GEOGRAPHY OF TAMILNADU

UNIT-III

MINERALS AND POWER RESOURCES-COAL, IRON ORE, PETROLEUM, ATOMIC AND THERMAL POWER-MAJOR HYDEL POWER PROJECTS-NON CONVENTIONAL ENERGY SOURCES-SOLAR AND WIND ENERGY

MINERALS AND POWER RESOURCES

Tamil Nadu is the leading holder of country's **resources** of vermiculite, magnetite, dunite, rutile, garnet, molybdenum and ilmenite. The State accounts for the country's 81% lignite, 75% vermiculite, 69% dunite, 59% garnet, 52% molybdenum and 30% titanium **minerals resources**.

Energy can be generated from fuel **minerals** like coal, petroleum, natural gas, uranium and from **electricity**. **Energy resources** can be classified as conventional and non-conventional sources. Conventional sources include: firewood, cattle dung cake, coal, petroleum, natural gas and **electricity** (both hydel and thermal

The Mannargudi is a large **coal** field **located** in the south of India in **Tamil Nadu**. Mannargudi represents one of the largest **coal** reserves in India, having estimated reserves of 2,037 crore tonnes of **coal**.

One of the best-planned townships in India, Neyveli is a small, compact city in the Cuddalore region of Tamil Nadu. Around 1935, it was discovered that copious amounts of the mineral **lignite** was available just a few feet below the surface of this region.

Thoothukudi **Thermal Power Station** (**Tamil**: *தூத்துக்குடி அனல் மின் நிலையம்*) is a **power plant** situated near newport of Thoothukudi in **Tamil** Nadu, India, on the sea shore of Bay of Bengal. It has 5 units with a total installed capacity of 1,050 MW and spread over 160 hectares (400 acres). All the unit are **coal** based.

The company operates four large **thermal power stations**: Ennore **Thermal Power** Station (ETPS) - 450 MW (2x60, 3x110 MW) Mettur **Thermal Power** Station (MTPS) - 1440 MW (4x210, 1x600 MW) North Chennai **Thermal Power** Station (NCTPS) 1830 MW (3x210 MW, 2x600 MW)

Coal is classified into **four** main **types**, or ranks: anthracite, bituminous, subbituminous, and lignite. The ranking depends on the **types** and amounts of carbon the **coal** contains and on the amount of heat energy the **coal** can produce.

Iron ore occurs as Banded Magnetite in Kanjamalai and Godumalai Hills in Salem district. Three bands are noticed in Kanjamalai hills. The Inferred reserves of **Iron ore** are 50-60 million tonnes in Kanjamalai. The **Iron** content varies from 33-36 percent.

The discovery well is situated 14-km south-east of Chidambaram town in **Tamil Nadu**. "Compared to earlier lower-productivity basement discoveries, Madanam-3 discovery is a major breakthrough in basement play exploration in Cauvery basin," the company said.

Kalpakkam is located on the east coast about 70 km south of **Chennai** in **Tamil Nadu State**. The Madras Atomic Power Station (MAPS) having two units of 220 MW was established in 1983-85 by Nuclear Power Corporation of **India** Ltd (NPCIL).
The Kudankulam Nuclear Power Plant (KNPP) is located 650km south of Chennai, in the Tirunelveli district of Tamil Nadu, India. It is being developed by the Nuclear Power Corporation of India (NPCIL).

Two 1,000 megawatt (MW) pressurised water reactor (PWR) units based on Russian technology were constructed in phase one of the project. An additional four units are scheduled to be added according to the agreement signed between India and Russia in December 2008.

Excavation works for the construction of units three and four started in 2016 with the aim of making them operational by 2023.

NPCIL and ASE Group of companies signed the general framework agreement for the construction of the fifth and sixth units in June 2017. The units are expected to be commissioned between 2025 and 2026.

The power plant will have a combined capacity of 6000MW upon commissioning of its six units.

Kundah Hydro Electric Complex

Kundah **Hydro Electric** Complex in Nilgiris hills is already one of the **biggest electricity** generating schemes in Tamil Nadu with installed capacity of 585 MW.

The group of peaks Devarbatta, Karaikada, Koulingabetta and Porthimund, all over 2,400 Metres ASL (above sea level) drain into two streams, Avalanche and Emerald.

Total **hydro power** development in Anamalai Hills is covered by seven rivers, namely, Nirar, Sholayar, Parambikulam, Thunnakavadu, Peruvaripallam, Aliyar and Oliyar. About 8 dams have been constructed in Anamalai Hills for impounding, diverting and regulating the water resources for **hydro power** generation and irrigation.

Different types of modern hydro power plants:

- Pumped storage **hydropower plants**.
- Reversible turbine pump **hydropower plants**.
- Underground **hydropower plants**.
- Tidal power **plants**.

NON CONVENTIONAL ENERGY SOURCES-SOLAR AND WIND ENERGY

- **Renewable energy** overview and targets.
- **Renewable electricity** generation.
- Hydroelectric **power**.
- Wind **power**.
- Solar **power**.
- Biomass.
- Biofuel.
- Waste to **energy**

Tamil Nadu Energy Development Agency (TEDA) (Tamil: *தமிழ்நாடு எரிசக்தி வளர்ச்சி முகமை*) is a state government owned agency in the Indian state of Tamil Nadu. Established in 1985, the agency takes the onus of promoting and proliferating the New and Renewable energy sources in this state.[1] This government undertaking is also the *Nodal agency* for Renewable energy related interests in this state.

Wind energy, form of **solar energy** that is produced by the movement of air relative to Earth's surface. This form of **energy** is generated by the uneven heating of Earth's surface by the Sun and is modified by Earth's rotation and surface topography. For an overview of the forces that govern the movement of air, see **wind**.

The Muppandal Wind Farm is India's largest operational onshore wind farm. This project **located** in Kanyakumari district, **Tamil Nadu**.

Tamil Nadu Muppandal is a 25.5MW wind farm located on the southern tip of India. The wind farm initially had a capacity of 8.5MW produced by ten turbines erected between March and April in 2005. Additional 20 turbines were added to increase the capacity by 17MW.

Per kWh, **solar** panels are **cheaper than wind turbines**. Not only is **solar** a **cheaper** way to generate **power**, but **solar** costs less when it comes to long-term maintenance because **wind turbines** will require more upkeep due to their many moving parts, which are more prone to breaking.

The world's best **solar power** schemes now offer the "cheapest **electricity** in history" with the technology cheaper than **coal** and gas in most major countries. That is according to the International Energy Agency's World Energy Outlook 2020.

The total operating capacity in **Tamil Nadu** was 1.8 GW. On 1 July 2017, the **solar** power tariff in **Tamil Nadu** has hit an all-time low of Rs 3.47 per unit when bidding for 1500 MW capacity was held. ... As of 2021, total installed capacity stands at 4.3 GW, with plans for capacity to double by 2022.

Kamuthi Solar Power Project is a photovoltaic power station spread over an area of 2,500 acres (10 km^2) in Kamuthi, Ramanathapuram district, 90 km from Madurai, in the state of Tamil Nadu, India.The project was commissioned by Adani Power. With a generating capacity of 648 MW_p at a single location, it is the world's 12th largest solar park based on capacity.

ABB commissioned five sub-stations to connect the solar park with the National Grid on 13 June 2016. The Kamuthi Solar Power Project was completed on 21 September 2016 with an investment of around ₹4,550 crore (equivalent to ₹53 billion or US$740 million in 2019). The solar plant consists of 2.5 million solar modules, 380,000 foundations, 27,000 metres of structures, 576 inverters, 154 transformers, and almost 6,000 km of cables. Construction of the structures needed to mount the solar panels required 30,000 tonnes of galvanised steel. Around 8,500 workers installed an average of 11 MW of capacity per day to complete the project within 8 months.

The entire solar park is connected to a 400 kV substation of the Tamil Nadu Transmission Corp. The solar panels are cleaned daily by a self-charged robotic system.

Given the solar resource of around 2100 kWh/(m^2*yr) an annual generation of 1.35 TWh/yr may be possible. This corresponds to a capacity factor (or average power) of 24% of the peak capacity 648 MW_p. Assuming a technical life time of 25 years the investment cost is 700 MUSD/(25*1.35 TWh) = 2 US cent/kWh.