Energy Transition Roadmap with a Focus on Indian States

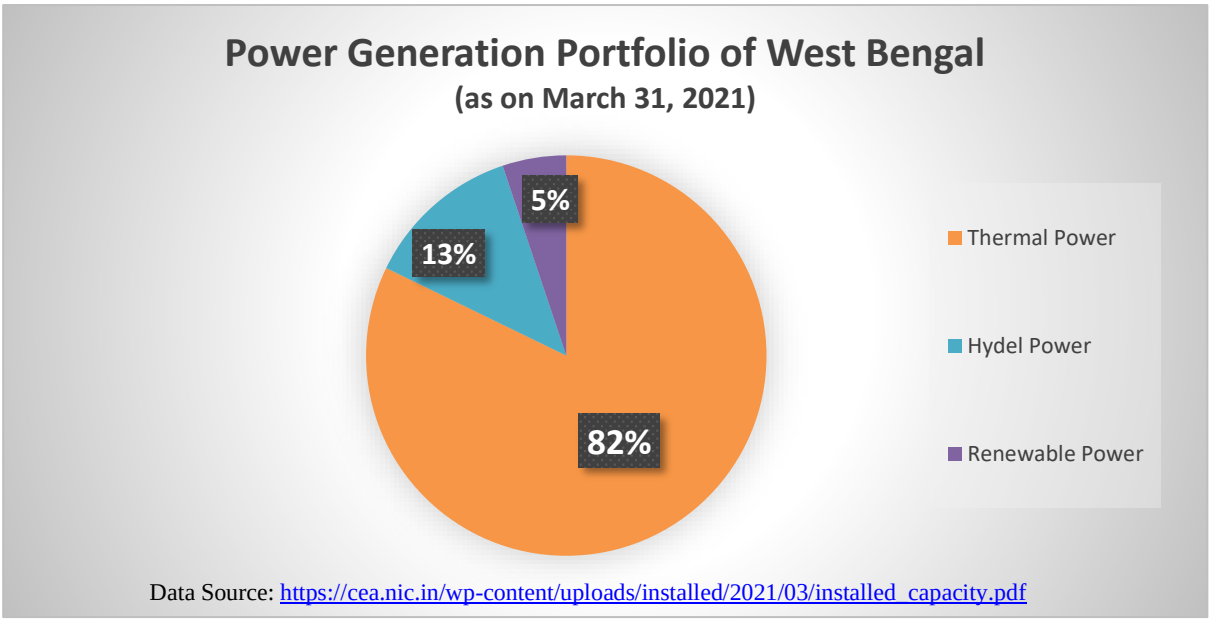
West Bengal and Rajasthan

CUTS International

West Bengal

Lying on the easternmost part of the Indo-Gangetic plains, West Bengal forms the primary business and financial hub of Eastern India. It is the 4th largest in terms of population and the 10th largest consumer of electricity, accounting for a significant percentage of the total energy consumption in India.[1]

The power sector in the state largely consists of the West Bengal State Electricity Board (WBSEB), which later split into distribution and a transmission company post-2005. Apart from these, there are multiple distribution utilities, some privately owned and some by the Central and state governments. Of the total installed power generation capacity of 11036.88 MW- thermal power contributed 9072.62 MW, hydel power 1396 MW, and renewable energy 568.26 MW (as per March 2021).[2]



Data Source: https://cea.nic.in/wp-content/uploads/installed/2021/03/installed_capacity.pdf

1 https://powermin.gov.in/sites/default/files/uploads/joint_initiative_of_govt_of_india_and_West_Bengol.pdf
2 https://cea.nic.in/wp-content/uploads/installed/2021/03/installed_capacity.pdf

While the state has achieved a significant level of electrification, with the increasing economic growth in this region, the peak demand for energy will rise rapidly in the coming years. Thus, to prevent any shortfalls, the state government has been trying to push renewable energy generation to decrease the reliance on coal and other fossil fuels while catering to the increasing power demand.

Coal Crisis and its Threat to Energy Security

The coal industry formed the bedrock of the Industrial Revolution in England in the 18th century as all the technological breakthroughs used coal as fuel energy. While coal was abundant in West Bengal, especially in the Bardhhaman and Birbhum districts, it was through the British that we finally learned to recognise and exploit the commercial potential of coal.

The Raniganj Coal Belt has been one of the oldest coal mines in the country. Over the centuries, energy from coal has helped satisfy our needs. Still, with the rapid economic development in the recent decades, it has been insufficient to cater to our growing demands for more and more energy.

This has been primarily fuelled by the growing disparity between the amount of coal being mined and the amount that reaches the thermal power plants for energy generation resulting in a recurrent problem of coal shortage. This disparity is triggered by several factors, such as variability in the international price of coal, the adverse impact of monsoon on mining and transportation of coal, and the ability of power generation companies to pay an upfront cost for the coal being procured.[3]

Apart from these, the Central Government has been discouraging coal imports instead, pushing thermal power plants to meet their demands with domestic coal resulting in power shortages and price shocks in the energy sector. Certain mines face logistics issues with poor road infrastructure and connectivity. This coupled with the absence of a concrete action plan for the abandoned mines and environmental and health hazards experienced by the local community, has created a negative connotation around the mines.

Additionally, the experience of local communities in areas like the Asansol-Raniganj mining belt of the Paschim Bardhaman district of West Bengal in terms of availing the compensatory packages has not been conducive. This has created a general lack of trust regarding government projects of a similar scale amongst the local people.

[3] https://india.mongabay.com/2021/10/indias-coal-shortage-could-set-stage-for-overhaul-of-laws/

The Deocha Pachami coal block, the largest in Asia spread across 12.31 square kilometres with an estimated reserve of 2,102 million tonnes, was allocated to West Bengal a few years back. It is expected to draw investment to Rs 12,000 crore and create employment for 1 Lakh people[4]. This region housed several legal and illegal stone quarries and crusher units earlier. On the one hand, the upcoming mining project implies job creation. At the same time, on the other, the health hazards already faced by the local communities due to stone crusher units will only intensify. Moreover, the infertile land with depleting groundwater levels could only support a single crop cycle throughout the year.

Though the state government has created a compensation package of Rs 10,000 crore for those who would get affected due to the project, without proper and updated land records, people are likely to be deprived of such compensation and rehabilitation benefits. With the Deocha Pachami mine project, thus the local people feel that situation will only worsen over time.

Initiatives to Promote Renewable Energy

The potential of the renewable energy sector is being explored increasingly in light of these coal shortages threatening the objective of the West Bengal state government. It aims to achieve 100 percent electrification, provide 24x7 access to reliable and affordable energy to its consumers, and pursue a greener and cleaner developmental path.

With the projected peak demand estimated to be approximately 14,730MW by 2031,[5] several efforts are being made towards increasing the capacity of this sector in the state to ensure an uninterrupted supply of energy and minimise the reliance on conventional energy sources.

In this context, West Bengal Renewable Energy Development Agency (WBREDA), formed in 1993, has implemented much solar energy, wind energy, mini & micro-hydro, and bio-energy programs to ensure energy security in the state. It also provides support for research in Renewable Energy & climate change. They also assist the state government, *panchayats*, municipal bodies, and NGOs to improve energy efficiency by raising public awareness through publication, exhibition, display, demonstration, and training programmes.

Additionally, the West Bengal Green Energy Development Corporation Limited (WBGEDCL) was started as a joint venture between three entities- the West Bengal Power Development Corporation Limited (WBPDCL), West Bengal State Electricity Distribution

[4] https://thewire.in/rights/tribal-agitation-bengal-mining-deocha-pachami-mamata
[5] https://wb.gov.in/business-solar-power-industry.aspx

Company Limited (WBSEDCL), and West Bengal Renewable Energy Development Agency (WBREDA).

Its main objective is to encourage private investment in the state's green energy initiatives by promoting public-private partnerships in grid-connected renewable energy-based power projects. Since 2009-10, the WBGEDCL has been solely responsible for installing and successfully operating several solar power plants in the state. It also assists developers in availing various incentives for implementing renewable energy projects.

Since West Bengal receives an average of 300 sunny days in a year, which, if harnessed correctly, can generate sufficient solar energy to electrify the entire state provided the other prerequisites such as land requirements are met.

One of the first grid-connected solar PV projects in West Bengal was installed in Jamuria near Asansol with a capacity of 1.1MW in 2009-10[6]. Since then, several solar power stations with rooftop-mounted and floating solar PV installations have been set up at Sagardighi (10MW), Bakreswar (2.866MWp), Kolaghat (2.27MW), Bandel (1.08MWp), and Santaldih (0.807MWp)[7].

Additionally, in a bid to facilitate the transition towards greener and cleaner sources of energy generation and especially promote the use of solar energy, in January 2021, the state government made allowances for net metering for rooftop solar panels in individual households, starting from 1 KW.[8]

This will ensure that any surplus energy generated by these households will be exported to interconnected grids, thus helping them earn revenue for the same and compensating for any power shortage by importing energy through the grid.

Apart from solar energy, the state also has a wind power potential of 450MW, excluding off-shore potential. In this context, it is notable that the WBREDA has been operating a wind farm project at Freserganj, South 24 Parganas, since 2001. Initially, the project started with 4 X 250 kW wind electric generators in the first phase, which was then augmented progressively in subsequent phases.[9]

However, due to the existing implementational challenges, the wind energy projects in the state have not been very successful.

6 https://www.wbgedcl.in/projects/
7 https://wbpdcl.co.in/irj/go/km/docs/documents/PDCL/FINAL/Pages/solar-project.html
8 https://economictimes.indiatimes.com/industry/energy/power/bengal-paves-way-for-viable-rooftop-solar-energy-with-net-metering/articleshow/80299583.cms?from=mdr
9 https://wbpower.gov.in/by-wbreda/

Another notable entry that deserves mention, in this case, is Biomass energy, especially with WBREDA running three Biomass Gasifier Power Plants at Gosaba (500 kW), Chotto Mollakhali (500 kW), and Gopalpur (400 kW).[10]

In 2010, it was reported that West Bengal had a biomass potential of about 350MW, of which only 80MW had been installed.[11] These plants are equipped with dual fuel type gasifiers, and currently, the state government is renovating and modernizing them so that they too can feed into the grid.

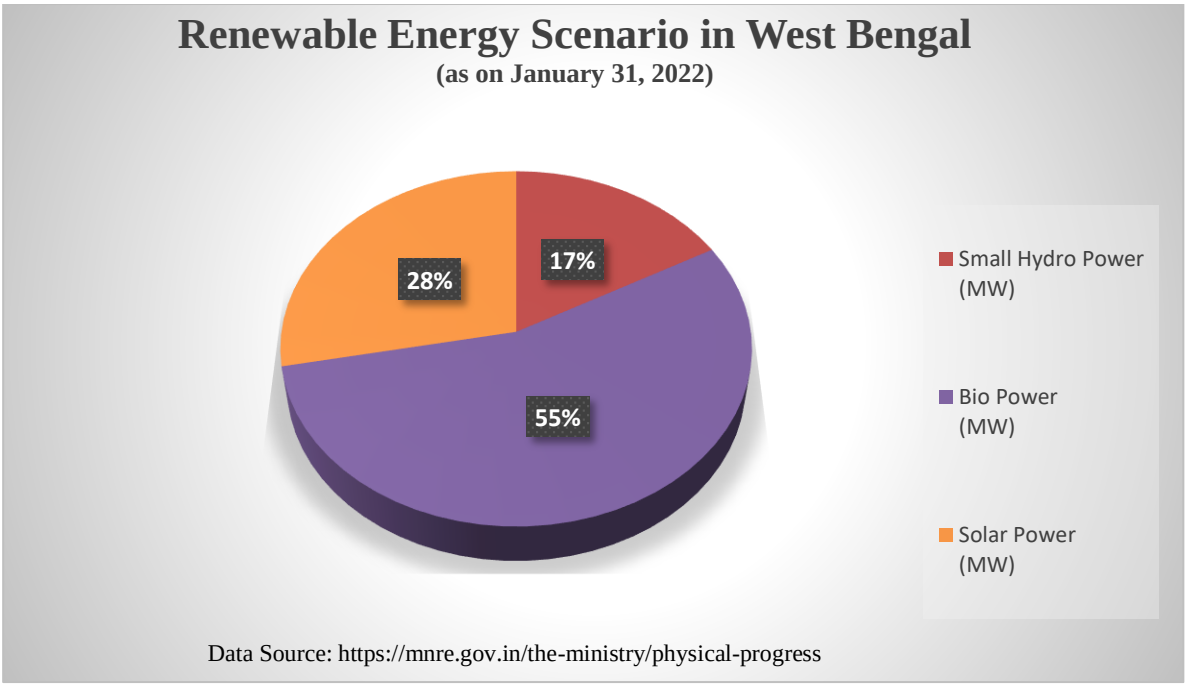
The state of West Bengal, especially the remote hilly northern parts, heavily depends on **decentralised Small, Mini, and Micro-Hydro Power** generation facilities (mostly run off the river schemes). Though these projects require a high initial investment, their operational costs are much lower than thermal power plants. Moreover, in the remote hilly locations where it is challenging to establish conventional forms of generation, such decentralised models are best fitted.

Setting up such infrastructure in remote locations also helps develop the local communities and healthcare, road infrastructure, and general area. However, the main challenge with these plants is that they are dependent on running water, making it difficult for them to cater to peak load during the lean periods. This often hampers operations and plant maintenance. Also, land acquisition in these locations is often subject to socio-political challenges.

While major efforts have been made over the years to improve the power generation performance of renewable energy, it is not adequate. In addition to the initiatives mentioned above, the government needs to strengthen the capacities of the nodal state institutions.

These include the West Bengal Renewable Energy Development Agency (WBREDA) and West Bengal Green Energy Development Corporation Limited (WBGEDCL). The onus of formulating and implementing plans related to renewable energy primarily rests on them. They could also provide financial incentives in soft loans and rebates to encourage grid-connected users to meet renewable energy targets. Lastly, for the continued operation of these initiatives, capacity building is crucial.

[10] http://www.wbreda.org/bio-energy-programme/
[11] https://www.energy-proceedings.org/wp-content/uploads/2020/03/1036_Paper_0714104635.pdf



Conflicts with Local Communities

An operational Pumped Storage Project, a viable solution to the energy storage crisis, exists in the Purulia district of West Bengal. An engineering marvel itself, this project maintains grid stability. It has also created employment opportunities for the local people directly and indirectly by promoting Purulia as a travel destination, thereby making tourist, transport, and hospitality sectors flourish.

However, with the deforestation caused by this project coupled with the faulty compensatory packages offered to the local communities, conservationists and local community people have criticised and opposed it. It has also disturbed the ecological balance of this region, which will only be exacerbated with the similar projects in the pipeline,

Modernisation and Life Extension of Existing Power Plants

Another factor that can help supplement the efforts made by the state governments to ensure an uninterrupted supply of energy is modernisation and expansion of old, decommissioned thermal power plants that are making losses. The bulk of the thermal power plants in West Bengal was established in the late 1980s, and since then, they have seldom been upgraded. As a result, they perform sub-optimally, generating much lower outputs than the inputs consumed.

In this regard, the WBPDCL has been taking measures to upgrade the thermal power stations at Kolaghat, Sagardighi, Santaldih, Bandel, and Bakreswar in a phased manner[12] to increase their generation efficiency and to ensure they are following the existing environmental norms. Also, actions plans are being chalked out by the state government to utilise the vacant land of the old decommissioned thermal units, focusing on employment generation and renewable energy project installations.

Conclusion

While renewable energy is growing at an impressive rate, coal remains the mainstay for power generation in the state. It may take another decade before this *status quo* is amended. Until then, renewables can supplement rather than substitute the more dominant conventional fossil fuels.

The lack of easy availability of renewable resources due to resource constraints such as land, lack of employment-generating opportunities remains the main hindrances in the growth of alternative energy generation in this state. Due to the geographic and climatic conditions, solar penetration will not be as high as in Western states.

While thorough planning is needed to create new opportunities in other sectors of the state economy, it can also be explored if the solar module manufacturing units could be established in coal-rich states. Also, less expensive small-mini-micro hydropower projects aimed to cater to remote hilly areas should be given weightage in this much-envisaged transition.

To address the environmental concerns of coal-based power generation, the government has promoted modern technology and incentivized the same. However, the lack of indigenous technology is a serious impediment, increasing financial investment requirements.

Due to its strategic position, West Bengal needs to be more proactive in embracing the shift from conventional to alternative source-based energy generation. It is the gateway to northeast India and far east countries, and it also serves as a business and financial hub for the entire eastern region. This state has multiple international borders, and hence with the increasing reliance on renewable energy programmes, possibilities for cross-border energy collaborations and a regional grid can be explored.

West Bengal undoubtedly exhibits a definite possibility to create an enabling ecosystem for a regional energy regime with an underlying objective of achieving more extensive economic pursuits. Like the existing and upcoming pumped storage projects in Purulia,

[12] https://wbpdcl.co.in/irj/go/km/docs/documents/PDCL/FINAL/Pages/project.html

engineering marvels stand as a unique solution to the energy storage challenge if the local context is given due weightage. With the present potential, technology availability, and geopolitical importance, the state of Bengal can achieve a greater height through relevant and inclusive policy interventions, private party engagement, and knowledge collaborations.

However, it is needless to say that the stake of local people, ecology and employment creation should be factored in a while preparing the action plan, whether it is the new coal mining, pumped storage, hydropower, or solar projects.

Rajasthan

Located in the north-westernmost part of the country, Rajasthan's power sector has undergone quite a few remarkable changes in the last decade in terms of infrastructure improvements, increase in generational capacity, and a shift towards renewable and low-carbon sources of energy. However, it continues to face difficulties owing to disparities between demand and supply of energy as distribution companies are unable to cater to the growing energy demands of the entire state.

The state continues to depend on peak load power plants, typically gas-based or diesel-based–close to load centers for meeting its deficit, peak, and uncertain seasonal demand increase.[13]

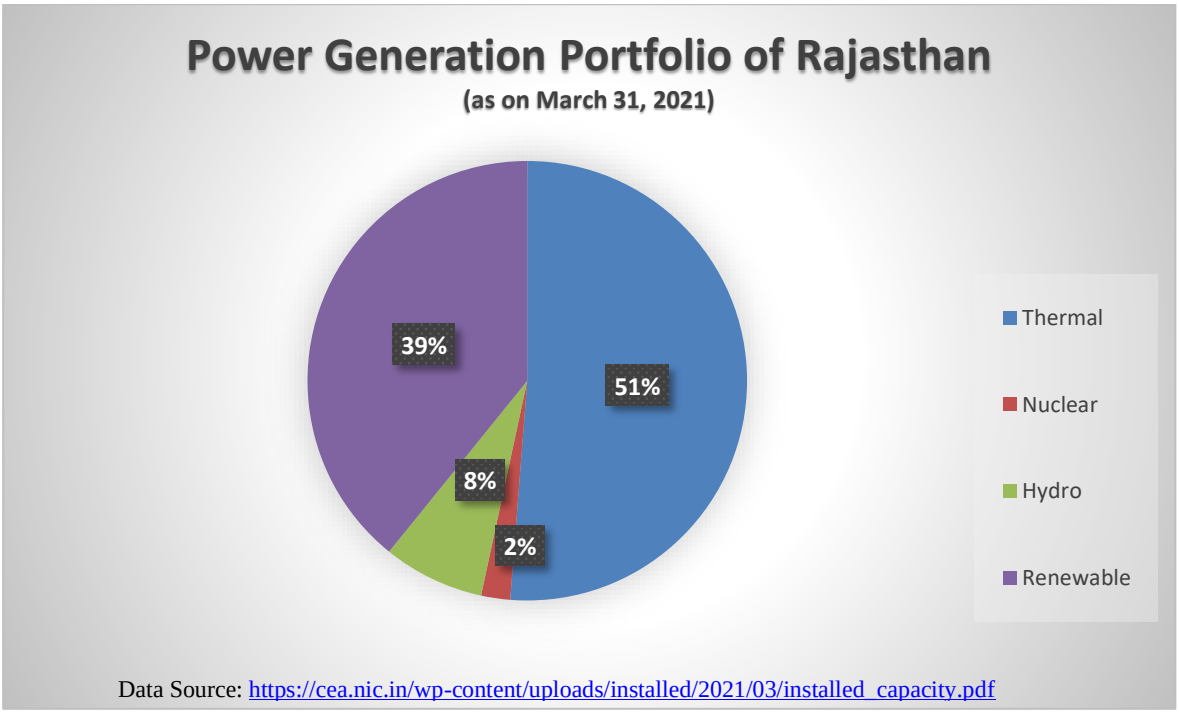
Since the late 1950s, Rajasthan Vidhyut Utpadan Nigam Limited (RSEB) has been the state's nodal agency responsible for energy generation, transmission, and distribution. However, post-July 2000, the RSEB underwent a structural transformation and was reorganised into five separate entities, each with a specific role in the power sector.

While Rajasthan Vidhyut Utpadan Nigam Limited (RVUNL) became responsible for energy generation, Rajasthan Rajya Vidyut Prasaran Nigam Limited (RVPN) was responsible for its transmission. The remaining three entities were region-based companies that oversaw energy distribution in the state. These were Jaipur Vidyut Vitran Nigam Limited (JVVNL), Jodhpur Vidyut Vitran Nigam Limited (JdVVNL), and Ajmer Vidyut Vitran Nigam Limited (AVVNL).[14]

[13] Sharma, K. G., Bhakar, R., & Mathuria, P. (2021). Energy Portfolio Optimisation for the State of Rajasthan. 2021 1st Odisha International Conference on Electrical Power Engineering, Communication and Computing Technology (ODICON). doi:10.1109/odicon50556.2021.942

[14] https://www.rajras.in/rajasthan/economy/infrastructure/power/

Now coming to the total installed capacity of Rajasthan, as of March 2021, out of the entire 26 GW- thermal power contributed 13.34 GW (51 percent), hydropower 1.9 GW (8 percent), nuclear power 0.5 GW (2 percent), and the rest by renewable energy sources which was about 10.2 GW (39 percent). While the state has been a leader in renewable energy generation, serving as a model to other states, coal still serves as the dominant fuel for power generation in the state. It may take another decade before Rajasthan can successfully transform its power sector into a low-carbon, low-cost, modern renewable energy-based system.



Data Source: https://cea.nic.in/wp-content/uploads/installed/2021/03/installed_capacity.pdf

Coal Crisis and its Threat to Energy Security

Since 2021, Rajasthan has been facing a coal crisis as two of the three coal mines commissioned to the state in Chhattisgarh are yet to become operational despite their allotment back in 2015. Concerned by the State of Affairs, Rajasthan's Chief Minister Ashok Gehlot wrote to Chhattisgarh's Chief Minister Bhupesh Baghel in October 2020. He requested him to expedite the process of obtaining the required clearances so that the coal can be procured at once for the thermal power plants installed in the state.[15]

But since these clearances were not obtained due to indigenous tribes opposing development in the area, the mines were not operational. This resulted in a coal crisis which had negative consequences for energy security in Rajasthan, resulting in power shortfalls and price shocks in the energy sector.

[15] https://www.opindia.com/2021/12/rajasthan-wants-centers-help-in-getting-coal-from-chhattisgarh/

The state has appealed to the Central Government to intervene and discontinued its power supply to Punjab and Uttar Pradesh in September 2021[16] to overcome this ensuing power shortage.

The coal crisis was further intensified by the monsoons that inundated the mines and the inability of the Rajasthan Vidhyut Utpadan Nigam Limited (RVUNL) to clear all outstanding payments for the procured coal. A few thermal power plants even had to be shut down due to this crisis as the state purchased electricity to mitigate some of the peak demand for electricity.

Initiatives to Promote Renewable Energy

Owing to the coal shortage and the resultant disruptions in power supply, Rajasthan has had to rely on energy imported from other states to meet the power deficiency during peak daytime hours. Thus, Rajasthan's state government has always looked towards increasing its reliance on renewable energy to supplement the dominant conventional sources of energy and provide a reliable and competitive electricity supply to its consumers.

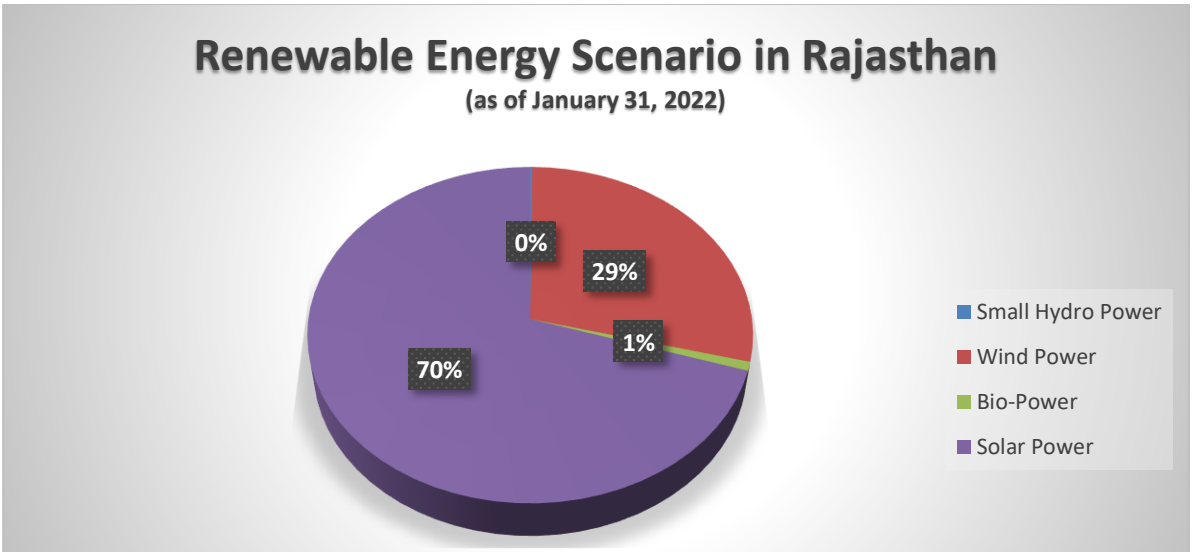
Additionally, high thermal tariffs and aggregate technical and commercial losses (AT&C) also put immense pressure on the state-owned energy distribution agencies, thus adding to the need of the state government to push for non-conventional sources of energy.

In August 2002, Rajasthan Energy Development Agency (REDA) and Rajasthan State Power Corporation Limited (RSPCL) merged to form the Rajasthan Renewable Energy Corporation Limited (RRECL),[17] which is the nodal agency at the helm of clean and sustainable energy generation in the state.

It is also responsible for assisting the state government, panchayats, municipal bodies, and NGOs to improve energy efficiency by raising public awareness through publication, exhibition, display, demonstration, and training programmes.

Owing to the proactive measures of the RRECL, as of January 2022, Rajasthan had an installed capacity of 14.9 GW of renewable capacity, out of which 10.5 GW belongs to solar (70 percent), 4.3 GW to wind capacity (29 percent), 0.02 GW of small run-of-river hydro, and 0.1 GW to biomass generation capacity (1 percent).[18]

16 https://www.hindustantimes.com/cities/jaipur-news/amid-coal-crisis-rajasthan-discontinues-supply-to-up-reduces-to-punjab-101631252700176.html
17 https://energy.rajasthan.gov.in/content/raj/energy-department/rrecl/en/home.html#
18 https://ieefa.org/wp-content/uploads/2020/09/Transforming-Rajasthans-Electricity-Sector_September-2020.pdf



Data Source: https://mnre.gov.in/the-ministry/physical-progress

Apart from this, Rajasthan holds immense potential **for solar** energy generation, especially since it hosts a desert of approximately 102,000 square kilometers (3 percent of India's total landmass). It also has high solar irradiance, wind speeds, and abundant barren land to deploy many solar and wind power projects**.** All these possibilities, if capitalised adequately, could make Rajasthan one of the biggest contributors to India's target of achieving 450 GW of renewable energy by 2030.

In this context, the RRECL, through its subsidiary Rajasthan Solar Park Development Company Limited, helmed the development of the Bhadla Solar Park in Rajasthan. It is the world's largest solar park to date, covering more than 14,000 acres of land and having an operational capacity of approximately 2245 MW.

Coming to wind energy, India's National Institute of Wind Energy estimates Rajasthan's wind power potential to be 18.7GW,[19] but it has not been fully exploited to its maximum potential. RRECL's records suggest that no wind energy projects have been commissioned in the state since 2018, indicating a lack of growth in wind energy capacity. Rajasthan's new wind and hybrid energy policy have set a target for adding 4 GW of additional wind and hybrid energy wind power capacity by 2025.

One major constraint in commissioning wind projects is land acquisition. Setting up of wind-solar parks in ecologically sensitive areas and installing associated power transmission lines are found to have a significant impact on the lives and natural habitat of flora and fauna of the region, which has been discussed in detail in the next section.

[19] https://niwe.res.in/department_wra_100m%20agl.php

Another notable entry that deserves mention in this context is Rajasthan's **Gas-fired** capacity which was reported to be 1 GW in 2020. Out of that, RUVNL owns 0.6GW of gas-fired capacity with combined cycle gas-fired powerplants (CCPP)- Dholpur CCPP (330MW) and Ramgarh CCPP (273MW) while National Thermal Power Corporation (NTPC) owns 0.4GW of Anta CCP.

While the state government has made notable efforts to strengthen the performance of renewable energy in the power sector, it is yet to exploit the state's full potential in this regard. In addition to the initiatives above, the state government needs to strengthen the capacities of the nodal state institution – Rajasthan Renewable Energy Corporation Limited (RRECL) as the onus of formulating and executing plans related to renewable energy rests on them.

Apart from this, they could set ambitious targets to put more significant pressure on the renewable energy sector and accelerate Rajasthan's transition from an energy importer to an energy exporter. Lastly, for the continued operation of these initiatives, capacity building is crucial.

Conflicts with People and Wildlife

Despite its immense resource potential in terms of solar and wind energy generation- Rajasthan, with its arid climate, is home to the critically endangered Great Indian Bustard (GIB). Standing at about 4 feet tall and weighing about 15 kgs, the GIB is among the heaviest flying birds in the world. Besides that, the bird has a poor frontal vision.[20]

Owing to this, the bird is at a fatal risk of collision from overhead electricity transmission lines. While the threat of imminent extinction looms large over this bird, the Wildlife Institute of India (WII) classifies power lines that criss-cross its last remaining core habitats as the "biggest threat to the species."

The GIB's migratory flight path goes through north Gujarat and western Rajasthan- both crucial for solar power projects as they receive over 300 days of direct sunlight every year. Also, the GIB is a 'keystone species' of the grasslands which means that its extinction will have severe consequences for the fragile ecological balance of its habitat.[21]

Given this context, several wildlife conservationists filed a petition against the renewable energy projects that had applied for transmission licenses encroaching the GIB's potential habitat.

[20] https://theswaddle.com/to-save-the-great-indian-bustard-remove-overhead-power-cables-sc-says/
[21] https://theprint.in/environment/from-1260-to-150-why-power-transmission-lines-are-biggest-threat-to-great-indian-bustard/783286/

In February 2020, the Supreme Court ruled in their favour, ordering transmission lines in Rajasthan's Jaisalmer district and surrounding areas to go underground. While a complete revamp to underground cables may not be feasible for all the projects owing to technical challenges that different locations may pose. Meanwhile, the court has directed the installation of 'bird diverters' on all power lines to prevent any further collisions.

Apart from the GIB, the solar energy installations in the uncultivable deserts of Jaisalmer have proven to be fatal to the camels inhabiting the region. There have been cases where camels have bled to death after being cut by sharp-edged angles installed to erect solar panels in the desert while searching for food.[22]

Also, the solar energy companies have fixed the height of the high-tension overhead wires at 20 feet. In comparison, the camel and the rider's height is approximately 13 feet, which is extremely risky considering a mere distance of 7 feet between the wires and the rider.[23]

On the one hand, the SC's ruling is favourable to protect a large bird already on the brink of extinction from hunting and habitat loss, as well as camels and camel-breeders. It also presents a rare case of inclusive and accommodating development projects towards the surrounding flora and fauna and their livelihood. The ruling also highlights the need to find ways to preserve the biodiversity of a region and protect the livelihood of the people inhabiting it to ensure overall sustainability.

Modernisation and Life Extension of Existing Power Plants

A factor that can help supplement the efforts made by the state governments to ensure a reliable supply of low-cost energy is refurbishment and expansion of old, decommissioned thermal and wind energy power plants that are making losses. The bulk of the thermal power plants in Rajasthan was established in the late 1990s and since then, they have not been upgraded. Also, more than 60 percent of Rajasthan's wind capacity was built before 2010. Since then, wind power technology has made several advancements that were not incorporated into the designs of these older plants.

Repowering old wind capacity would allow the state to optimize its wind power resources and produce more energy to support the rapid economic development going on in the state. For Rajasthan, replacing near end-of-life 200-500kW turbines with higher towers and newer models with the latest 2-3 MW technology will allow for a tenfold increase in wind capacity and potentially a twentyfold increase in generation.

[22] https://timesofindia.indiatimes.com/city/jaipur/solar-power-surge-in-desert-threatening-lives-of-camels/articleshow/84126539.cms

[23] https://scroll.in/article/1002763/in-rajasthan-villagers-are-standing-up-to-green-energy-companies-to-protect-sacred-groves-and-birds

Thus, the modernisation of old power units is essential for improving their performance and compliance with stricter environmental norms. Additionally, the life-extension of these old power units is necessary to extend their operational capacity 15 to 20 years beyond the original design.

Conclusion

Rajasthan is the largest state in India and serves as a natural corridor between the wealthy northern and the prosperous western states, making it an important trade and commerce centre. It is a mineral-rich state with a diversified economy having agriculture, mining, and tourism as the key drivers of its growth. It is also the second-largest producer of crude oil in India, accounting for about 22.68 percent of its total domestic crude oil production in 2019. Thus, given its economic significance, the state must increase its reliance on renewable energy.

Besides that, the state has the highest resource potential for solar and wind energy generation in the country, owing to the Thar desert. It also has high solar irradiance, wind speeds, and abundant barren land to deploy many solar and wind power projects. All these possibilities, if capitalised adequately, could make Rajasthan one of the most significant contributors to India's target of achieving 500 GW of renewable energy by 2030.

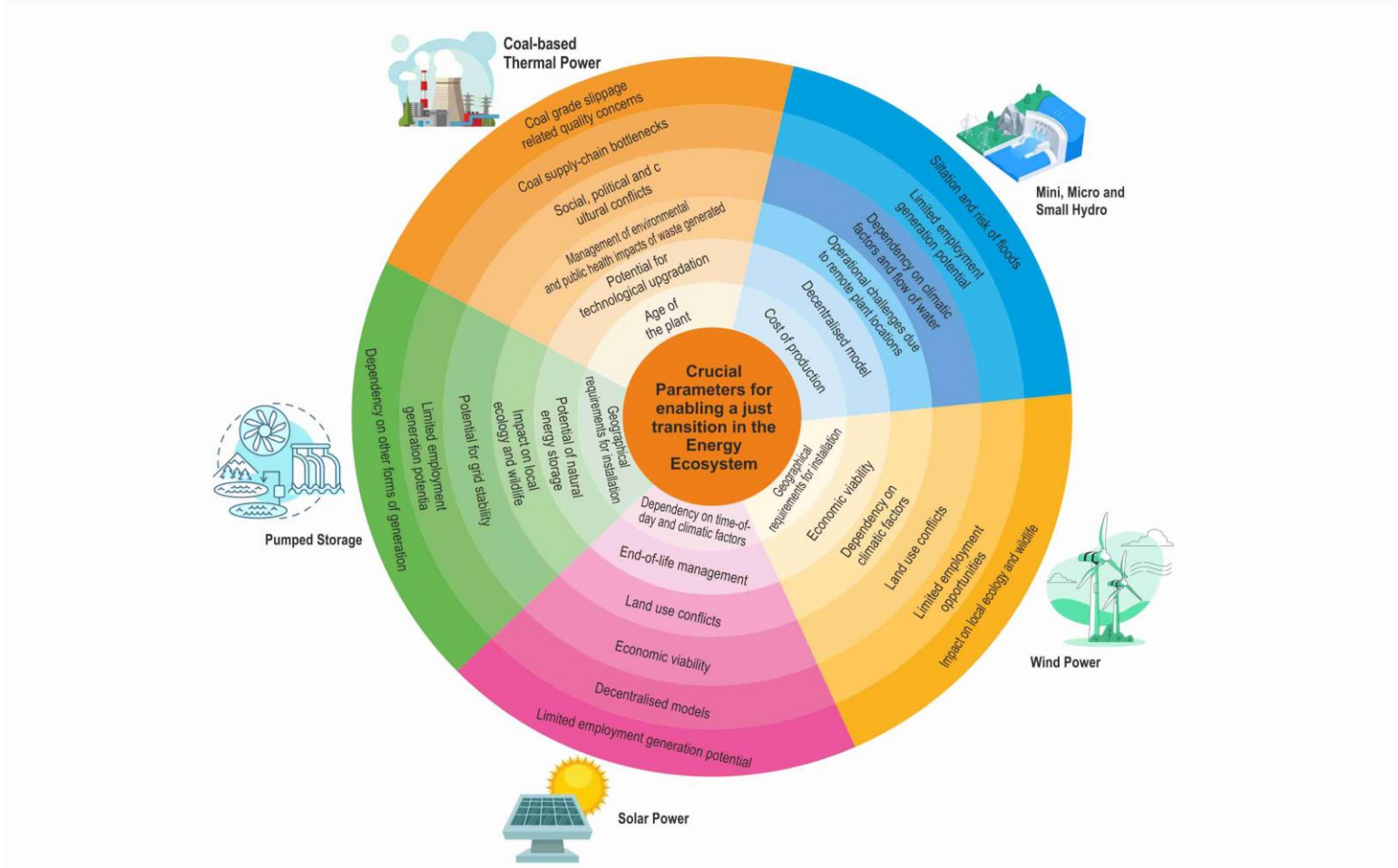
Also, Rajasthan has a rich historical and cultural heritage, making it one of India's top travel destinations. In 2019, the state recorded 53.82 million tourist arrivals,[24] higher than any other state in the country.

To promote this flourishing tourism and hospitality sector, a cleaner, greener, and secured energy regime is imperative for the state government. The sector can generate employment and revenue, which are indispensable to achieving more significant economic pursuits.

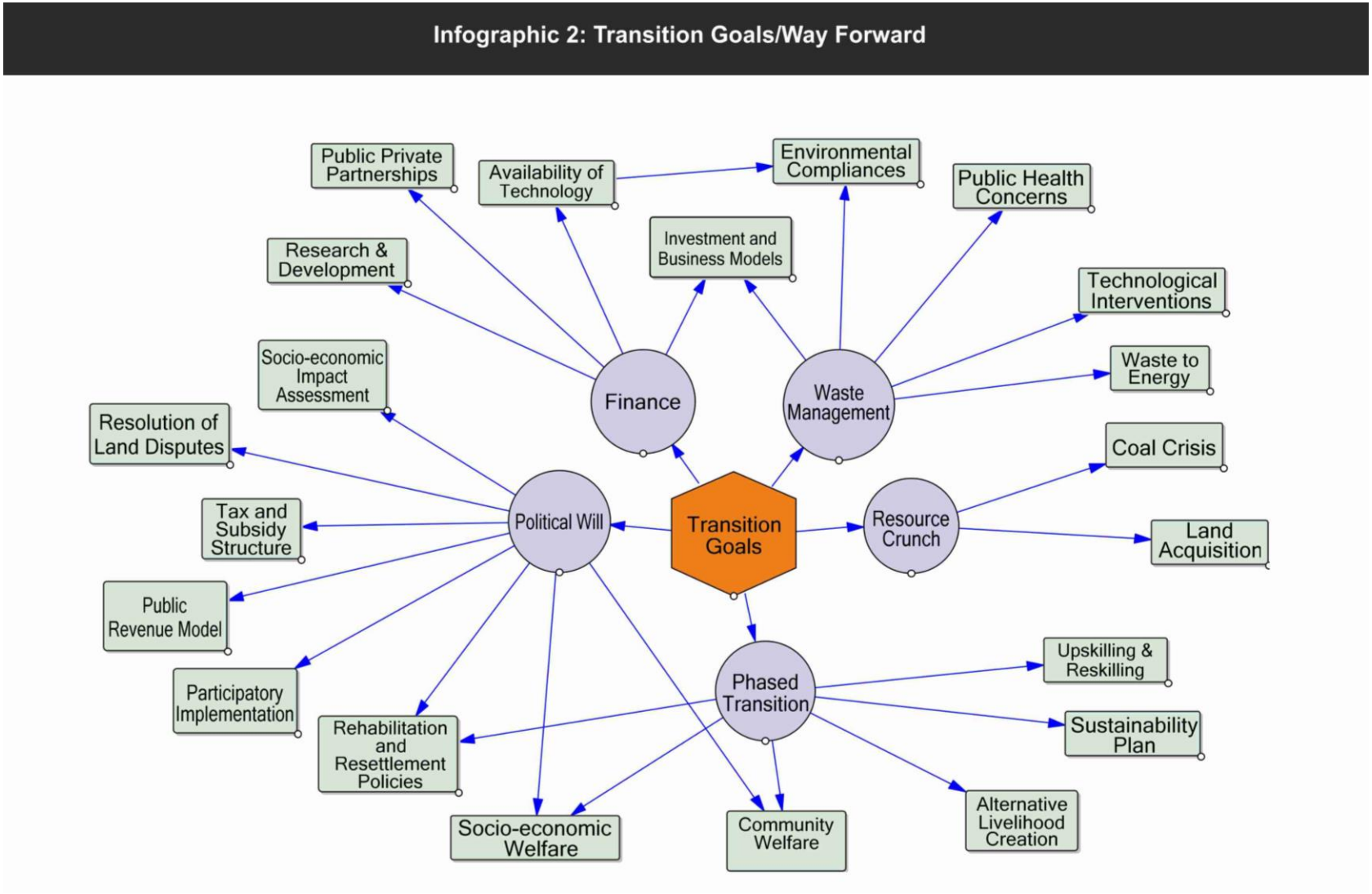
[24] https://www.ibef.org/download/Rajasthan-June-2021.pdf

Infographic 1: This infographic explores the key aspects of different forms of power generation in India that will need to be considered during a transition to clean energy. This infographic provides a comprehensive idea of the future energy mix and its social, economic, and environmental connotations.

Infographic 1: Crucial Parameters for enabling a just transition in the Energy Ecosystem (Innermost Layer)



Infographic 2: This infographic highlights the envisaged energy transition's critical goals and details the various factors associated with implementing each of these goals. It places transition goals at the core and links them with the related pillars and elements.



These infographics are based on insights gathered from field inquiries in Rajasthan and West Bengal under this project.