ODYSSEY 2K50

Energy planning Contest

Case study 1: TRIPURA

CAN IT BE CONSIDERED AS AN ENERGY STATE?

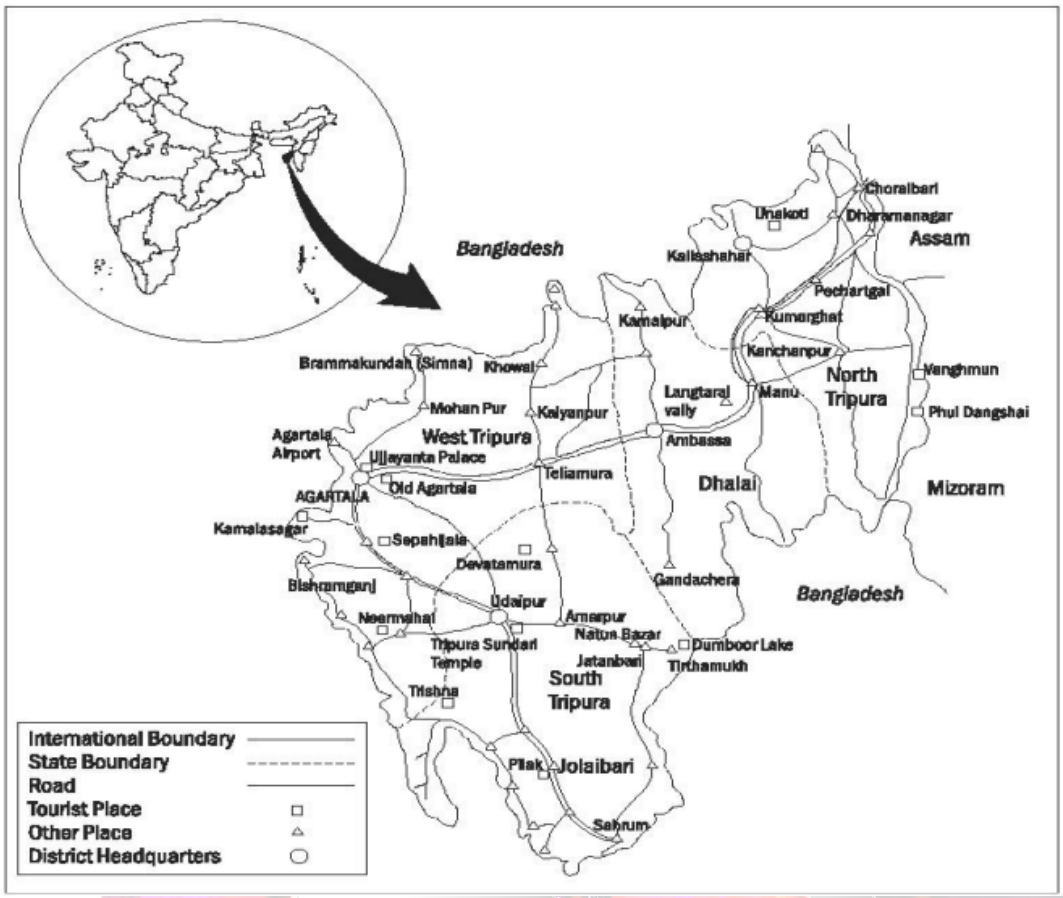
GEOGRAPHICAL LOCATION AND ADVANTAGES:

Tripura is the third smallest state in our country, behind Goa and Sikkim.
The total area of the state is 10,500 km2. Sixty percent of the total area of the state comprises hills and forests.
The former princely state of Tripura was ruled by the Maharajas of Manikya dynasty.
Tripura became a union territory without legislature with effect from November 1, 1956, and a ministry was formed in Tripura on July 1, 1963. On January 21, 1972, Tripura attained statehood.

- Thanks to its strategic geography, Tripura is seen as the Gateway to Southeast Asian economies. Bounded by Bangladesh on its south, west, and north, it also shares its borders with Assam and Mizoram.

- With Bangladesh being there on three sides of Tripura, export promotion and cross-border trade are important areas. Export promotion,particularly in Bangladesh, is another area of focus.

- The recent launch of trans-shipment operations in Chittagong, Bangladesh, aims to boost trade and facilitate the seamless movement of goods. India was for a long time seeking a transit and transshipment facility to carry goods to Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura from West Bengal through a shortened route via Bangladesh.



ENERGY DEMANDS OF TRIPURA:

- Tripura's energy sector mainly relies on thermal power plants and hydroelectric power plants. The state has a total installed power generation capacity of around 695 MW, out of which about 514 MW is from thermal power plants and 181 MW is from hydroelectric power plants.

- The power demand in Tripura has been increasing steadily over the years due to the growth in population and industrialization. According to a news article published in June 2021, Tripura's peak power demand was around 590 MW, and the state's power generation capacity was sufficient to meet the demand.

- However, like any other state, Tripura also faces occasional power shortages, and the state government is taking initiatives to increase power generation capacity and improve the distribution infrastructure to meet the growing demand.

SOURCES OF ENERGY IN TRIPURA:

Tripura generates power from various sources, including:

Natural Gas: Tripura has significant reserves of natural gas, and the state government has set up a number of gas-based power plants to generate electricity. The most prominent among them are the Palatana Power Plant, which has a capacity of 726.6 MW, and the Monarchak Power Plant, which has a capacity of 101 MW.

Solar Energy: Tripura has been promoting the use of solar energy for generating power and has set up a number of solar power plants in the state. Some of the prominent ones are the 5 MW solar power plant at Gandhigram, the 2 MW solar power plant at Rajnagar, and the 2 MW solar power plant at Bishalgarh.

Hydro Power: Tripura has several rivers and streams, which are a source of hydroelectric power. The state has a number of small and medium-sized hydropower plants with a combined capacity of around 40 MW. The most significant among them are the Rukni and Gumti hydropower plants.

Wind Energy: While not as prominent as other sources of energy, Tripura has some potential for generating power from wind energy. The state government has set up a 2 MW wind power plant at Dhalai and is exploring the potential for further development in this area.

Biomass: Tripura also generates power from biomass, using agricultural waste and other organic materials. The state has a number of small-scale biomass power plants with a combined capacity of around 5 MW.

Overall, Tripura has diversified sources of energy for generating power, with a mix of conventional and renewable sources.

FOREIGN INVESTMENTS IN TRIPURA:

Tripura is attracting foreign investments in various sectors, including infrastructure, tourism, and energy. Here are some examples of foreign investments in Tripura:

ONGC Tripura Power Company (OTPC): OTPC is a joint venture between the Oil and Natural Gas Corporation (ONGC) and the Tripura State Electricity Corporation Limited (TSECL). The company operates the Palatana gas-based thermal power plant, which has a capacity of 726.6 MW. The project was funded by a consortium of banks led by the Asian Development Bank (ADB).

National Buildings Construction Corporation (NBCC): NBCC is a public sector company that has undertaken several infrastructure projects in Tripura, including the construction of a new Secretariat building, a new Assembly building, and a new High Court building. The projects are being funded by the Government of India.

NEEPCO: The North Eastern Electric Power Corporation Limited (NEEPCO) is a public sector company that is involved in the generation and distribution of electricity in the northeastern region of India. NEEPCO has set up several hydroelectric power plants in Tripura, including the Rukhia and Kamalasagar hydroelectric power plants.

Tourism: Tripura is also attracting foreign tourists, and the state government is promoting tourism by developing infrastructure and promoting cultural and eco-tourism. The government has signed MoUs with several foreign countries, including Bangladesh, to promote crossborder tourism.

Overall, Tripura is attracting foreign investments in various sectors.

WHICH SOURCE OF ENERGY WOULD BE THE BEST TO PRODUCE POWER IN TRIPURA?

It is difficult to determine which source of energy is the best for producing power in Tripura, as each source has its own advantages and limitations. The choice of energy source depends on various factors such as availability, cost, environmental impact, and technology.

Natural gas is currently the most dominant source of energy for power generation in Tripura, as the state has significant reserves of natural gas.

Renewable energy sources such as solar, hydro, wind, and biomass also have potential for power generation in Tripura. The state has been promoting the use of solar energy and has set up several solar power plants. Hydro power also has potential, as the state has several rivers and streams. However, the development of hydro power plants may face environmental and social challenges.

Wind energy has not been fully explored in Tripura, but the government has set up a small wind power plant. Biomass energy can also be a good source of power, as Tripura has abundant agricultural waste and other organic materials.

Overall, a mix of energy sources, including natural gas and renewable sources, may be the best option for power generation in Tripura, as it would provide a balance between reliability, affordability, and sustainability.

FUTURE OF TRIPURA AS AN “ENERGY STATE”:

Tripura has great potential in the energy sector, particularly in the areas of renewable energy and natural gas. Here are some of the ways in which Tripura is expected to grow in the energy sector in the future:

Renewable energy: Tripura has already taken steps towards promoting renewable energy, particularly solar power. The state has set up a 5 MW solar power plant in the Dhalai district and a 2.5 MW solar power plant in the Sepahijala district. The government is also planning to set up more solar power projects in the state.

Natural gas: Tripura has large reserves of natural gas, and the state government is taking steps to exploit these reserves for power generation and other purposes. The Palatana gas-based thermal power plant, operated by ONGC Tripura Power Company (OTPC), is a major source of power in the state. In addition, the government is planning to set up a new gas-based power plant in the state.

Cross-border power trading: Tripura shares its borders with Bangladesh, and the state has the potential to export surplus power to Bangladesh. The government is exploring opportunities for crossborder power trading with Bangladesh and other neighboring countries.

Energy efficiency: The state government is also taking steps to promote energy efficiency in the state by encouraging the use of energy-efficient appliances and promoting energy conservation measures.

Overall, Tripura has a bright future in the energy sector, and the state government is taking steps to promote sustainable energy development and create a conducive business environment for investors.

Case study 2: ANDHRA PRADESH

BACKGROUND :

A state in the south-eastern coastal region of India. It is the seventh-largest state by area covering an area of 162,975 km2 (62,925 sq mi) and tenth-most-populous state, with 49,386,799 inhabitants. It has the second longest coastline in India after Gujarat, of about 974 km (605 mi). Andhra State was the first state to be formed on a linguistic basis in India on 1 October 1953. Amaravati serves as the capital of present Andhra with the largest city being Visakhapatnam.It is also known for being the land of Koh-i-Noor and other globally known diamonds from Kollur Mine It is also a major producer of rice known as the "Rice bowl of India". The final population of Andhra Pradesh in the year 2014, as per census 2011 is 49,634,314, with a density of 304.5/km2 (789/sq mi).

GEOGRAPHY:

The state has varied topography ranging from the hills of Eastern Ghats and Nallamala Hills to the shores of Bay of Bengal that support varied ecosystems .There are two main rivers namely, Krishna and Godavari, that flow through the state. The coastline of the state extends along the Bay of Bengal from Srikakulam to Nellore district with a length of 975 km (606 mi). The coastal plains are for the most part of delta regions formed by the Godavari, Krishna, and Penna rivers.The Eastern Ghats are a major dividing line in the state's geography.Most of the coastal plains are put to intense agricultural use. The Rayalaseema region has semi-arid conditions.The forest in the state can be broadly divided into four major biotic provinces. They are: 1. Deccan Plateau,

2.Central Plateau,

3.Eastern Highland,

4. East Coastal Plains.

CULTURE:

Andhra Pradesh has rich culture and heritage.Kuchipudi, the cultural dance recognized as the official dance. originated in the village of Kuchipudi in Krishna district. .The other GI tagged goods are, Bobbili Veena, Budithi Bell and Brass Craft, Dharmavaram Handloom Pattu Sarees and Paavadas, Guntur Sannam, Kondapalli Toys, Machilipatnam Kalamkari, Mangalagiri Sarees and Fabrics, Srikalahasti Kalamkari, Tirupati Laddu, Uppada Jamdani Sari and Venkatagiri Sari.Machilipatnam and Srikalahasti Kalamkari are the two unique textile art forms practised in India. There are also other notable handicrafts present in the state, like the soft limestone idol carvings of Durgi. Etikoppaka in Visakhapatnam district is notable for its lac industry, producing lacquered wooden.Telugu is the official language of Andhra Pradesh,The majority of the people in Andhra Pradesh are Hindus while Muslims constitute a sizeable minority. The print media in the state consists mainly of Telugu and English newspapers. Eenadu, Sakshi, Andhra Jyothi, and Tel.J.D.Patrika Vaartha all these are Telugu newspapers. English newspapers include Deccan Chronicle and The Hans India.Telugu people's traditional sweet Pootharekulu originated from Atreyapuram village of East Godavari district.The state has several beaches in its coastal districts such as Rushikonda, Mypadu, Suryalanka etc.caves such as, Borra Caves, Indian rock-cut architecture depicting Undavalli Caves .

Yes, there are several tribal communities in Andhra Pradesh, India. Some of the major tribal communities in Andhra Pradesh

1. Lambadas: with a population of around 4.5 M.They are primarily concentrated in the Telangana region of the state.

2. Koyas: with a population of around 1.5 million. They are primarily found in the northern part of the state, in districts like Adilabad, Khammam, and Warangal. Yanadis:

3. Yanadis: with a population of around 50,000. They are primarily concentrated in the Vishakhapatnam district of the state.

4. Chenchus: C with a population of around 50,000. They are primarily found in the Nallamala forest area of the state.

5. Gadabas: with a population of around 150,000. They are primarily found in the districts of Visakhapatnam, Vizianagaram, and Srikakulam.

6. Jatapus: with a population of around 100,000. They are primarily found in the Visakhapatnam and East Godavari districts of the state.

7. Kondareddis: with a population of around 20,000. They are primarily found in the Chittoor district of the state.

ECONOMY: Andhra Pradesh was ranked eighth among other Indian states in terms of GSDP for the financial year 2014–2015. The GSDP at current prices was ₹5,200.3 billion (US$65 billion) and at constant prices was ₹2,645.21 billion (US$33 billion).Andhra Pradesh's economy is mainly based on agriculture and livestock. Four important rivers of India, the Godavari, Krishna, Penna, and Tungabhadra flow through the state and provide irrigation. Rice is the major food crop and staple food of the state. It is an exporter of many agricultural products and is also known as "Rice Bowl of India".Andhra Pradesh is investing in building infrastructure in the state such as highways and making every service of the government digital.The industrial sector of the state includes some of the key sectors like pharmaceutical, automobile, textiles etc. Sricity located in Chittoor district is an integrated business city which is home to firms including PepsiCo, Isuzu Motors, Cadbury India, Kellogg's, Colgate-Palmolive, Kobelco etc. The PepsiCo firm has its largest plant in India at Sri City.The state is also emerging in information technology and biotechnology. The IT/ITES revenues of Visakhapatnam is at ₹14.45 billion (US$180 million) in 2012–2013. The development of IT in Tier-II and Tier-III cities like Vijayawada, Kakinada and Tirupati is also improving. In the fiscal year 2012–2013, Vijayawada's IT/ITeS revenues were ₹1,153 million (US$14 million). Tirupati with ₹693 million (US$8.7 million) and Kakinada with ₹615 million (US$7.7 million) stand next..Mining is identified as one of the growth engines for the overall development of industry and infrastructure. The Tummalapalle Uranium mine in Andhra has confirmed 49,000 tonnes (48,000 long tons; 54,000 short tons), 700 million tonnes (690,000,000 long tons; 770,000,000 short tons) of metal grade Bauxite deposits in proximity to Visakhapatnam Port.Thermal (natural gas and coal based) and renewable power plants totaling to 21,000 MW were installed in the state by 2015.

POLITICAL CONDITIONS: The state has a unicameral legislature and a parliamentary form of government, with the Governor of Andhra Pradesh serving as the head of the state and the Chief Minister as the head of the government. The politics of Andhra Pradesh is dominated by two major political parties, the Telugu Desam Party (TDP) and the YSR Congress Party (YSRCP). The TDP was founded by former Chief Minister N.T. Rama Rao in 1982 and has been in power for a significant portion of the state's history. The YSRCP was founded in 2011 by Y.S. Jaganmohan Reddy, the son of former Chief Minister Y.S. Rajasekhara Reddy. In recent years, Andhra Pradesh has witnessed a significant political upheaval, with the YSRCP sweeping to power in the 2019 Assembly elections, winning 151 out of 175 seats. The TDP, which was in power prior to the elections, suffered a major setback, winning only 23 seats.

##The major energy demands in the state of Andhra Pradesh are:

1. Industrial Sector: The industrial sector is the largest consumer of energy in the state of Andhra Pradesh, accounting for approximately 50% of the total energy demand. Industries such as cement, fertilizer, steel, textiles, and pharmaceuticals require large amounts of energy for their operations.

2. Agricultural Sector: The agricultural sector is the second-largest consumer of energy in the state. The state has a large agricultural base, and energy is required for irrigation, pumping, and other farm-related activities.Residential Sector: The residential sector is the third-largest consumer of energy in the state. The increasing urbanization and growth of the middle class have led to a rise in demand for energy in the residential sector.

3. Transportation Sector: The transportation sector is a significant consumer of energy in the state. The growth of the automobile sector, increasing urbanization, and the expansion of the road network have contributed to the rise in demand for energy in the transportation sector

4.Commercial Sector: The commercial sector, including offices,hospitals, hotels, and shopping malls, is another significant consumer of energy in the state.

Case study 3: UNION TERRITORY -LADAKH

ABOUT :

Ladakh is a region administered by India as a union territory which constitutes a part of the larger Kashmir region and has been the subject of dispute between India, Pakistan, and China since 1947.

Geography:

Ladakh is bordered by the Tibet Autonomous Region to the east, the Indian state of Himachal Pradesh to the south, both the Indian-administered union territory of Jammu and Kashmir and the Pakistan- administered Gilgit-Baltistan to the west, and the southwest corner of Xinjiang across the Karakoram Pass in the far north. It extends from the Siachen Glacier in the Karakoram range to the north to the main Great Himalayas to the south. The eastern end, consisting of the uninhabited Aksai Chin plains, is claimed by the Indian Government as part of Ladakh, and has been under Chinese control since 1962

• Administering country – India
• Capitals – Leh ,Kargil
• Districts – 2

Government

• BODY – Administration of Ladakh
• Lieutenant Governor – B.D. Mishra.
• Member of parliament – Jamyang Tsering Namgyal (BJP)
• High court – Highcourt of Jammu and Kashmir and Ladakh

AREA

• Total - 59,146 sq. Km (22,836 sq mi)
• Highest elevation - (saltoro kangiri) 7742 m (8370 ft)
• Lowest elevation - (indus River) 2550m

Population (2011)

• Total – 274289 • Density – 4.6 per sq km
• Languages
Official. – Hindi and English
Spoken - Ladakhi , Urdu ,Purgi , Balti

Economy of Ladakh:

• The economy of Ladakh has been based on small farms and herding.
• The economy is a stable and self-reliant rural economy.
• A small-scale farming system was developed by the Ladakhis. Livestock is also a major part of Ladakh's economy. Keeping livestock, specially sheep, yak, goats and cows is a major part of pastoral farming. From yak they yield milk for butter, hair for ropes and tents, hide for boots, aprons and baskets, horns for agricultural implements, dung for fuel and meat. The goats have extremely fine, long staple fleece, pashm famed for its end product of pashmina shawls.
• The Ladakh is a biomass-based economy. Crops like barley, wheat and peas are grown. Western agricultural practices like heavy use of chemical pesticides and fertilizer have enhanced the quality of agriculture thereby influencing the economy of Ladakh. Ladakh is an exporter of Pashmina products and dried apricots.
•In Past, the people of Ladakh used to collect tax on goods that crossed their kingdom from Kashmir, Tibet, Punjab and Turkistan. The tourist sector has developed Ladakh's economy to a great extent today. People are employed in the tourism industry. Zanskari ponies are distinguished for their strength, speed and stamina and so they make excellent means of transport

Major developments :

Currently, only two roads connect Ladakh to the rest of India with limited access during winter. Ladakh has ~4,300 kms of road with 39% under PWD and 61% under BRO. In March 2021, the central government announced to a parliamentary panel that a 'standalone project' to build a critical road in Ladakh, along the border with China, is in progress.

The following are some key initiatives taken by the government to promote Ladakh as an investment destination:

• In October 2021, BRO announced five major road infrastructure projects to boost connectivity in a Ladakh.

• In August 2021, BRO constructed the highest motorable road in Eastern Ladakh at 19,300 ft. to boost the socio-economic condition and promote tourism in the union territory.

• In June 2021, Minister of Defence Mr. Raj Nath Singh virtually inaugurated 11 bridges in Ladakh to boost border connectivity in the union territory.

• In July 2021, the Union Cabinet approved establishment of an Integrated Multipurpose Corporation in Ladakh to ensure socio-economic development of the union territory.

• To provide grid connectivity to the far-flung villages of Ladakh, the central government approved intra-state transmission project at a revised estimated cost of Rs. 1,309.71 crore (US$ 179.51 million) in May 2021.

Political Conditions:

Under the terms of the Jammu and Kashmir Reorganisation Act, Ladakh is administered as a union territory without a legislative assembly or elected government. The head of government is a Lieutenant Governor appointed by the President of India who is assisted by civil servants of the Indian Administrative Service.

Ladakh is divided into two districts.

1. Kargil
2. Leh

Autonomous District Councils

Each district of Ladakh is administered by an autonomous district council, they are:

• Ladakh Autonomous Hill Development Council, Kargil

• Ladakh Autonomous Hill Development Council, Leh

The two autonomous district councils work with village panchayats to take decisions on economic development, healthcare, education, land use, taxation, and local governance which are further reviewed at the block headquarters in the presence of the chief executive councillor and executive councillors.

The government of Jammu and Kashmir looks after law and order, the judicial system, communications and the higher education in the region.

The two autonomous district councils continue to exist following the formation of the union territory of Ladakh on 31 October 2019.

Law enforcement and justice

• Ladakh is under the jurisdiction of the High Court of Jammu and Kashmir and Ladakh.
• The union territory of Ladakh has its own police force headed by a director general of police.

Ladakh in the Parliament of India

Ladakh sends one member (MP) to the lower house of the Indian parliament the Lok Sabha. The MP for the Ladakh constituency in the current Lok Sabha is Jamyang Tsering Namgyal from the Bharatiya Janata Party (BJP)

Transportation:

- There are about 1,800 km (1,100 mi) of roads in Ladakh of which 800 km (500 mi) are surfaced.

- The majority of roads in Ladakh are looked after by the Border Roads Organisation. There are two main roads that connect Ladakh with the rest of the country, NH1 connecting Srinagar to Kargil and Leh, and NH3 connecting Manali to Leh. A third road to Ladakh is the Nimmu– Padam–Darcha road, which is under construction.

- There is an airport in Leh, Kushok Bakula Rimpochee Airport, from which there are daily flights to Delhi and weekly flights to Srinagar and Jammu. There are two airstrips at Daulat Beg Oldie and Fukche for military transportation.

- The airport at Kargil, Kargil Airport, was intended for civilian flights but is currently used by the Indian Army. The airport is a political issue for the locals who argue that the airport should serve its original purpose, i.e., should open up for civilian flights. Since past few years the Indian Air Force has been operating AN-32 air courier service to transport the locals during the winter seasons to Jammu, Srinagar and Chandigarh
- A private aeroplane company Air Mantra landed a 17-seater aircraft at the airport, in presence of dignitaries like the Chief Minister Omar Abdullah, marking the first ever landing by a civilian airline company at Kargil Airport.

Energy demands:

Life in a cold desert is harsh and exacting. You need enormous amounts of energy for everything, but there are very few sources.

Getting electricity to light up houses in Leh is no easy task. About two-thirds of the power supply in the summer comes from diesel generator sets (DG) sets – and this does not include the numerous power sets run by families, businesses and institutions.

In 2002-03, the power development department of Leh burnt 2.57 million litres of diesel (at a daily average of more than 7,000 litres) costing over Rs 5.65 crore annually. And all this to supply power for about five hours in the evening. In the winters, the DG sets are the only source of power as the other source – the hydel power plant on the Indus river at Stakna, about 40 km upstream of Leh city – freezes up for about two months. The other problem with the hydel plant is that the heavy silt load of the Indus prevents its optimum operation. Desiltation is very costly.

Ladakh is not connected to the national electricity grid. Traditionally, people relied on cakes of cattle and yak dung to keep warm. But with tourism opening in 1971, came new demands. Now, tourists living in hotels expect hot tap water and a steady supply of electricity. Ladakh is providing answers to this situation in charactersitic fashion.

Initiatives:

- Leh city has done a remarkable job of reducing its energy demand by introducing compact fluorescent lamps (CFL) that consume one-fifth the power that conventional light bulbs need by reducing the number of illegal connections and trying to tap the vast potential of solar power.
- In Ladakh, however, the public sector power supplier has not only managed to regularise a majority of power connections and improve its revenue recovery but actually got people to spend several times extra to install energy efficient lighting systems. Take the case of the LAHDC's decision to replace conventional lamps with CFLs – first in commercial establishments and government offices. While CFL saves energy, it costs a lot to install.
- LAHDC was asking the people to do was to spend more money on new components and expensive bulbs. "The key to our success lay in controlling the price of CFL and to demonstrate to the people that if they saved energy, the supply of power would improve and their power bills would come down," says Tsewang Paljor, assistant executive engineer with the power department.
- The price was controlled by selling subsidised 14-watt bulbs at Rs 180 each through cooperative societies and getting the private sector suppliers to lower the price. The price of the 18-watt bulb came down to Rs 250 from Rs 280. By September 2003, 37,000 CFLs had been sold in Leh, saving as much as 30 per cent of the total power consumed in Leh for lighting. The power tariff structure of consumers with 250 watts of consumtion or more was made such that if they did not switch to CFL, they would have had to pay higher rates. A social consensus was created on the need to save electricity.
- Today, several homes and establishments, especially hotels, have one CFL and one conventional lamp in the rooms. In summer, when the power supply is better, they use conventional lamps. In winter they switch to CFLs.

Steps by government:

- In June 2021, Convergence Energy Services Limited (CESL) signed an agreement with the Administration of Union Territory (UT) of Ladakh to implement energy-efficient programmes and solar power projects for clean & efficient energy and make the UT carbon neutral.
- In June 2021, CESL signed an MoU with the Union Territory of Ladakh to expand its decentralised solar portfolio in the UT.
- To make Leh self-sufficient in power, Ladakh, in collaboration with the Solar Energy Corporation of India (SECI), initiated a carbon- neutral initiative for implementation of 50 MW solar storage plant in the UT.
- In February 2021, an MoU was signed between Oil and Natural Gas Corporation (ONGC) and the UT administration of Ladakh to develop a geothermal field development project with a power potential of 200 MW.
- In January 2021, the central government and the Central Water Commission (CWC) sanctioned eight hydropower projects (144 MW) on the Indus river and its tributaries in Ladakh. These projects will be developed in the districts of Leh and Kargil in compliance with the Indus Waters Treaty with Pakistan
    -

Case study 4: West Bengal

Economy:

West Bengal, India's sixth largest state in terms of economic size, has a projected Gross State Domestic Product (GSDP) of Rs. 17.13 trillion in 2022-23. The state's GSDP grew at a CAGR of 11.54% from 2015-16 to 2022-23. Between October 2019-June 2022, FDI inflows in West Bengal stood at US$ 1,048.25 million.

Agriculture:

The state is the largest source of the important food crop of rice, a staple diet across India and the second-largest producer of potatoes in India. West Bengal is also the second-largest fish producing state. It is also the second largest tea-producing state in India accounting for 27.8 percent of the country's total tea production. West Bengal accounts for nearly 10% of the country's edible oil production. The state is the third largest meat producing state in the country (including for investments in setting up Mega Food Parks (MFP) as well as processing units in the MFPs.

Industry:

There are up to 10,000 registered factories in the state and the state government has opened Shilpa Sathi, a single window agency in order to provide investors with all kinds of assistance in establishing and running industrial units. NASSCOM-Gartner ranks West Bengal power infrastructure the best in the country. The centre has established a number of industries in the areas of tea, sugar, chemicals and fertilisers. Currently, 22-25 percent of India's tanning activity is undertaken in Kolkata and its suburbs. As of 2011, the state has 22 formally approved special economic zones (SEZ). Of these, 17 are related to information technology (IT) or IT, enabled services.

Economic Indices:

In 2009–10, the tertiary sector of the economy (service industries) was the largest contributor to the gross domestic product of the state, with a compound annual growth rate of 15.2% and contributing 57.8% of the state domestic product compared to 24% from primary sector (agriculture, forestry, mining) and 18.2% from secondary sector (industrial and manufacturing). The state's total financial debt is estimated to further grow to ₹6,478 billion at the end of 2023–24.

Exports:

West Bengal is one of the country's leading exporters of finished leather goods. In 2009–10, the state accounted for around 13.5% of the country's exports of leather and leather products. The state accounted for around 70% of India's dried flower exports in 2008–09. The state is also a leading exporter of shrimps and tea.

Grography:

West Bengal is on the eastern neck of India, stretching from the Himalayas in the north to the Bay of Bengal in the south. West Bengal borders with Bangladesh on its east, Assam and Sikkim on its northeast, Odisha on its southwest and, Jharkhand and Bihar on its west. The capital of the state is Kolkata, the third-largest urban agglomeration and the seventh-largest city in India.

Depending on soil and climate variations, West Bengal can be divided into six broad divisions:

- The hill region in the north
- The Terai and Teesta alluvial regions of North Bengal
- The lateritic, red and gravely undulating region in the west
- The coastal alluvial region in the south
- The Gangetic alluvial region in the east!
- The Vindhya alluvial region in the centre

Climate:

West Bengal's climate varies from tropical savannah in the southern portions to humid subtropical in the north. In early summer, brief squalls and thunderstorms known as *kal-baisakhi* often arrive from the north or northwest. Monsoons bring rain to the whole state from June to September. Winter is mild over the plains with average daily low temperatures of 15 °C.

Political Conditions:

In the 2011 West Bengal Legislative Assembly election, the Left Front was defeated by the All India Trinamool Congress which won an absolute majority of seats. This led to the end of 34 year Communist rule in. Mamata Banerjee, the leader of Trinamool Congress, has been the Chief Minister of West Bengal ever since. From 2008, things changed as the government found a cause

to champion in West Bengal. It was a fight for the rights of the farmers to sell or keep their land. It was also a fight to protect farmlands from being levelled for industrialisation. This new cause alienated investors and industrialists from the state. However things are slowly changing as the government is trying to attract national and internatioHowever,estors instead of solely focusing of village industries.

Cultural Conditions:

As of 2011, West Bengal had a population density of 1,029 inhabitants per square kilometre (2,670/sq mi) making it the second-most densely populated state in India. The literacy rate is 77.08%, higher than the national rate of 74.04%. The proportion of people living below the poverty line in 2013 was 19.98. Scheduled castes and tribes form 28.6% and 5.8% of the population, respectively, in rural areas and 19.9% and 1.5%, respectively, in urban areas. In September 2017, West Bengal achieved 100% electrification, after some remote villages in the Sundarbans became the last to be electrified. West Bengal is also home to indigenous tribal Adivasis such as: Santhal, Munda, Oraon, Bhumij, Lodha, Kol and Toto.

Energy Demands (and how they are being met):

West Bengal shows certain promising signs for better energy situation in the state because of its financially viable power sector, energy surplus situation and it's easy accessiblity. However, there are certain shortcomings like despite its almost 100% village electrification, the state's 42% rural households are still without electricity. Acquiring land for power projects is another problem that the state is facing. The peak demand in West Bengal is projected to be between 8,937 and 10,871 MW in 2021 increasing to about 14,730 MW by 2031. As of December 2011, West Bengal had 9220.19 MW of thermal power, 315.88 MW of hydro power, 92.88 MW of nuclear power and 262.71 MW of power from renewable energy sources. The State Government is encouraging setting up of renewable energy- based power plants.

Case study 5: Uttar Pradesh

Economic conditions:

In terms of net state domestic product (NSDP), Uttar Pradesh is the second-largest economy in India after Maharashtra, with an estimated gross state domestic product of ₹14.89 lakh crore (US$190 billion),[185] contributing 8.4% of India's gross domestic product. According to the report generated by India Brand Equity Foundation (IBEF), in 2014–15, Uttar Pradesh has accounted for 19% share in the country's total food grain output.[186] About 70% of India's sugar comes from Uttar Pradesh. Sugarcane is the most important cash crop as the state is country's largest producer of sugar.[186] As per the report generated by Indian Sugar Mills Association (ISMA), total sugarcane production in India was estimated to be 28.3 million tonnes in the fiscal ending September 2015 which includes 10.47 million tonnes from Maharashtra and 7.35 million tonnes from Uttar Pradesh.

According to the Uttar Pradesh Budget Documents (2019–20), Uttar Pradesh's debt burden is 29.8 per cent of the GSDP.[195] The state's total financial debt stood at ₹2.09 lakh crore (US$26 billion) in 2011.[196] Uttar Pradesh has not been able to witness double digit economic growth despite consistent attempts over the years.[195] The GSDP is estimated to have grown 7 per cent in 2017–18 and 6.5 per cent in 2018–19 which is about 10 per cent of India's GDP. According to a survey conducted by the Centre for Monitoring Indian Economy (CMIE), Uttar Pradesh's unemployment rate increased 11.4 percentage points, rising to 21.5 per cent in April 2020.[197] Uttar Pradesh has the largest number of net migrants migrating out of the state.[198] The 2011 census data on migration shows that nearly 14.4 million (14.7%) people had migrated out of Uttar Pradesh.[199] Marriage was cited as the predominant reason for migration among females. Among males the most important reason for migration was work and employment.

The state is attracting foreign direct investment which has mostly come in the software and electronics fields; Noida, Kanpur and Lucknow are becoming major hubs for the information technology (IT) industry and house the headquarters of most of the major corporate, media and financial institutions. Sonebhadra, a district in eastern Uttar Pradesh, has large-scale industries. Its southern region is known as the Energy Capital of India.[207] In May 2013 Uttar Pradesh had the largest number of mobile subscribers in the country, a total of 121.60 million mobile phone connections out of 861.66 million in India, according to the telecom regulator, Telecom Regulatory Authority of India (TRAI).[208][209][210][211] In November 2015, the Ministry of Urban Development selected sixty-one cities of Uttar Pradesh for a comprehensive development program known as the Atal Mission for Rejuvenation and Urban Transformation (AMRUT).[212] A package of ₹260 billion (US$3.3 billion) was declared for the cities to develop service level improvement plan (SLIP), a plan for better functioning of the local urban bodies in the cities

Geographical condition:

Uttar Pradesh, with a total area of 243,290 square kilometres (93,935 sq mi), is India's fourth-largest state in terms of land area and is roughly of same size as United Kingdom. It is situated on the northern spout of India and shares an international boundary with Nepal. The Himalayas border the state on the north,[65] but the plains that cover most of the state are distinctly different from those high mountains.[66] The larger Gangetic Plain region is in the north; it includes the Ganges-Yamuna Doab, the Ghaghra plains, the Ganges plains and the Terai.[67] The smaller Vindhya Range and plateau region are in the south.[68] It is characterised by hard rock strata and a varied topography of hills, plains, valleys and plateaus. The Bhabhar tract gives place to the terai area which is covered with tall elephant grass and thick forests interspersed with marshes and swamps.[69][70] The sluggish rivers of the bhabhar deepen in this area, their course running through a tangled mass of thick undergrowth. The terai runs parallel to the bhabhar in a thin strip. The entire alluvial plain is divided into three sub-regions.[71] The first in the eastern tract consisting of 14 districts which are subject to periodical floods and droughts and have been classified as scarcity areas. These districts have the highest density of population which gives the lowest per capita land. The other two regions, the central and the western, are comparatively better with a well-developed irrigation system.[72] They suffer

from waterlogging and large-scale user tracts.[73] In addition, the area is fairly arid. The state has more than 32 large and small rivers; of them, the Ganga, Yamuna, Saraswati, Sarayu, Betwa, and Ghaghara are larger and of religious importance in Hinduism.

Cultivation is intensive in the state.[Uttar Pradesh falls under three agro-climatic zones viz. Middle Gangetic Plains region (Zone–IV), Upper Gangetic Plains region (Zone–V) and Central Plateau and Hills region (Zone–VIII). The valley areas have fertile and rich soil. There is intensive cultivation on terraced hill slopes, but irrigation facilities are deficient.· The Siwalik Range which forms the southern foothills of the Himalayas, slopes down into a boulder bed called 'bhabhar'.The transitional belt running along the entire length of the state is called the terai and bhabhar area. It has rich forests, cutting across it are innumerable streams which swell into raging torrents during the monsoon.

Cultural Background:

Language and literature:

Several texts and hymns of the Vedic literature were composed in Uttar Pradesh. Renowned Indian writers who have resided in Uttar Pradesh were Kabir, Ravidas, and Tulsidas, who wrote much of his *Ram Charit Manas* in Varanasi. The festival of Guru Purnima is dedicated to Sage Vyasa, and also known as *Vyasa Purnima* as it is the day which is believed to be his birthday and also the day he divided the Vedas.Hindi became the language of state administration with the Uttar Pradesh Official Language Act of 1951. A 1989 amendment to the act added Urdu, as an additional language of the state. Linguistically, the state spreads across the Central, East-Central, and Eastern zones of the Indo Aryan languages. The major Hindi languages of the state are Awadhi, Bagheli, Bundeli, Braj Bhasha, Kannauji, and Hindustani.[282] Bhojpuri, an Eastern Indo Aryan language, is also spoken in the state.

Music and dance:

Kathak, a classical dance form, owes its origin to the state of Uttar Pradesh. Ramlila is one of the oldest dramatic folk dances; it depicts the life of the Hindu deity Rama and is performed during festivals such as Vijayadashami. In the gharana dance form, both the Lucknow and the Benares gharanas are situated in the state.

Fairs and festivals:

Chhath Puja is the biggest festival of eastern Uttar Pradesh. The Kumbh Mela, organised in the month of Maagha (February—March), is a major festival held every twelve years in rotation at Allahabad on the river Ganges. Lathmar Holi is a local celebration of the Hindu festival of Holi. It takes place well before the actual Holi in the town of Barsana near Mathura.Taj Mahotsav, held annually at Agra, is a colourful display of the culture of the Braj area.Ganga Mahotsav, a festival of Kartik Purnima, is celebrated fifteen days after Diwali.

Cuisine:

Mughlai cuisine is a style of cooking developed in the Indian subcontinent by the imperial kitchens of the Mughal Empire. It represents the cooking styles used in North India, especially Uttar Pradesh, and has been strongly influenced by Central Asian cuisine. Awadhi cuisine from the city of Lucknow consists of both vegetarian and non-vegetarian dishes. It has been greatly influenced by Mughlai cuisine.

Political condition:

The Government of Uttar Pradesh (ISO: Uttar Pradesh Sarkār; often abbreviated as GoUP) is the subnational government of the Indian state of Uttar Pradesh with the governor as its appointed constitutional head of the state by the President of India.[2] The Governor of Uttar Pradesh is appointed for a period of five years and appoints the Chief Minister of Uttar Pradesh and their council of ministers, who are vested with the executive powers of the state. The governor remains a ceremonial head of the state, while the chief minister and their council are responsible for day-to-day government functions.

The state of Uttar Pradesh's influence on Indian politics is important, and often paramount and/or a bellwether, as it sends the most members of parliament to both the Lok Sabha and the Rajya Sabha, the state's population being more than 200 million; approximately double that of the next-most populous state.

Energy Demands:

The state of Uttar Pradesh in India has a diverse energy mix, with different sectors having different energy demands. Here are some of the major energy demands in Uttar Pradesh:

1. **Power Generation:** Uttar Pradesh is one of the largest consumers of electricity in India, with a peak demand of around 23,000 MW. The major sources of electricity generation in the state are thermal power plants, hydroelectric power plants, and renewable energy sources like solar and wind.

2. **Agriculture:** Agriculture is a major sector in Uttar Pradesh, and it accounts for a significant portion of the state's energy consumption. The primary energy demand in this sector is for irrigation pumps, which are mostly powered by diesel and electricity.

3. **Industry:** Uttar Pradesh has a significant industrial base, with industries ranging from small-scale units to large-scale manufacturing plants. The major industries in the state include textiles, food processing, chemicals, and engineering. The energy demand in this sector is mainly for electricity and fuel for running machines and equipment.

4. **Transportation:** Uttar Pradesh has a vast network of roadways, railways, and airports, which require significant energy for their operations. The energy demand in the transportation sector is mainly for fuel, including petrol, diesel, and aviation fuel.

5. **Residential and Commercial:** The residential and commercial sector in Uttar Pradesh also accounts for a significant portion of the state's energy consumption. The energy demand in this sector is mainly for lighting, heating, and cooling, as well as for running appliances and electronic devices.

Overall, the energy demands in Uttar Pradesh are significant and diverse, and the state relies on multiple sources of energy to meet its requirements.

SHASWAT 2023