. Bangladesh is already importing 1,160 MW of power from India. Meanwhile, Bangladesh's closest neighbour, Myanmar is connected to the ASEAN grid and has a hydro potential of 40,000 MW. Energy trade between these countries can significantly contribute towards balancing the grid in the region.

Nepal

In December 2020, Nepal presented its second nationally determined contributions (NDC) report to the United Nations, committing to meet 15 per cent of its total energy demand through clean energy sources by 2030. The country plans to expand its clean energy generation to 15,000 MW. Meanwhile, EVs are expected to account for 25 per cent of the sales of

all private passenger vehicles, including two-wheelers, and 20 per cent of the sales of all four-wheeler public passenger vehicles, in the country. Similarly, 25 per cent of households are expected to be using electric cooking stoves by 2030. Moreover, Nepal has committed to net zero emissions by 2045.

The country's key issues on the clean energy adoption front are its limited power transmission system and difficult geographical terrain. Further, runoff variation in the rivers, owing to the surplus precipitation in the wet season and low rainfall during the lean period, impacts the operation and development of hydro projects. Transmission interconnectivity between Nepal and India is also poor.

Going forward, Nepal is focusing on modernising and automating its electricity grid to make the system stable. In order to meet the NDC commitments, an investment to the tune of \$25 billion will be required, for which support from development partners will be crucial. Overall, Nepal is expected to have a net electricity surplus by 2025, and could export electricity to India and Bangladesh to meet their global commitments and mitigate fossil fuel energy generation. To this end, discussions are under way with the Government of India for CBET and electricity banking.

Bhutan

Bhutan is primarily dependent on hydropower for electricity generation. Hydropower plays a very crucial role in the country's revenue generation. Over 99 per cent of the communities in the country have been electrified. Work is under way to electrify the remaining communities through decentralised solar photovoltaic, and if successful, this can be replicated in other communities. In the cooking sector, although currently the country is dependent on LPG in urban areas and firewood in rural areas, plans are in place to promote electric cooking appliances in urban areas and biogas in rural ones.

Bhutan's hydropower plants are run-of-

the-river projects. During lean months, the plants run short of their generation capacities and the country ends up importing electricity from India. Bhutan is cognisant of its reliance on a single source of electricity, and the government is focusing on diversifying into other energy sources, including solar and wind. Bhutan has over 12,000 MW of solar potential and close to 800 MW of wind potential. It also has power generation potential in the thermal, biomass and bioenergy segments. The government has charted out a plan to bring in over 200 MW of solar capacity by 2030, which will comprise both ground-mounted and rooftop solar. The ministry has also initiated amendments to existing policies to accelerate the development of alternative energy resources. Moreover, the ministry is working on a roadmap to produce green hydrogen as well as to transition to EVs. Bhutan receives support from development partners in promoting its renewable energy sector, which is still at a nascent stage. A common power market may help enhance efficiencies and potentially cut electricity prices, thereby contributing to overall growth in South Asia.

Sri Lanka

Sri Lanka has set a target of generating 70 per cent of its electricity from renewable energy sources by 2030. At the COP26 summit, the country committed to cease building new coal-fired power plants and achieve net zero carbon emissions by 2050. To achieve its 2030 goals, the country will need to generate 30,000 GWh of energy; and to have renewable energy account for 70 per cent, it will need to add almost 9,000 MW of renewable energy capacity. Therefore, rooftop, ground-mounted and floating solar, as well as onshore and offshore wind, will gain traction in the country, going forward. Challenges will lie in managing the intermittent renewable energy sources, and controlling the grid to maintain the power quality and the stability of the power system. Sri Lanka is in discussions with India to build a transmission line for trade of electricity. It is also in discussions with the Singapore govern-

ment regarding power trading. Building a link with Singapore could, in the future, help connect the country to Malaysia and Indonesia.

Conclusion

South Asian countries have abundant and varied sources of power generation. Bangladesh has natural gas, Bhutan and Nepal have hydropower, Sri Lanka has abundant solar and wind potential, and India has a mix of all of these. Today, electricity trade is taking place between Nepal and India, Bhutan and India, and Bangladesh and India, and it is evolving further.

There is a need to enhance collaboration in the South Asian region. The countries entering into partnerships based on mutual respect and transparency could help advance regional cooperation and CBET. Trade can increase complementarity, improve availability of round-the-clock power and reduce cost in all of these countries, making it mutually beneficial. To this end, trading on electricity exchange platforms would be particularly beneficial, as they allow electricity transactions to take place at very little cost and provide clarity and transparency in transactions. Further, interconnecting the whole world through the "One Sun, One World, One Grid" initiative will accelerate the clean energy transition.

USAID recently initiated the South Asia Regional Energy Partnership (SAREP) programme, which can promote advanced technologies, create an enabling environment for private sector investment and strengthen utilities, specifically distribution companies, so that they can provide improved service. SAREP has launched a partnership fund to support innovative business models that promote clean and renewable energy. The cost and efficiency of technologies with respect to clean and renewable energy are advancing tremendously. By working together, the region can harness its resources, become more efficient, drive economic growth in each of its countries, and reduce environmental costs. ■