



# Collaborative Approach

Leveraging regional alliances for green energy growth

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**T**he urgent need to reduce greenhouse gas emissions has accelerated the adoption of clean energy worldwide, prompting nations to make renewable energy transition a major long-term goal.

South Asia, comprising Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka, possesses abundant resources that hold tremendous potential for rapid renewable energy transition. By tapping into these resources, South Asian countries can reduce their reliance on fossil fuels, mitigate climate change impacts, and drive sustainable economic growth. The region's growing energy demand and its commitment to achieving 100 per cent energy access also present a unique oppor-

tunity to prioritise renewables deployment. However, converting this potential into real gains requires South Asian countries to implement firm strategies, develop supportive policy frameworks, foster collaboration, and leverage innovative technologies.

## Current renewable energy capacity and potential of South Asian countries

Although all South Asian countries have significant renewable energy potential, they differ considerably in terms of the type of renewable resources, stage of development (technological and economic), commitments/targets and challenges.

Afghanistan's installed renewables capacity of over 350 MW is dominated by

hydropower, and the country depends heavily on imported electricity and fuel. Its vast untapped renewable energy potential (over 300 GW), which includes solar power (over 220 GW), wind power (over 65 GW) and hydropower (over 20 GW), can provide clean and sustainable electricity, and spur economic growth. Afghanistan has set a target of installing 5 GW of renewables capacity and transitioning to a fully private sector-led industry by 2032.

Similarly, Bhutan, known for its commitment to environmental conservation, generates most of its energy from hydropower sources. Interestingly, while hydropower accounts for nearly 99 per cent of the total installed capacity (over 2,300 MW), it is not enough to fulfil the

country's energy needs throughout the year. Bhutan's mountainous terrain offers enormous wind and solar energy potential, estimated to be over 750 MW and 12 GW respectively. The country plans to add 300-400 MW of solar energy generation capacity by 2025-26.

Nepal, too, depends heavily on its installed hydropower capacity for its energy needs, and like Bhutan, its current installed hydropower capacity (of over 2,200 MW) is also insufficient to meet the country's energy requirement. Having an estimated hydropower potential of 50 GW and immense untapped solar, wind and biomass energy potential, Nepal plans to increase its renewables capacity to 15 GW by 2030.

Meanwhile, Bangladesh's significant progress in renewable energy development is driven by solar power. With an installed capacity of over 1,000 MW, the country aims to generate 40 per cent of its power from renewable energy by 2041. The country's combined solar and wind power potential is over 300 GW, providing an opportunity to go well beyond its target.

Then we have India, which has demonstrated a strong commitment to renewable energy development through its ambitious targets such as the installation of 500 GW of renewables capacity by 2030. The country boasts an impressive installed renewables capacity of over 165 GW, comprising solar, wind, hydropower (large and small) and biomass. According to the REN21 Renewables 2022 Global Status Report, India stands fourth in terms of installed capacity (including large hydro), as well as solar and wind power capacity.

Moving on, there is Pakistan, which has made significant strides in renewable energy over the years. Its installed capacity of over 13 GW includes 10 GW of hydropower and over 2 GW of solar and wind power. The country has an estimated potential of over 100 GW of solar, wind and

hydropower capacity, and aims to meet 60 per cent of its energy needs through renewable energy sources by 2030.

The archipelago nation of Maldives faces unique energy challenges due to its heavy dependence on imported fossil fuels. However, it does have abundant renewable sources such as sun, wind and ocean that it could harness. Maldives has set ambitious renewable energy targets and aims to achieve its net zero target by 2030. The country also aims to fulfil 70 per cent of its power requirement through renewables by 2030.

Finally, there is Sri Lanka, which has made commendable progress in adding more renewable capacity and reducing its reliance on fossil fuels. The nation's installed renewable energy capacity, mainly comprising wind, solar and hydro power, stands at approximately 3 GW. Sri Lanka plans to source 70 per cent of its electricity requirement from renewables by 2030, aiming to attain net zero by 2050.

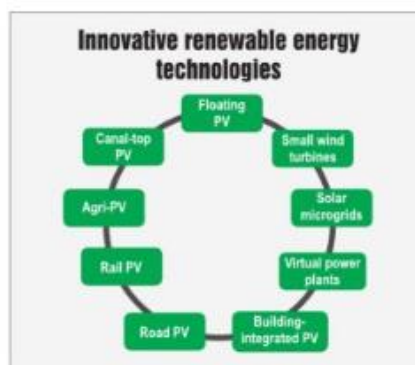
#### Country-specific measures to boost renewable energy deployment

For each South Asian nation, the steps for enhancing renewable energy utilisation would be determined by its diversity and uniqueness in harnessing renewables. For instance, through greater diversification of its renewables portfolio, Bhutan can reduce its dependency on electricity imports from India, while Bangladesh can enhance energy access and reduce greenhouse gas emissions by

embracing innovative applications, such as floating solar farms and small wind turbines along with rooftop solar, utility solar and large-scale wind power installations. Likewise, Nepal can harness renewable energy better, through both large-scale and distributed applications, owing to its favourable climate and vast mountainous landscape. India can become a global renewable energy powerhouse by promoting innovative technologies, deploying renewable energy applications at scale and further strengthening its regional collaborations. Given its favourable climate and vast renewable potential, Pakistan can enhance energy access, while reducing its dependence on imported fuel products by leveraging innovative applications such as floating solar farms, small wind turbines and off-grid solutions, along with large-scale solar, wind and hydro projects. For Maldives, the integration of energy storage and solar microgrids can enhance energy resilience. Meanwhile, Sri Lanka's island geography can enable it to tap into offshore wind energy, and explore ocean energy and small wind turbines, among others.

While these measures can help in harnessing an individual nation's renewable resources better, they may not be adequate to effectively address energy demand fluctuations and infrastructural challenges. This is especially true for smaller nations, whose financial and technical capabilities are relatively low. Bhutan's first mega power project, the 336 MW Chukha Hydropower Project, which was commissioned in 1987, is a prime example of the importance of regional collaboration. The project, which enhanced Bhutan's energy generation capacity significantly, was fully funded by India (with 60 per cent grant and 40 per cent loans).

Thus, working together can equip all nations in the region to effectively manage individual challenges and realise the full potential of their diverse renewable energy resources. Collaboration will also be crucial for making the region's rapid growth



sustainable by enabling renewable energy to drive it.

#### Coming together for a multiplier effect

With its huge renewable energy potential, South Asia has a crucial role to play in global sustainable development. Joint efforts to scale up renewable energy by countries will complement their strengths and amplify the region's renewable energy advantage. Such collaborative actions can include knowledge sharing, capacity building and research and development, regional grid integration, policy alignment and advocacy, cross-border renewable energy initiatives, and exploration of innovative applications and technologies.

Organising joint workshops, seminars and capacity building programmes, and establishing platforms for exchange of best practices and technical expertise can facilitate cross-learning. Collaborative research and development initiatives, such as joint research projects and innovation centres, can be instrumental in driving technological innovation in renewables and accelerating the adoption of advanced renewable energy technologies.

South Asian countries can also explore opportunities for regional grid integration to enhance energy security, optimise RE generation, and enable cross-border power trading. Collaborative initiatives like the South Asian Association for Regional Cooperation (SAARC) can play a pivotal role in nurturing regional energy cooperation. Harmonising rene-

wable energy policies and regulations in the region can create a conducive environment for investment and project development, while joint policy dialogues can help nations to identify common challenges and opportunities for developing a shared policy framework to promote renewables deployment. Collaboration can also amplify their voices in advocating for renewable energy on global platforms, where they can share success stories and influence international policies on renewables and climate change mitigation.

Jointly developing renewable energy projects can be another impactful way of leveraging the strengths and resources of South Asian nations. Many such initiatives are already bearing fruit. For instance, the India-Nepal initiatives have facilitated the commissioning of large-scale hydropower projects in Nepal. Similarly, Afghanistan and Pakistan are part of the Central Asia-South Asia Electricity Transmission and Trade Project (CASA-1000), which would allow the export of 1,300 MW of surplus hydropower from Kyrgyzstan and Tajikistan to Afghanistan and Pakistan. The project includes 1,387 km of transmission lines between the four countries and would greatly help Afghanistan and Pakistan in meeting their energy demand.

Further, synergistic efforts for establishing regional funding mechanisms, pooling resources and creating joint funds can provide affordable financing, especially to smaller countries with limited financial

capacity, thereby promoting renewable energy initiatives across the region.

Finally, to scale up renewable energy capacity, South Asia should embrace innovative technologies. While currently at extremely nascent stages in South Asia, these technologies offer enormous potential for additional renewable energy deployment.

#### Innovative renewable energy technologies

Floating solar PV can help in effectively utilising the vast water bodies in the region, thereby conserving land resources. Small wind turbines (< 50 kW) can be installed on rooftops, telecom towers, coastal areas, etc., and in rural areas where electricity supply is unreliable, while solar microgrids can be set up in remote and off-grid areas for clean and reliable electricity access. Virtual power plants (cloud-based power plants that aggregate generators, storage units, and electrical loads to work together as one entity) can be explored in conjunction with renewables. This would help in addressing power outages and network stability issues, making power grids reliable. In addition, the South Asian nations need to embrace technologies such as building-integrated PV, canal-top PV, road-integrated PV, rail PV, agri-PV and solar-powered transportation. If tapped well, these technologies can be a potential game changer for South Asia's renewable energy sector.

#### The bottom line

South Asia is one of the fastest growing regions of the world. As such, an effective renewable energy transition in the region can have a significant positive impact on global net-zero targets. But for this to happen, the South Asian countries must leverage their collective strengths to accelerate this transition and reinforce each other's growth, thereby creating a multiplier effect. Fostering collaboration through regional alliance, technology transfer and policy support would be key to enabling green energy growth, not only in the region but also across the world. ■

