भारत ऊर्जा
INDIA ENERGY

INDIA CLIMATE & ENERGY DASHBOARD

ICED MANUAL

July 2023

NITI Aayog

G20 भारत 2023 INDIA

VASUDHA FOUNDATION
Green ways for a good earth!

Introduction

The India Climate and Energy Dashboard (ICED) is NITI Aayog's flagship initiative developed in association with Vasudha Foundation. ICED is a user-friendly platform that aims to bring together comprehensive and time series data from 2005 onwards to provide single window access for all datasets required for climate and energy-related modelling assessments and research. It offers insightful analysis of India's energy, climate and relevant economy-related aspects and further acts as a pillar for robust decision-making enabling India's clean energy transition.

more...

Introduction ▸

Available & Accessible

An open-source knowledge platform with a dynamic and interactive interface that promotes ease of use and accessibility for researchers, policy makers, investors and other stakeholders. The platform endorses data transparency for all three sectors – Energy, Climate and key Economy indicators. Each of these sections are covered comprehensively with a cohesive approach to assist the user in gathering relevant information and further download all datasets to support their respective areas of work.

Comprehensive & Reliable

The Energy and Climate sector in India is governed by multiple ministries and departments at Central and State Governments. At the Central Government, there are different ministries responsible for coal, oil & gas, power, renewable energy, nuclear energy, environment, biodiversity etc. However, there are inter-linkages between the different sub-sectors, and this has a bearing on how the data is collected and organised. The dashboard provides the user with a holistic and complete view of the sector by providing granular level data across States, Cities, DISCOMs, Power Plant Units, Consumer etc. The data is collected from credible and official publicly available data repositories sourced from ministries and departments both at central and state level. A detailed list of data sources and methodologies is provided in the ICED handbook.

Relevant and Analytical

All the ICED users can get access to near-real time information via suave visualizations and interactive analytics using the dashboard's in-built queries in the analytics section. The featured queries explore the interdependency amongst multiple datasets across different sectoral verticals of energy, climate and economy and further reveals the data parameters most used for energy and climate related planning exercises. Covering cross-sectoral issues and connecting the various aspects of the power sector in an integrated manner aids the efficient and easy use of the otherwise vast and disaggregated data available across multiple sources.

Introduction ▸

The ENERGY tab of the ICED dashboard includes the following sections

Fuels and Sources - Provides in-depth information on reserves/potential, production and consumption and prices for all fuel sources.

Electricity - Access to in-depth and up to date information on various aspects of generation, transmission, and distribution sector in India. It further provides a complete list of power plant unit level information and all electricity distribution companies information at one place.

End-use - The section is work in progress and will be taken up in the subsequent phases.

The CLIMATE AND ENVIROMENT tab of the ICED dashboard includes the following sections

GHG Emissions - provides an overview of the national greenhouse gas emissions, both at the sectoral and sub-sectoral level. Furthermore, proportion of different gases in the overall emissions[1], and sectoral shares in the gases are given.

Climate Variability - offers comparative charts to visualise monthly and annual insights on temperature and rainfall data.

Biodiversity - provides interesting data visualizations on forest area cover (density-wise), land-use-land-cover, wildlife sanctuaries and national parks.

Environment - offers comparative charts to visualise yearly air quality statistics for various stations. Also offers land use-land cover data over the years. Further provides interesting data on risk assessment for various natural disasters.

Water - uses interesting data to present pre and post monsoon ground water levels, reservoirs water levels, per capita water availability in 2025 and 2050 for various regions in India.

The ECONOMY and DEMOGRAPHY tab of the ICED dashboard includes the following sections

Key economic indicators - Access a range of datasets on gross domestic product, gross state domestic product, gross value added, balance of payments, index of industrial production, and per capita income.

Demography tab - provides state-wise population data based on male/female and urban/rural classification.

[1]This is compared on the basis of widely followed carbon equivalent metrics.

Introduction

The ANALYTICS tab of the ICED dashboard is a logical selection of a few selected queries that provides a user a quick glance of the data depth and its applications for the user.

This is an illustrative list and the ICED will continue to add more.

- State-wise deep dive based on compilation of sectoral energy, climate, and economic parameters
- Comparison of state level renewable energy potential and it's installed capacity
- State-wise peak power demand Vs temperature change
- Per capita GDP Vs per capita electricity consumption
- Operational and Financial Performance of DISCOMs
- The shift to Electric Vehicles in the road transport sector
- Crude oil prices Vs it's import
- Power purchase portfolio of DISCOMs

Vision & Mission

Act as a state-of-the-art resource centre, be a repository of research on good governance and best practices in sustainable and equitable development as well as help their dissemination to stakeholders.

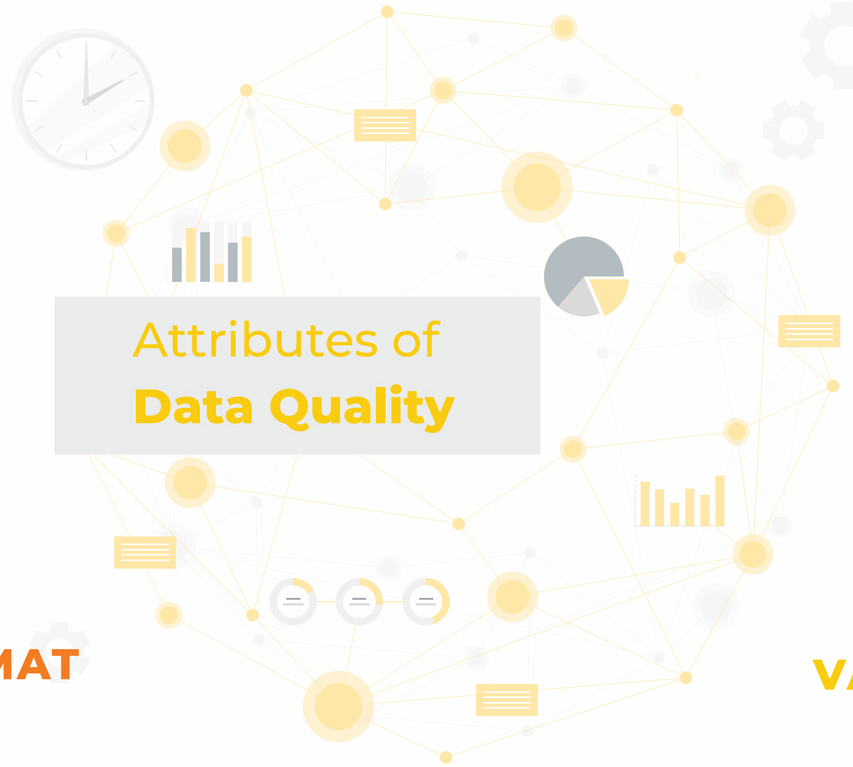
- To function as ONE-STOP PLATFORM for all the Energy, Climate and associated economic dataset related to INDIA for public consumption.
- To enable evidence-based research to fast-track realisation of India's climate goals.
- To develop a user-friendly and dynamic platform that provides easy data access for policymakers, researchers, private-sectors, financial institutions.
- To ensure high quality data that meets all the five dimensions - Availability, Usability, Reliability, Relevance & Presentation quality.
- To facilitate the confluence of multiple dashboards/sources for holistic & informed assessments.

Objectives

- Act as a backbone for Energy and Climate related data at single platform collected from various government sources at one place and support India’s Climate and Energy Modelling Fraternity.
- Provide comprehensive data from the energy, climate and economic sector and offer insightful analysis for accelerating India's clean energy transition and tracking its climate targets.
- Bring together a variety of stakeholders to help bridge the data gaps and granularity issues.
- Become the primary open-source integrated platform that provides near-real time information via a dynamic and interactive interface.

Why ICED

- Need for an open-source knowledge platform to present a comprehensive energy sector outlook for India in line with our Nationally Determined Contribution (NDCs).
- One stop solution for keeping track of multiple government reports, dashboards and portals to holistically understand and be updated with sector progress.
- To overcome the difficulty in extracting large and unprocessed dataset.
- Historical data to assist policymakers/researchers/investors in defining trends and better planning & assessments.



ACCESSIBILITY

RELEVANCE

UNIQUENESS

DATA FORMAT

ACCURACY

TIMELINESS

CONSISTENCY

COMPLETENESS

VALIDITY

Sitemap

ICED
India Climate & Energy Dashboard

ENERGY

FUELS & SOURCES

COAL	Reserve • Production • Import • Offtake • Consumption • Pricing • Transport
OIL	Reserve • Crude Supply • Product Supply • Pipeline • Consumption • Pricing
GAS	Reserve • Supply • Pipeline • Consumption • Pricing
SOLAR	Resource Potential • Irradiance • Pricing
WIND	Resource Potential • Wind Speed, hub Height • Pricing
HYDRO	Resource Potential • Technology • Reservoir • Turbine Type • Source of Water
NUCLEAR	Fuel Types/Reserves • Technology Types
OTHERS	Bio Energy • Small Hydro • Storage

ELECTRICITY

GENERATION	Overview • Power Plant Details • Pipeline Capacity • Operational Capacity • Power Generation • Technical Parameters
TRANSMISSION	Transmission Lines • Sub-stations • Green Energy Corridor
DISTRIBUTION*	Overview • Electricity Demand • Power Purchase • Consumption Details • Operational Performance • Financial Health • RPO
CAPTIVE POWER PLANT	

END-USE**

CLIMATE & ENVIRONMENT

GHG EMISSIONS

- ENERGY
- IPPU
- LULUCF
- AGRICULTURE
- WASTE

CLIMATE VARIABILITY

- TEMPERATURE
- RAINFALL

ENVIRONMENT

- AIR QUALITY
- NATURAL DISASTERS
- BIODIVERSITY
- LAND COVER

WATER

- GROUND WATER LEVELS
- PER CAPITA AVAILABILITY
- RESERVOIRS

CLIMATE FINANCE**

ECONOMY & DEMOGRAPHY

KEY ECONOMIC INDICATORS

- GDP
- GVA TRENDS
- BALANCE OF PAYMENTS
- INDEX OF INDUSTRIAL PRODUCTION
- SOCIO-ECONOMIC PARAMETERS

DEMOGRAPHY

ANALYTICS

PORTALS

* Data collected from SERC's tariff orders and Annual reports
** Work in progress

Features of the Dashboard

The dashboard is free to use and does not require any login credentials to access the data.

It is an integrated open-source platform that offers near-real time information through a dynamic user interface.

The dashboard provides granular data such as power plant unit level information, states/DISCOMs related data et al.

It provides an interactive analytics section that aims to bring together the various elements of energy and power sector, as well as data on climate, the economic and demographic indicators.

A user-friendly and dynamic platform that provides easy data access to policymakers, researchers, private sector and financial institutions.

It offers easy downloading of the data with the choice of format selection such as excel sheet, PDF and JPEG.

A dedicated space in the home page is provided for the user to access other dashboards and portals of various departments and agencies.

Details of the Daily, Monthly & Annual Indicators

HOURLY

- State-wise demand met

DAILY

- Source-wise daily generation
- Power plant wise forced outages for Coal, Nuclear and Hydro
- National and state-wise peak demand met and electricity met
- Daily international oil prices for Brent crude, WTI crude and OPEC basket
- Daily international gas prices of Henry Hub natural gas and LNG Japan Korea Marker
- Daily indonesian coal price
- Daily retail selling prices of petrol and diesel for 4 Metro cities i.e., Delhi, Mumbai, Chennai & Kolkata
- Climate Variability- - Station-wise temperature and rainfall data

MONTHLY

- Power plant unit wise details (location, commissioning status, ownership, implementing agency, technology type)
- Source-wise and plant-wise capacity, generation and PLF for conventional sources
- State-wise capacity, generation and CUF for renewable energy sources
- Power plant/unit level details for operational, pipeline and retired power plants details for conventional sources
- Pipeline project details for Solar and Wind
- Coal and gas power plants CO2 emissions
- Coal power plant fuel linkage and coal consumption
- Technical Parameters (Ramp up/down details) for Coal and Gas
- Coal power plant unit wise FGD status
- Transmission lines and substations capacity progress
- State-wise electricity requirement and supplied, peak demand and peak demand met
- Supply, Trade and Consumption of crude oil and petroleum products
- Monthly production and import of Gas
- Reservoirs water level and storage
- Station wise monthly rainfall and temperature

ANNUAL

- Source-wise and plant-wise capacity, generation and PLF for convention sources
- State-wise capacity, generation and CUF for renewable energy sources
- Auxiliary consumption and Heat rate for coal power plants
- Air quality indicators for SO2, NO2, PM2.5 and PM10
- District wise pre and post monsoon water level mapped with power plant locations
- DISCOM wise power purchase quantum from each power plant and per unit cost (Fixed and Variable)
- Category-wise number of consumers, sales, revenue, connected load, average billing rates and actual tariffs
- Average Cost of Supply and Revenue Realization
- DISCOM wise billing and collection efficiencies, T&D and AT&C losses
- DISCOM wise total cost, revenue, profit and loss, subsidy booked and received
- Power purchase cost, Employee cost, Interest cost, Depreciation cost and other costs
- State-wise per capita electricity consumption
- Reserves, Production, Import, Offtake, Transport, Consumption and Pricing for Coal
- Reserves, Production, Import, Export, Pipeline, Consumption and Pricing for crude oil and petroleum products
- Reserves, Production, Import, Pipeline, Consumption and Pricing for Natural Gas
- Resource Potential for renewable energy sources
- Station wise temperature
- State-wise rainfall distribution of districts
- India's sectoral and sub sectoral emissions (latest is 2016)
- State-wise Forest density-wise area and total forest area (Annual data made available biennially)
- Area under different land use classes
- Stage of Ground Water Extraction (annual data, made available intermittently)
- Categorization of ground water extraction assessment units (annual data, made available intermittently)
- National and State GDP/GSDP
- National and State GVA
- Overall balance - Balance of Payments
- Index of Industrial Production - Industry and use-based
- State-wise per capita income
- State-wise Population

OTHER DATASETS

- Per capita water availability by 2025 and 2050
- Mapping of Wildlife Sanctuary
- Mapping of National Park
- District wise natural disaster zones (Earthquake, Floods and Wind Hazard

Data Sources ▸

All the data provided on this website is compiled and collated from various government sources, Central as well as State, and also includes State and Central Regulatory Commissions and other Government Institutions such as the Central Electricity Authority, Power System Operation Corporation Limited, Solar Energy Corporation of India etc. Further, the data was largely taken from publicly available information such as publications of the various government departments and agencies or from their websites.

However, in some cases, data has been derived or assumed. These have been clearly footnoted in the respective sections along with the formula that have been used for the purpose. In some cases, we have clearly stated, that the numbers could be “Provisional” and would be updated, as and when, the actual data is available in public domain.

The energy sector data taken from annual report and statistics of the various ministries and departments i.e., Ministry of Coal, Ministry of Petroleum and Natural Gas, Ministry of Commerce and Industry, Petroleum Planning & Analysis Cell, Directorate General of Hydrocarbons etc.

Further, data on the power sector is available from various authorities and agencies such as the Ministry of Power, Government of India, Central Electricity Authority, Power Systems Operations Corporation Limited (POSOCO), Solar Energy Corporation of India (SECI), Ministry of New and Renewable Energy etc. Therefore, to ensure uniformity of information, we tried to source information as far as possible from only Central Electricity Authority (CEA) for information on thermal power and a combination of data from CEA and SECI for information on Renewable Energy. However, we have tried to validate the authenticity of information we have used from other sources wherever possible.

The data on climate, economy and demography sections has been taken from India's biennial update reports to the UNFCCC, Ministry of Statistics and Programme Implementation, Central Water Commission, Reserve Bank of India, Economic Survey, India Meteorological Department, and Census of India.

Data Sources

Data sources from below mentioned ministries/departments:

ENERGY

Coal statistics, Coal directory of India, Price notification
MoC/Coal controller
PNG statistics, India's Hydrocarbon Outlook, monthly reports, daily retail selling price of petrol & diesel
MoPNG/PPAC
Energy Statistics
MOSPI
Import/Exports
Ministry of Commerce and Industry
Irradiance data
ISRO
Coal, Oil and Gas daily prices
International Commodity Market
PARIVAHAN Dashboard
Ministry of Road Transport and Highways

CLIMATE & ENVIRONMENT

BUR/NATCOM to the UNFCCC, Forest survey of India, ENVIS Centre on Wildlife & Protected Areas
MoEFCC
EnviStats
MoSPI
Daily temperature and rainfall reports
IMD
Dynamic ground water resources of India
Central Ground Water Board
Central Water Commission
India WRIS Portal
Vulnerability survey of India, Ministry of Housing & Urban Affairs
BMTPC
National Wetland Inventory and Assessment Atlas
VEDAS, ISRO
Central Pollution Control Board

POWER

Notifications
MoP
Installed capacity, RE generation, Transmission & substations, Thermal broad status, hydro projects monitoring reports, fuel reports
CEA
Daily and Monthly reports
National Power Portal
Daily and monthly reports, Ancillary reports
POSOCO
Physical progress, Annual reports
MNRE
Tariff orders, Tariff petition, Annual reports
SERCs/DISCOMs
Performance of state utilities
PFC
NSSO
MoEFCC
Rajya Sabha/Lok Sabha Answers (for validation)
Industrial production, energy u**sed**
Various Industrial Ministries

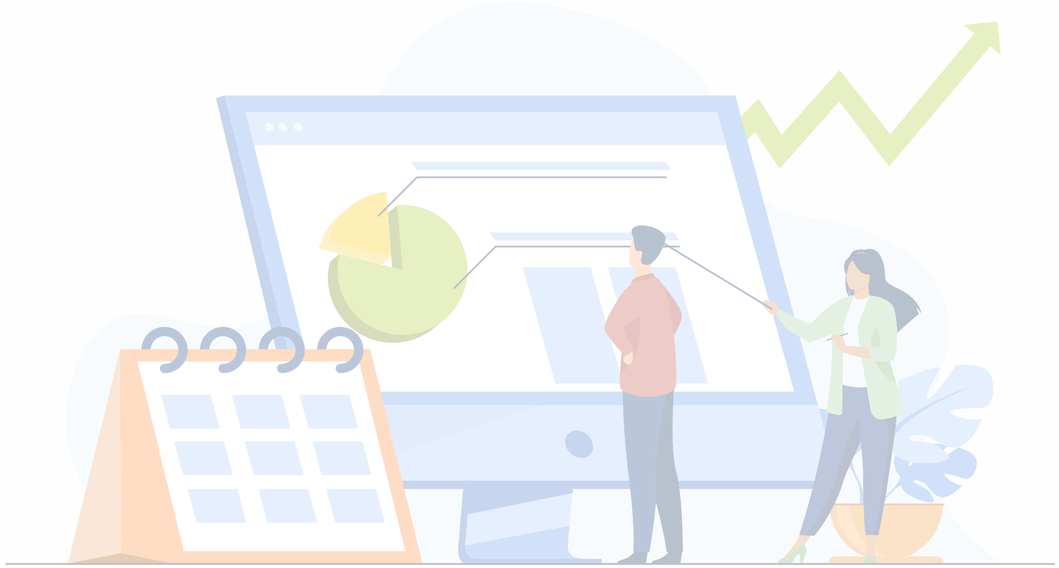
ECONOMY & DEMOGRAPHY

Database on Indian Economy, Handbook of Statistics on Indian Economy, Annual reports
Reserve Bank of India
National Statistical Office
MOSPI
Economic Survey
Census of India, Linguistic Survey of India
Population projections commission report
Ministry of Health and Family Welfare

Future Plans

The dashboard will remain relevant as long as the data is added on a regular basis. Currently, the yearly data for majority parameters is up to the fiscal year 2022-23 (details on each parameter is provided in the Data sources table below). The monthly data gets updated during the last week of the month and all the daily and hourly data is updated on a weekly basis.

Going forward, the endeavour is to generate automated data via API formats (Application Programming Interface) for most parameters and hence reduce human effort. The dashboard will continue to build its data expanse and user-experience. It will continue to increase the spatial and temporal depth of all the current data. It will further explore numerous new datasets especially bringing in data on the end-use side and further building in state-of-the-art tools for improved data access and analytics. The ICED further welcomes any collaboration and suggestions to advance the whole experience of the dashboard. (iced-niti@nic.in)



Acknowledgement

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Details of the data sources & assumptions along with the source link

Coal

Parameter		Year	Details	Source and Link

Reserve	Classification of Indian coal reserves based on Indian Standard Procedure (ISP)	2016	The proved reserves are also referred to as ""measured reserves."" The UNFC classification of coal reserves is given as follow-
			measured reserves = (3,3,1);
			indicated reserves = (3,3,2);
			inferred reserves = (3,3,3).	

		All Years	Coal reserves of 0-600 m are for Jharia Coalfield in Jharkhand. Demonstrated reserves are those for which evidence has been gathered up to a moderate level of confidence through collection of samples. Reserves are recorded at the start of each financial year (i.e., 1st of April). Reserves of Andhra Pradesh and Telangana states are proportionately split for the years prior to bifurcation, i.e., 2006-2014, based on their respective shares of the combined reserves in 2015.	
	Overall	All Years	Indian Standard Procedure (ISP) Classification: Coal resources are classified based on the degree of assurance of exploration data. The three categories of coal resources under the ISP are proved, indicated and inferred. Proved reserves are estimated with a high level of confidence (expected variation less than 10%). Indicated reserves are estimated with moderate level of confidence and inferred reserves are estimated with a low level of confidence. United Nations Framework Classification (UNFC) is an internationally recognised method of classification of coal reserves. Classification of Indian coal reserves as per UNFC is available for two years - 2011 and 2013 - for CIL coalfields only (not all of India).	http://www.coalcontroller.gov.in/pages/display/16-coal-directory

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Annexure

Details of the data sources & assumptions along with the source link

Parameter		Year	Details	Source and Link
	State-wise inventory of lignite reserve (million tonnes)	All Years	Depth-wise and field-wise reserves of lignite are available in coal directory	http://www.coalcontroller.gov.in/pages/display/16-coal-directory
		FY 2021 onwards	Data taken from coal directory of India report published by Ministry of Coal.	
Production	Coal type-wise, state-wise and company wise domestic production (million tonnes)	2006 to 2014	All of the production listed under the state of Andhra Pradesh for the years 2006-2014 is from areas that are part of the Telangana state formed in 2014.	http://www.coalcontroller.gov.in/pages/display/16-coal-directory
	Grade-wise coal production (million tonnes)	All Years	Two different coal grading systems have been used in India in recent years - Useful Heat Value (or UHV) and Gross Calorific Value (GCV). Coal India Limited (CIL) switched from UHV-based pricing to GCV-based pricing in 2012. Production by Grade Trend chart shows the switch and the approximate equivalence between UHV grades (A-G) and GCV grades (G1-G17).	
	Sector-wise coal imports (million tonnes)	2015	Coal Directory 2014-15 only segregates coal imports for 2014-15 into the Steel & Washery sector and ""Others"". Further segregation (into power and cement sectors) is not available for Others.	
		FY 2021 onwards	Data taken from coal directory of India report published by Ministry of Coal.	
		All Years	Here the domestic coal consumption is assumed same as its offtake as no coal transport loss data is available. The coal import by power sector reported by in the Coal Controller's Office (CCO) is significantly lower than that reported by Central Electricity Authority (CEA). The numbers used for the dashboard are from CCO's Coal Directory.	

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Details of the data sources & assumptions along with the source link

Parameter		Year	Details	Source and Link
Import	Source-wise, country-wise and coal type-wise imports	FY 2021 onwards	Data taken from coal directory of India report published by Ministry of Coal.	http://www.coalcontroller.gov.in/pages/display/16-coal-directory
Offtake	Domestic Offtake by Coal Type	FY 2021 onwards	Data taken from coal directory of India report published by Ministry of Coal.	http://www.coalcontroller.gov.in/pages/display/16-coal-directory
Consumption	Sector-wise offtake of Raw Coal, Washed Coal, Middling's & Lignite For Final Consumption (FC) to different states (million tonnes)	2006 All Years	Segregation of coal offtake based on coal product type is not published for 2006. Consumption reported is based on offtake numbers reported by coal producing companies. Offtake of coal to Andhra Pradesh and Telangana is listed against the combined state of Andhra Pradesh during the year 2006-2014. The offtake is split between the two states in 2015.	http://www.coalcontroller.gov.in/pages/display/16-coal-directory
		FY 2021 onwards	Data taken from coal directory of India report published by Ministry of Coal.	
Pricing	Indonesian Coal Price Index	All Years	Daily price index data collected from investing.com	https://in.investing.com/commodities/coal-ici-4-indonesian-coal-index-f-futures-historical-data
Transport	Coal type and ownership wise mode of transport	FY 2021 onwards	Data taken from coal directory of India report published by Ministry of Coal.	http://www.coalcontroller.gov.in/pages/display/16-coal-directory

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Details of the data sources & assumptions along with the source link

Oil

Parameter		Year	Details	Source and Link
Reserve	Oil Reserve by State	FY 2021 onwards	Data taken from Indian Petroleum & Natural Gas Statistics published by Ministry of Petroleum and Natural Gas.	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics
	Oil Reserve by Regime	FY 2021 onwards	Data taken from India's Hydrocarbon Outlook published by Directorate General of Hydrocarbons, MoPNG	https://dghindia.gov.in/index.php/page?pageId=75&name=Downloads
Crude Supply	Crude oil supply by Basin	FY 2021 onwards	Data taken from Indian Petroleum & Natural Gas Statistics published by Ministry of Petroleum and Natural Gas.	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics
	Crude oil Import	FY 2021 onwards	Data taken from Import/Export of Crude oil and Petroleum Products reports published by Petroleum Planning & Analysis Cell, MoPNG	https://ppac.gov.in/import-export
	Country-wise Crude Oil Import	FY 2021 onwards	Data taken from Country-wise Trade report published by Department of Commerce, Ministry of Commerce and Industry.	https://tradestat.commerce.gov.in/eidb/
	Monthly Crude Oil Production	Jan-2022 onwards	Data taken from Monthly Production report published by MoPNG	https://mopng.gov.in/en/petroleum-statistics/monthly-production
Products Supply	Production of the Petroleum Products	FY 2021 onwards	Data taken from Indian Petroleum & Natural Gas Statistics published by Ministry of Petroleum and Natural Gas.	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics
	Import/Export of Petroleum Products	FY 2021 onwards	Data taken from Import/Export of Crude oil and Petroleum Products reports published by Petroleum Planning & Analysis Cell, MoPNG	https://ppac.gov.in/import-export
	Monthly data on Petroleum Products production, Import and Export	Jan-2022 onwards	Data taken from Import/Export of Crude oil and Petroleum Products reports published by Petroleum Planning & Analysis Cell, MoPNG	https://ppac.gov.in/

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Details of the data sources & assumptions along with the source link

Parameter		Year	Details	Source and Link
Pipeline	Details for crude oil and petroleum products pipelines-operational and under construction	2016 All Years	Data about throughput of pipelines is provisional. Most regional pipelines networks are not shown in the map. Pipelines under construction are shown only on the map. Some small length pipelines are not shown in the pipelines map. The pipelines map does not show offshore pipelines.	
		All Years and Crude oil	"8"" CTF to CPF line not in use due to damage / rupture of river portion of pipeline near Dhanturia on 25.08.2013 due to high floods in Narmada River." GMAA EPT to S.Yamam Unloading Terminal (1st Line) is not under use due to multiple leakages and required repair on account of ROU issues and has not been used in 2015. Kalol-Nawagam (Old) trunk line is isolated and kept on standby. KSP-WGGS to TPK Refinery Pipeline dispatch resumed from 28.12.2015 onwards. Length and capacity data given for CPF, Gandhar to Saraswani 'T' point trunk pipeline includes length and capacity of branch lines from GNAQ and Dabka meeting at Magnad 'T' point and Mobha 'T' point respectively.	
		All Years and Petroleum products	Narimanam (NRM) to CPCL line-Old abandoned and Narimanam (NRM) to CPCL new line has been put to use. Design capacity of pipeline is 1.70 MMTPA. However, its throughput is not shown as it is Branch Line for pumping product from MMBPOL or BKPL	
		FY 2021 onwards	Data taken from Indian Petroleum & Natural Gas Statistics published by Ministry of Petroleum and Natural Gas.	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics

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Details of the data sources & assumptions along with the source link

Parameter		Year	Details	Source and Link
Consumption	State-wise, Sector-wise consumption of Petroleum Products	FY 2021 onwards	Data taken from Indian Petroleum & Natural Gas Statistics published by Ministry of Petroleum and Natural Gas.	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics
	Monthly consumption of petroleum products	Jan-2022 onwards	Data taken from Import/Export of Crude oil and Petroleum Products reports published by Petroleum Planning & Analysis Cell, MoPNG	https://ppac.gov.in/consumption/products-wise
Pricing	Price of Brent Crude Oil	All Years	Data taken from US Energy Information Administration	https://www.eia.gov/dnav/pet/pet_pri_spt_s1_d.htm
	Price of OPEC Basket of Crude	All Years	Data collected from Organization of the Petroleum Exporting Countries website	https://www.opec.org/opec_web/en/data_graphs/40.htm
	Price of WTI Crude	All Years	Data taken from US Energy Information Administration	https://www.eia.gov/dnav/pet/pet_pri_spt_s1_d.htm

Gas

Parameter		Year	Details	Source and Link
Reserves	Gas Reserves by Regime	All Years	"Oil and Gas reserves are categorised based on the degree of assurance of exploration data. Internationally, several roughly equivalent terms are in use to indicate these categories. The most certain reserves are called proven reserves or ""1P"" reserves. Moderately certain reserves (up to 50% certainty) are called probable, indicated or ""2P"" reserves. Least certain reserves (at least 10% certainty) are called possible or ""3P"" reserves. In India, reserves are reported in two categories: Initial In-place and Ultimate reserves, which correspond to 3P and 2P reserves respectively. Balance recoverable reserves are remaining ultimate	

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Details of the data sources & assumptions along with the source link

Parameter		Year	Details	Source and Link
			(2P) reserves that can be recovered after accounting for oil and gas already extracted." Balance recoverable reserves for 2008-09 to 2011-12 are as reported by Ministry of Petroleum and Natural Gas (MoPNG). Balance recoverable reserves are reported by Directorate General of Hydrocarbons (DGH) and MoPNG for the years 2012-13 to 2014-15. However, these do not match. Source for the reserves reported here for the years 2012-13 to 2014-15 are as reported by DGH. Oil and gas exploration contracts were granted in two distinct regimes in India - nomination and production sharing (PSC). Under nomination regime, the contract is exclusively granted to national oil companies (NOCs). Under PSC regime, private companies either competitively bid for auctioned blocks along with NOCs (NELP) or entered into joint ventures with NOCs (pre-NELP), and a part of the profit is shared with the government.	
		FY 2021 onwards	Data taken from India's Hydrocarbon Outlook published by Directorate General of Hydrocarbons, MoPNG	https://dghindia.gov.in/index.php/page?pageId=75&name=Downloads
	Gas Reserves by State	2006 to 2008 All Years	Assam reserves include reserves within the states of Assam, Tripura, Nagaland & Arunachal Pradesh. Western offshore reserves include Rajasthan and JVC. Balance recoverable reserves are as on 01st April of each year	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics
		FY 2021 onwards	Data taken from Indian Petroleum & Natural Gas Statistics published by Ministry of Petroleum and Natural Gas.	
Supply	State-wise Gross & Net Production of Natural Gas in India (MMSCM)	2006 to 2009	Production of Assam includes Arunachal Pradesh Production of West Bengal includes Madhya Pradesh and Jharkhand	
		All Years	CBM means Coal Bed Methane, i.e., natural gas available on coal beds.	

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Parameter		Year	Details	Source and Link
			Flaring refers to the process of burning natural gas that cannot be evacuated for safety reasons. In addition, gas may be reinjected to improve the output of oil and gas wells. Net gas available for sale is gross production - (gas flared + gas reinjected). Gross production and Flared gas data is available combined for all offshores together (eastern, western and Gujarat), whereas individual offshore wise data is available for utilization of gas (sales + internal utilization). There is a slight mismatch between the total offshore production and offshore wise gas utilization data.	
	State-wise, Basin-wise Gas Production and Flaring	FY 2021 onwards	Data taken from Indian Petroleum & Natural Gas Statistics published by Ministry of Petroleum and Natural Gas.	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics
	Country-wise Gas Import	FY 2021 onwards	Data taken from Country-wise Trade report published by Department of Commerce, Ministry of Commerce and Industry.	https://tradestat.commerce.gov.in/eidb/
	Monthly Gas Production	Jan-2022 onwards	Data taken from Monthly Production report published by MoPNG.	https://mopng.gov.in/en/petroleum-statistics/monthly-production
	Monthly LNG imports	Jan-2022 onwards	Data taken from Import/Export of Crude oil and Petroleum Products reports published by Petroleum Planning & Analysis Cell, MoPNG.	https://ppac.gov.in/natural-gas/import
Pipeline		2001	Data about throughput of pipelines is provisional. GAIL's total capacity/throughput does not include capacity/throughput of Chhainsa-Jhajjar-Hissar pipeline and Dadri Bawana Nangal pipelines as these are extension of DVPL-GREP upgradation pipeline. Most regional pipelines networks are not shown in the map. Pipelines under construction are shown only on the map.	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics

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Parameter		Year	Details	Source and Link
			Some small length pipelines are not shown in the pipelines map. The pipelines map does not show offshore pipelines.	
		FY 2021 onwards	Data taken from Indian Petroleum & Natural Gas Statistics published by Ministry of Petroleum and Natural Gas.	
Consumption	CNG and PNG sales for 2016	2016	CNG and PNG sales data is based on reports submitted to PNGRB by the authorised gas supply entities and is provisional in nature. The data is as available with PNGRB on 30 May 2016. CNG: Compressed Natural Gas, PNG: Piped Natural Gas Financial year 2016 data is provisional. Non-domestic PNG is a combination of gas sold for commercial and industrial segments of customers.	
	CNG sales	FY 2021 onwards	Data taken from Indian Petroleum & Natural Gas Statistics published by Ministry of Petroleum and Natural Gas.	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics
	Sector-wise gas consumption (MMSCM)	2006 to 2008	Data taken from Indian Petroleum and Natural Gas Statistics 2012-13	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics
		2006 to 2011	The Indian Petroleum and Natural Gas Statistics do not provide sectoral consumption of LNG imports between 2005-06 and 2010-11. Hence, for these years, all imported LNG has been accounted under the 'others' category.	
		2008 to 2011	Data taken from Indian Petroleum and Natural Gas Statistics 2014-15	
		2012 to 2015	Data taken from Indian Petroleum and Natural Gas Statistics 2015-16	
		All Years	The consumer categories reported in the Indian Petroleum and Natural Gas Statistics has changed over the years, particularly with respect to consumption of natural gas through city gas distribution networks. Hence, the distribution of	

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Parameter		Year	Details	Source and Link
			CGD consumption across residential, industrial and transport sectors has been estimated based on the shares reported in 2015-16. There is a slight mismatch between the total offshore production and offshore wise gas utilization data.	
		FY 2021 onwards	Data taken from Indian Petroleum & Natural Gas Statistics published by Ministry of Petroleum and Natural Gas.	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics
	State-wise Utilisation of Domestic Natural Gas in India	All Years	Utilization includes sales to consumers and internal use of the gas well.	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics
Pricing	Gas Prices	All Years	Consumer price for north-eastern states is 60% of the producer price. The difference of producer price and consumer price in northeast is paid to ONGC/OIL from government budget. From 01.04.2011 onwards, consumer price/producer price in Rs. /Standard cubic meter (SCM) is worked out considering average foreign exchange rate (RBI reference rate) of previous month. Government notified New Domestic Gas Pricing Guidelines, 2014 on 25.10.2014, which are made effective from 01.11.2014. As per new guidelines, domestic gas price is: (a) US$ 5.05/mmbtu on gross GCV basis from 01.11.2014 to 31.03.2015 (b) USD 4.66/mmbtu on gross GCV basis from 01.04.2015 to 30.06.2015 North-eastern states have consumer prices at 60% of the given consumer prices. Price of APM gas from 01.01.2006 to 31.05.2010 was exclusive of royalty/levies. With effect from 04.06.2010, GOI revised the producer price of natural gas to US$ 4.2/mmbtu less royalty on net GCV basis.	
		From 01st Oct 2019 onwards	Data taken from Indian Petroleum & Natural Gas Statistics published by Ministry of Petroleum and Natural Gas.	https://mopng.gov.in/en/petroleum-statistics/indian-png-statistics

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Parameter		Year	Details	Source and Link
	Price of Henry Hub Natural Gas	All Years	Data taken from US Energy Information Administration on daily henry hub gas price	https://www.eia.gov/dnav/ng/hist/rngwhhdD.htm
	Price of Japan/Korea LNG	All Years	Data taken from investing.com on daily Japan/Korea LNG price	https://in.investing.com/commodities/lng-japan-korea-marker-platts-futures-historical-data?end_date=1680287400&st_date=1648751400

Solar

Parameter		Year	Details	Source and Link
Resource Potential	State-wise Estimated Potential of Solar Power	As per latest assessment by MNRE	Solar potential data sourced from Energy Statistics Report, MoSPI.	https://www.mospi.gov.in/sites/default/files/publication_reports/Energy_Statistics_2023/EnergyStatisticsIndia2023.pdf

Wind

Parameter		Year	Details	Source and Link
Resource Potential	Estimated Potential of Wind Power	As per latest assessment by MNRE at 120 m hub height	Wind potential data sourced from Energy Statistics Report, MoSPI.	https://www.mospi.gov.in/sites/default/files/publication_reports/Energy_Statistics_2023/EnergyStatisticsIndia2023.pdf

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Hydro

Parameter		Year	Details	Source and Link
Resource Potential	Status of hydroelectricity potential development (in terms of installed capacity above 25 MW)	Identified Capacity as per Reassessment Study (1978-87)	Hydroelectric potential does not include potential for pumped storage schemes. Data Sourced from CEA report on Status of Large Hydro Electric Potential Development.	https://cea.nic.in/wp-content/uploads/hepr/2022/10/hydro_potential_state_10-1.pdf
Technology Type	Power Plant technology type for large hydro	Updated as per the latest report	CEA and NHPC. (Run of River type, Run of River with Pondage; Pumped Storage Scheme, Multipurpose, Storage)	

Nuclear

Parameter		Year	Details	Source and Link
Technology Type	Power Plant-wise technology type	Updated as per the latest report	The data for technology type was sourced from each power plant page from the Nuclear Power Corporation of India Limited (NPCIL) website.	Link for plant pages on NPCIL website: https://npcil.nic.in/content/302_1_AllPlants.aspx

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Small Hydro

Parameter		Year	Details	Source and Link
Resource Potential	Estimated potential of Small Hydro	As per latest assessment by MNRE	State-wise small hydro potential data sourced from Energy Statistics Report, MoSPI.	https://www.mospi.gov.in/sites/default/files/publication_reports/Energy_Statistics_2023/EnergyStatisticsIndia2023.pdf

Biomass

Parameter		Year	Details	Source and Link
Resource Potential	Estimated potential of Biomass	As per latest assessment by MNRE	State-wise biomass potential data sourced from Energy Statistics Report, MoSPI.	https://www.mospi.gov.in/sites/default/files/publication_reports/Energy_Statistics_2023/EnergyStatisticsIndia2023.pdf

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ELECTRICITY

Generation

Parameter		Year	Details	Source and Link
Power Plant details	Thermal Power Plant (Coal, Lignite and Gas)	Name of the Power Plant, Installed Capacity, Date of Commissioning, Ownership type/implementing agency	Thermal Performance Review reports, Central Electricity Authority – Updated year on year from Central Electricity Authority year on year annual publication. Also, sourced from various Implementing agencies for the respective coal fired power plants. The data updated on monthly basis from the CEA, Installed capacity report	Link to the website: https://cea.nic.in/old/reports.html https://cea.nic.in/installed-capacity-report/?lang=en
		Location of the power plant	Location taken from CEA and geo-reference and cross checked using google maps	
		Boiler type/Technology	Sourced from Environmental Clearance documents and the website of the Thermal power plants.	
	Hydro	Name of the Power Plant, Installed Capacity, Date of Commissioning, Ownership/Implementing agency	Central Electricity Authority- Review of Performance of Hydro Power Station- Updated year on year from their annual publication. Also referred to the monthly installed capacity reports for the year 2020-21. *Capacities for few plants were Re-rated in later years For example, Bassi Hydroelectric Power Project's capacity was upgraded in 2017-18 from (4*15 MW as per annual report 2016-17) to (4*16.5 as per annual report 2017-18)	Links for Review of Performance of Hydro Power Station reports for 2008-09, 2009-10, 2010-11, 2011-12, 2012-13, 2013-14, 2014-15: http://www.cea.nic.in/old/annualarchive.html 2015-16: http://cea.nic.in/reports/old/annual/hydroreview/hydro_review-2016.pdf 2016-17: http://cea.nic.in/reports/old/annual/hydroreview/hydro_review-2017.pdf
		Location of the power plant	Location taken from CEA and geo-reference and cross checked using google maps	

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Parameter		Year	Details	Source and Link
				2017-18: http://cea.nic.in/reports/old/annual/hydroreview/hydro_review-2018.pdf
	Nuclear	Name of the Power Plant, Installed Capacity, Date of Commissioning, Ownership/Implementing agency	Central Electricity Authority (CEA) and Nuclear Power Corporation of India Limited (NPCIL)	Link for NPCIL: https://npcil.nic.in/index.aspx
		Location of the Power Plant	Location taken from NPCIL and geo-reference and cross-checked using Google maps	Link for plant pages on NPCIL website: https://npcil.nic.in/content/302_1_AllPlants.aspx
	Solar	Name of the Plant, Developer details, Installed Capacity, Date of Commissioning,	Solar Energy Corporation of India along with Central Electricity Authorities Publication (2020) and State Renewable Energy Development Agency	
		Geographical Information	Sourced from SECI and geo-tagged to the location using google maps. In some cases, where the actual locations were not available, the geographical indicator is the district geo information.	
	Wind	Name of the Plant or Farm, Developer details, Installed Capacity, Date of Commissioning	The Information has been sourced from Wind Directory, published by "Consolidated Energy Consultant Limited" for the years 2018 and 2019 However, instead of having individual ownership information, we compiled the information district wise and turbine make wise.	Link to the Publication: https://cecl.in/directory.php
		Geographical Information	The exact location of the wind plant is not available, the geo location is the district geo information.	

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Parameter		Year	Details	Source and Link
	Small Hydro	Name of the Developer, installed capacity, Date of commissioning,	Sourced from multiple websites includes Ministry of New and Renewable Energy (MNRE), States Renewable Energy Development Agencies, Developer website, State Power Corporations and other sources (all about renewables etc.)	Link to the all about renewables site: https://allaboutrenewables.com/small-hydro-power-ipps-list.html
		Geographical information	Sourced from geo-tagged to the location using google maps. In some cases, where the actual location was not available, the geographical indicator is the district geo information.	
	Biomass & Co-gen	Name of the Developer, installed capacity, Date of commissioning,	Biomass Portal, under the Ministry of New and Renewable Energy (MNRE) and State government lists of bio power projects State Renewable Energy Development Agency.	Link to the Biomass portal: https://biomasspower.gov.in/index.php
		Geographical information	Sourced from Biomass Portal and geo-tagged to the location using google maps. In some cases, where the actual location was not available, the geographical indicator is the district geo information.	
Operational Capacity	Coal	1962-63 onwards	The annual/monthly operational capacity is the total of operational power plant capacities and that matches with the installed capacity report published by CEA on monthly basis. The capacity numbers are based on the commissioning date of the power plant.	Link to the CEA report: https://cea.nic.in/installed-capacity-report/?lang=en Power Plant capacities, Report number 16: https://npp.gov.in/monthlyGenerationReportsAct
	Oil & Gas	1965-66 onwards	The annual/monthly operational capacity is the total of operational power plant capacities and that matches with the installed capacity report published by CEA on monthly basis. The capacity numbers are based on the commissioning date of the power plant.	Link to the CEA report: https://cea.nic.in/installed-capacity-report/?lang=en

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Parameter		Year	Details	Source and Link
	Hydro	1902-03 onwards	The annual/monthly operational capacity is the total of operational power plant capacities and that matches with the installed capacity report published by CEA on monthly basis. The capacity numbers are based on the commissioning date of the power plant.	Link to the CEA report: https://cea.nic.in/installed-capacity-report/?lang=en
	Nuclear	1969-70 onwards	The annual/monthly operational capacity is the total of operational power plant capacities and that matches with the installed capacity report published by CEA on monthly basis. The capacity numbers are based on the commissioning date of the power plant.	Link to the CEA report: https://cea.nic.in/installed-capacity-report/?lang=en
	Solar, Wind, Small Hydro, Biomass	2015-16 onwards	The annual capacity taken from Annual Reports from Ministry of New and monthly capacity has been updated from Physical Progress report by Ministry of New and Renewable Energy.	Annual Reports: https://mnre.gov.in/knowledge-center/publication Physical Progress: https://mnre.gov.in/the-ministry/physical-progress
Retired Capacity	Coal	2015-16 onwards	The date of decommissioning gives information date/ year when the thermal power plant was decommissioned. The data is based on the list released by the Central Electricity Authority for those plants which have formally retired.	CEA and Power Plant website
	Oil & Gas	2001-02 onwards	Further, we also track daily, monthly and annual forced outages of power plants. So, if a particular unit is not generating for prolonged periods of time, and is not in the “forced outage” list, then we also individually track those units to see if they are retired or are there other reasons for not generating electricity for prolonged periods of time.	

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Parameter		Year	Details	Source and Link
Pipeline Capacity	Coal	Updated as per the latest available report	Power plants that are in various stages of construction and commissioning, the data has been taken from Thermal Broad Status Report from Central Electricity Authority.	Link to Thermal Broad Status Report: https://cea.nic.in/thermal-broad-status-reports/?lang=en
	Oil & Gas	Updated as per the latest available report	Data on under construction power plant taken from Thermal Broad Status Report published by CEA.	https://cea.nic.in/thermal-broad-status-reports/?lang=en
	Hydro	Updated as per the latest available report	Information on the status of the power plant at various stages of construction and commissioning has been taken from Hydro Project Appraisal Division Reports by CEA. This data gets updated on monthly basis.	https://cea.nic.in/hydro-project-appraisal-division-monthly-reports/?lang=en
	Nuclear	Updated as per the latest available report	For the list of Proposed nuclear power projects, sourced the data from the section on 'Status of Projects Under Construction" from the Nuclear Power Corporation of India (NPCIL) website.	https://npcil.nic.in/content/297_1_ProjectConstructionStatus.aspx
	Solar	Updated as per the latest available report	Sourced from tenders of Solar Energy Corporation of India and State Renewable Energy Development Agencies. For the solar under construction projects, the data has been taken from Renewable Project Monitoring Division by CEA.	https://www.seci.co.in/view/publish/tender?tender=all CEA report: https://cea.nic.in/renewable-project-monitoring/?lang=en
	Wind	Updated as per the latest available report	Sourced from Renewable Project Monitoring Division by CEA. This data updated on a quarterly basis as per report published by CEA.	https://cea.nic.in/renewable-project-monitoring/?lang=en
Power Generation	Coal	2012-13 onwards	From 2012-13 to 2017-18, the generation data taken from Thermal Performance Review Reports for the Years 2012-13, 2013-14, 2014-15, 2015-16, 2016-17 & 2017-18 published by the Central Electricity Authority (CEA)	https://cea.nic.in/thermal-performance-review-report/?lang=en

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Parameter		Year	Details	Source and Link
			From 2018-19 to 2022-23, data taken from monthly generation reports of the CEA available at the National Power Portal and then totalled up to arrive at the annual generation (for the latest month, we take the data from daily generation as provisional values till we get the actual data for Monthly generation, which we will replace accordingly).	Monthly generation report: https://npp.gov.in/monthlyGenerationReportsTen
		2015-16 onwards	Monthly generation data taken from the Monthly generation report from the National Power Portal	https://npp.gov.in/monthlyGenerationReportsTen
		01st April 2015 onwards	Daily generation data from 2015-16 to as on date, has been taken from the National Power Portal. Daily generation data for 26th July 2017 to 31st July 2017, 1st August to 9th August 2017 & 17th August to 31st August 2017, 1st & 2nd October 2017, 19th March to 31st march 2020, April and May 2020 are not available.	https://npp.gov.in/dgrReports
	Oil & Gas	2012-13 onwards	For Gas power plants the annual generation, referred to the monthly generation data, Central Electricity Authority (CEA).	https://npp.gov.in/monthlyGenerationReportsTen
		2015-16 onwards	Monthly generation data taken from the Monthly generation report from the National Power Portal	Monthly generation report: https://npp.gov.in/monthlyGenerationReportsTen
		01st April 2015 onwards	Daily generation data from 2015-16 to as on date, has been taken from the National Power Portal. Daily generation data for 26th July 2017 to 31st July 2017, 1st August to 9th August 2017 & 17th August to 31st August 2017, 1st & 2nd October 2017, 19th March to 31st march 2020, April and May 2020 are not available.	https://npp.gov.in/dgrReports

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Parameter		Year	Details	Source and Link
	Hydro	2012-13 onwards	Hydro Performance Review Reports for the Years 2012 -13, 2013-14, 2014-15, 2015-16, 2016-17 & 2017-18 published by the Central Electricity Authority (CEA) Annual Generation from 2019-20 onwards compiled from monthly generation reports	Links for Review of Performance report: http://www.cea.nic.in/old/annualarchive.html
		2015-16 onwards	Monthly generation data taken from the Monthly generation report from the National Power Portal	https://npp.gov.in/monthlyGenerationReportsTen
		01st April 2015 onwards	Daily generation data from 2015-16 to as on date, has been taken from the National Power Portal. Daily generation data for 26th July 2017 to 31st July 2017, 1st August to 9th August 2017 & 17th August to 31st August 2017, 1st & 2nd October 2017, 19th March to 31st march 2020, April and May 2020 are not available.	https://npp.gov.in/dgrReports
	Nuclear	2012-13 onwards	For Annual generation for 2012-13, 2013-14, 2014-15 sourced data from the Generation reports published by the Central Electricity Authority (CEA)	Links for Generation reports: http://cea.nic.in/old/archives.html
		2015-16 onwards	From 2015-16 onwards, the data has been compiled from Monthly generation reports from National Power Portal	https://npp.gov.in/monthlyGenerationReportsTen
		01st April 2015 onwards	Daily generation data from 2015-16 to as on date, has been taken from the National Power Portal. Daily generation data for 26th July 2017 to 31st July 2017, 1st August to 9th August 2017 & 17th August to 31st August 2017, 1st & 2nd October 2017, 19th March to 31st march 2020, April and May 2020 are not available.	https://npp.gov.in/dgrReports

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Parameter		Year	Details	Source and Link
	Solar, Wind, Small Hydro and Biomass	2015-16 onwards	Monthly and Annual State-wise electricity generation for renewable energy sources taken from Monthly Renewable Energy Generation Reports published by CEA.	https://cea.nic.in/installed-capacity-report/?lang=en
		01st July 2019 onwards	State-wise Daily Generation for Solar, Wind and Other RES taken from Daily Generation Report published by CEA.	https://cea.nic.in/daily-renewable-generation-report/?lang=en
Plant Load Factor/CUF	Thermal Power Plants	2012-13 to 2017-18	From 2012-13 to 2017-18, the PLF data was taken from Thermal Performance Review Reports for the Years 2012-13, 2013-14, 2014-15, 2015-16, 2016-17 & 2017-18 published by the Central Electricity Authority (CEA).	Report 2017-18: https://cea.nic.in/wp-content/uploads/opm_grid_operation/2020/07/thermal_review-2018%20(1).pdf
		2018-19 onwards	From 2018-19 onwards, Plant Load Factor was calculated based on generation and installed capacity. The methodology used to calculate PLF = Generation / (24*No. of Days* Capacity of the Plant/ Plant Unit) *100. This formula was used to arrive at the PLF in percentage. This is applicable for Annual and Monthly Plant Load Factor	Derived
	Hydro	2012-13 to 2017-18	From 2012-13 to 2017-18, the PLF data was taken from Hydro Performance Review Reports for the Years 2012-13, 2013-14, 2014-15, 2015-16, 2016-17 & 2017-18 published by the Central Electricity Authority (CEA)	Report 2017-18: http://cea.nic.in/old/reports/annual/hydroreview/hydro_review-2018.pdf
		2018-19 onwards	From 2018-19 onwards, Plant Load Factor was calculated based on generation and installed capacity. The methodology used to calculate PLF = Generation / (24*No. of Days* Capacity of the Plant/ Plant Unit) *100. This formula was used to arrive at the PLF in percentage. This is applicable for Annual and Monthly Plant Load Factor	Derived

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Parameter		Year	Details	Source and Link
	Nuclear	2012-13 to 2014-15	Calculated and verified PLF for ,2012-13, 2013-14, 2014-15 sourced data from the Generation reports published by the Central Electricity Authority (CEA)	Links for Generation reports for 2012-13, 2013-14, 2014-15: http://cea.nic.in/old/archives.html
		2015-16 onwards	From the year 2015-16 onwards, sourced and derived based on the generation. The methodology used to calculate PLF = Generation / (24*No. of Days* Capacity of the Plant/ Plant Unit) *100. This formula was used to arrive at the PLF in percentage. This is applicable for Annual and Monthly Plant Load Factor	Derived
	Solar, Wind, Small Hydro and Biomass	2015-16 onwards	Annual and Monthly State-wise Plant Load Factor was calculated based on generation and installed capacity. The methodology used to calculate PLF = Generation / (24*No. of Days* Capacity of the Plant/ Plant Unit) *100. This formula was used to arrive at the PLF in percentage.	Derived and Indicative
Forced Outages	Coal	2012-13 to 2014-15	Data taken from Thermal Performance Review Reports for the Years 2012-13, 2013-14, 2014-15, published by the Central Electricity Authority (CEA). The forced outage data made available by CEA in the Thermal Performance Review Report, is the long duration outage with outage for more than 25 days.	Report 2017-18: https://cea.nic.in/wp-content/uploads/opm_grid_operation/2020/07/thermal_review-2018%20(1).pdf
		2015-16 onwards	From the year 2015-16 onwards, compiled and aggregated from Daily Generation Report from National Power Portal. The generation loss calculation formula is: Generation Loss = (Capacity of power plant unit * Outage Days * 24 * PLF)/1000. The Generation loss has been derived assuming a 100% PLF.	https://npp.gov.in/dgr Reports
	Hydro	2017-18 to 2019-20 (Jul-19)	Data taken from Daily Outages Report from National Power Portal. The generation loss calculation formula is: Generation Loss = (Capacity of power plant unit * Outage Days * 24 * PLF)/1000. The Generation loss has been derived assuming a 100% PLF.	https://npp.gov.in/dgrReports
	Nuclear	2014-15 onwards	Compiled and aggregated from Daily Generation Report from National Power Portal. The generation loss calculation formula is: Generation Loss = (Capacity of power plant unit * Outage Days * 24 * PLF)/1000. The Generation loss has been derived assuming a 100% PLF.	https://npp.gov.in/dgrReports

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Parameter		Year	Details	Source and Link
CO2 Emissions	Thermal Power Plants	2008-09 onwards	This data was derived using the emission factor of 0.989kg/kWh for Coal based power plants, 1.37 kg/kWh for Lignite based power and 0.45 kg/kWh for Gas based power plants. The emission factor was taken from Central Electricity Authority's (CEA) Baseline Carbon Dioxide Emission Database Version 15.0. From 2022 onwards, the average emission rate assumed for Coal is 0.975 kg/kWh, lignite 1.280 kg/kWh and 0.465 kg/kWh for gas power plant as per User Guide Version 18. The Emission figures are only indicative and cannot be taken as the actual emissions, as we have not factored in the kind of coal and its calorific value, the boiler type, other fuel used such as starter fuels, the frequency of start and stop and so on to estimate the plant level or unit level emissions.	Link to CO2 Baseline Database for the Indian Power Sector Report: https://cea.nic.in/?lang=en&s=baseline
Technical Parameters	Status of FGD Installation	Updated as per the latest report	Plant-wise FGD installation status information has been taken from Unit wise FGD implementation status and summary sheet from Central Electricity Authority. This data updated on monthly basis based on the latest published report.	https://cea.nic.in/?lang=en&s=FGD
	Fuel Linkage	Updated as per the latest report	Information procured from Fuel Report published by Central Electricity Authority. The data updated on monthly basis based on the latest published report.	https://cea.nic.in/fuel-reports/?lang=en
	Coal Consumption	2015-16 onwards	For coal consumption, we sourced the monthly coal consumption data for all coal fired power plants from the Central Electricity Authority Fuel reports- report.	https://cea.nic.in/fuel-reports/?lang=en
	Coal Usage per Unit generated (in Kg/kWh)	2015-16 onwards	For Coal usage per unit generated, we took the Coal consumption values from the monthly Fuel Report and the gross Generation values (factoring in auxiliary consumption + net generation (plant wise generation values)), we calculated the coal usage per unit generation in kg per kilowatt -hours. The data for Coal Usage per Unit generated is indicative.	https://cea.nic.in/fuel-reports/?lang=en Derived and Indicative

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Parameter		Year	Details	Source and Link
	Auxiliary Consumption	2008-09 to 2017-18	Thermal Performance Review Reports for the Years 2008-09, 2009-10, 2010-11, 2011-12,2012-13, 2013-14, 2014-15, 2015-16, 2016-17 & 2017-18 published by the Central Electricity Authority (CEA) The Auxiliary Consumption for the years 2018-19, 2019-2020, we took an average of the Auxiliary Consumption for that particular plant for the years 2008-09, 2009-10, 2010-11, 2011-12,2012-13, 2013-14, 2014-15, 2015-16, 2016-17 & 2017-18.	https://cea.nic.in/old/annualarchive.html
	Technology type	Updated as per the latest report	Technology type of the power plants data has been collated from CEA reports. Also, NHPC in case of Hydro power plants. The data for technology type was sourced for nuclear power plant page from the Nuclear Power Corporation of India Limited (NPCIL) website.	https://cea.nic.in/?lang=en http://www.nhpcindia.com/ https://npcil.nic.in/content/302_1_AllPlants.aspx
	Designed and Operating Heat Rate	2008-09 to 2015-16	Thermal Performance Review Reports for the Years 2008-09, 2009-10, 2010-11, 2011-12,2012-13, 2013-14, 2014-15, 2015-16, 2016-17 & 2017-18 published by the Central Electricity Authority (CEA)	https://cea.nic.in/old/annualarchive.html
	Ramping Details	Oct-16 onwards	Ramp up and Ramp down rates of Power Plants units has been taken from RRAS Instruction Summary reports, Power System Operation Corporation Limited (POSOCO).	https://posoco.in/reports/as3-details/
	Water Source	Updated as per the latest report	The sources of water supply for every thermal power plant, for which information is available on this site was taken from the Terms of Reference and Environment Clearances. This is indicative as the source of water supply may have changed.	Assumed based on original submission by plant operators

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Transmission

Parameter		Year	Details	Source and Link
Transmission Lines	India's Transmission Map	As on 20th October 2019	Transmission lines map of India re-created in ArcGIS using the same PDF published by Power Grid Corporation of India Limited.	https://www.powergrid.in/sites/default/files/All%20India%20Map%20Oct%2719%20-%20POWERGRID%20and%20JV%20.pdf
	Transmission Lines (CKM) Progress	2015-16 onwards	The data has been collated from CEA growth and executive summary reports on progress of Transmission sector Monthly data on Transmission lines (220 kV and above) commissioned/ready for commissioning in that particular month is also being captured.	https://cea.nic.in/transmission-reports/?lang=en
Substations	Progress of Substations	2015-16 onwards	The data has been collated from CEA growth and executive summary reports on progress of Substations in the country Monthly data on Substations (220 kV and above) commissioned/ready for commissioning in that particular month is also being captured.	https://cea.nic.in/transmission-reports/?lang=en
Green Energy Corridor	Transmission lines progress under green energy corridor	As of May 2021	Transmission lines progress under green energy corridor for selected states. The data has been taken from TARANG dashboard and created the maps using GIS software.	http://tarang.website/home

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Distribution

Parameter		Year	Details	Source and Link
Peak Demand met	National and State level peak demand met	01st April 2018 onwards	Daily data on national and state-wise peak demand met has been taken from Power System Operation Corporation Limited (POSOCO) daily reports.	https://posoco.in/reports/daily -reports/
	Monthly State-wise peak demand and demand met	2015-16 onwards	State-wise monthly data on peak demand and peak demand met collected from POSOCO monthly report.	https://posoco.in/reports/monthly -reports/
Electricity Demand	National and State level Electricity demand met	01st April 2018 onwards	Daily data on national and state-wise electricity demand met has been taken from POSOCO daily reports.	https://posoco.in/reports/daily -reports/
	Monthly State-wise electricity requirement and met	2015-16 onwards	State-wise monthly data on electricity requirement and met collected from POSOCO monthly report.	https://posoco.in/reports/monthly -reports/
Load Curve	State-wise hourly demand met	01st January 2017 onwards	State-wise hourly demand met data from POSOCO	https://posoco.in/
Power Purchase Quantum	Plant-wise power purchase quantum for all the DISCOMs	2015-16 onwards	The power purchase quantum data was taken from the tariff orders for the Distribution Companies (DISCOMs) for the years 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21 and 2021-22. The data for the Power Purchase Quantum, captures the power plant wise data for the Quantum of Electricity Purchase. In cases where the True up value was not available, the Commissioned approved values was taken. Further, in rare cases where the commission approved values were not available, we took the Petitioner's submitted values.	SERCs and DISCOMs Multi Year Tariff Orders

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Parameter		Year	Details	Source and Link
			Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new entities are referred to as the Jammu Power DISCOM, Kashmir Power DISCOM, and the Ladakh Power Development Department.	
Power Purchase Cost	Plant-wise power purchase cost for all the DISCOMs	2015-16 onward	The power purchase cost data was taken from the tariff orders for the DISCOMs for the years 2015-16, 2016-17, 2017-18, 2018-19, 2019-20, 2020-21 and 2021-22 The data comprises of fixed cost, variable cost, total costs and other costs wherever given. The data sourced is mostly true-up and approved power purchase cost values. In some cases, where we have calculated the data based on the values available (in the tariff order), for Energy Purchased by the DISCOM (in MU) and Fixed or Variable cost values (in Crores) We used the following formula to calculate Fixed and Variable cost at Rs. /kWh: Fixed Cost or Variable Cost = Cost (in crores) divided by Energy Purchased (in MU) In cases where the True up value was not available, we took the Commissioned approved values. Further, in rare cases where the commission approved values were not available, we took the Petitioner's submitted values for cost. Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new	SERCs and DISCOMs Multi Year Tariff Orders

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Parameter		Year	Details	Source and Link
			entities are referred to as the Jammu Power DISCOM, Kashmir Power DISCOM, and the Ladakh Power Development Department.	
Consumer Category	Category-wise details on Number of Consumers, Electricity Sales, Revenue, Connected Load for all the DISCOMs	2015-16 onwards	The consumer category wise data on various parameters has been taken from DISCOMs Tariff Orders, Annual Reports and PFC Reports. Gaps for Nos. of consumers and electricity sales are derived by CAGR growth rates The generation from captive power which is getting consumed within industry is not included in the total industrial electricity consumption. Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new entities are referred to as the Jammu Power DISCOM, Kashmir Power DISCOM, and the Ladakh Power Development Department.	SERCs/DISCOMs Multi Years Tariff Orders and Annual Reports Performance of Power Utilities, PFC Reports for 2017-18, 2018-19 and 2019-20
	Category-wise Average Billing Rate	2015-16 onwards	Average Billing rates calculated by formula: Total Revenue from Electricity sales/Total Electricity Sales for the particular consumer category in a year. Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new entities are referred to as the Jammu Power DISCOM, Kashmir	

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Parameter		Year	Details	Source and Link
			Power DISCOM, and the Ladakh Power Development Department.	
	Category-wise actual tariff rates for all the DISCOMs	2021-22 onwards	The actual tariff rates for agriculture, commercial, domestic and industrial categories have been captured for the DISCOMs from the Tariff Orders for the year 2021-22 and 2022-23	DISCOMs Multi Year Tariff Orders
Operational Performance	Average Cost of Supply (ACS)	2015-16 onwards	Sourced from Annual Accounts and Tariff orders and derived by Formula: Input Energy basis: ACS (Rs/kWh) = Total Cost (Rs. Crores)/Power Purchased (MU) Energy Sold Basis: ACS (Rs/ kWh) = Total Cost (Rs. Crores)/ Total Electricity Sold (MU) Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new entities are referred to as the Jammu Power DISCOM, Kashmir Power DISCOM, and the Ladakh Power Development Department.	SERCs/DISCOMs Multi Years Tariff Orders and Annual Reports
	Average Revenue Realization (ARR)	2015-16 onwards	Sourced from Annual Accounts and Tariff orders and derived by Formula: Input Energy basis: ARR (Rs/kWh) = Total Revenue (Rs. Crores)/Power Purchased (MU) Energy Sold Basis: ARR (Rs/ kWh) = Total Revenue (Rs. Crores)/ Total Electricity Sold (MU)	SERCs/DISCOMs Multi Years Tariff Orders and Annual Reports

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Parameter		Year	Details	Source and Link
			Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new entities are referred to as the Jammu Power DISCOM, Kashmir Power DISCOM, and the Ladakh Power Development Department.	
	Collection and Billing Efficiencies	2015-16 onwards	Collection Efficiency (%) sourced from Tariff Orders, annual accounts and PFC reports for the DISCOMs Sourced from Annual Accounts and Tariff orders and derived by Formula: Billing Efficiency (%) = ((Electricity Sold (MU)/Electricity Input (MU))*100 Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new entities are referred to as the Jammu Power DISCOM, Kashmir Power DISCOM, and the Ladakh Power Development Department.	SERCs/DISCOMs Multi Years Tariff Orders and Annual Reports Performance of Power Utilities, PFC Reports for 2017-18, 2018-19 and 2019-20
	AT&C Losses	2015-16 onwards	Sourced from Tariff Orders and annual accounts of DISCOMs. For National level AT&C Loss, the average of all the DISCOMs is used. For State level, the average of all the DISCOMs in that particular state is used. Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power	SERCs/DISCOMs Multi Years Tariff Orders and Annual Reports Performance of Power Utilities, PFC Reports for 2017-18, 2018-19 and 2019-20

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Parameter		Year	Details	Source and Link
			Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new entities are referred to as the Jammu Power DISCOM, Kashmir Power DISCOM, and the Ladakh Power Development Department.	
	Transmission Losses, Distribution Losses, T&D Losses	2015-16 onwards	Sourced from Tariff Orders and annual accounts and derived by Formula: Total Losses (Mus)/Total Energy purchased For National level T&D Loss, the average of all the DISCOMs is used. For State level T&D Loss, the average of all the DISCOMs in that particular state is used. Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new entities are referred to as the Jammu Power DISCOM, Kashmir Power DISCOM, and the Ladakh Power Development Department.	SERCs/DISCOMs Multi Years Tariff Orders and Annual Reports
Financial Health	Cost Parameters for the DISCOMs (Power Purchase Cost, Employee Cost, Interest Cost, Depreciation cost and other cost)	2015-16 onwards	Data captured from DISCOMs Tariff Orders and Annual Reports. Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new entities are referred to as the Jammu Power DISCOM, Kashmir Power DISCOM, and the Ladakh Power Development Department.	SERCs/DISCOMs Multi Years Tariff Orders and Annual Reports

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Parameter		Year	Details	Source and Link
	Revenue Parameters (Revenue from Sale of Power, Subsidy and other income)	2015-16 onwards	Data captured from DISCOMs Tariff Orders and Annual Reports. Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new entities are referred to as the Jammu Power DISCOM, Kashmir Power DISCOM, and the Ladakh Power Development Department.	SERCs/DISCOMs Multi Years Tari ff Orders and Annual Reports
	Profit/Loss of the DISCOMs	2015-16 onwards	Data captured from DISCOMs Tariff Orders and Annual Reports. Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new entities are referred to as the Jammu Power DISCOM, Kashmir Power DISCOM, and the Ladakh Power Development Department.	SERCs/DISCOMs Multi Years Tariff Orders and Annual Reports
	Subsidy booked and received	2015-16 onwards	Data captured from DISCOMs Tariff Orders and Annual Reports. Until the 2018-19, there was only one electricity distribution company in Jammu & Kashmir, known as the J&K Power Development Department. However, starting from 2019-20, it underwent a division into three separate DISCOMS. These new entities are referred to as the Jammu Power DISCOM, Kashmir Power DISCOM, and the Ladakh Power Development Department.	SERCs/DISCOMs Multi Years Tariff Orders and Annual Reports Performance of Power Utilities, PFC Reports for 2017-18, 2018-19 and 2019-20
Renewable Purchase	State-wise RPO target and compliance	2018-19 onwards	For 2018-19, data has been taken from Conference of Power and Renewable Energy report from MNRE.	https://powermin.nic.in/sites/default/files/webform/notices/Power%20book_1.pdf

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Parameter		Year	Details	Source and Link
Obligation (RPO)			For 2019-20, data has been taken from Standing Committee report on Action Plan for Achievement of 175 GW RE target	http://www.indiaenvironmentportal.org.in/files/file/Action%20Plan%20for%20achievement%20of%20renewable%20energy.pdf

Captive Power Plant

Parameter		Year	Details	Source and Link
State-wise Captive Power Capacity and Generation	Source-wise captive power capacity and generation	2005-06 onwards	State and source wise capacity and generation data taken from General Review reports published by CEA.	Data captured from hard copies of the general review reports from 2007 to 2019. Link to the reports from 2020 onwards: https://cea.nic.in/general-review-report/?lang=en

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CLIMATE & ENVIRONMENT

GHG Emissions

Parameter		Year	Details	Source and Link
National GHG Emissions	Sectoral and sub-sectoral levels emissions	2011-16	Third Biennial Update Report to The United Nations Framework Convention on Climate Change & Second Biennial Update Report to the United Nations Framework Convention on Climate Chang e	https://unfccc.int/sites/default/files/resource/INDIA_%20BUR-3_20.02.2021_High.pdf https://unfccc.int/sites/default/files/resource/INDIA%20SECOND%20BUR%20High%20Res.pdf
		2010	First Biennial Update Report to the United Nations Framework Convention on Climate Change	https://unfccc.int/documents/180646
		2007	Indian Network for Climate Change Assessment	INCCA https://www.iitr.ac.in/wfw/web_ua_water_for_welfare/water/WRDM/MOEF_India_GHG_Emis_2010.pdf
		2000	India's Second National Communication to the United Nations Framework Convention on Climate Change	NATCOM 2 https://unfccc.int/resource/docs/natc/indnc2.pdf
		1994	India's Initial National Communication to the United Nations Framework Convention on Climate Change	NATCOM1 https://unfccc.int/resource/docs/natc/indnc1.pdf

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Climate Variability

Parameter		Year	Details	Source and Link
Climate Variability	Temperature & rainfall	1990 to 2021 1901 to 2022 1901 to 2022 June 1 to September 2020	Station-wise daily temperature and rainfall data Temperature – 1) National decadal trends (Mean values of years in between 2001 to 2010 and 2011 to 2020 were used as decadal values for the corresponding periods.) for national annual & seasonal - minimum, maximum & mean, 2) National Annual and Seasonal Temperature (decadal averages for the period 1901 to 2000) Rainfall – 1) National decadal trends for national annual and monthly rainfall, 2) National annual and monthly rainfall (decadal averages for the period 1901 to 2000) State-wise rainfall distribution of districts	National Data Centre, Climate Research & Services, India Meteorological Department EnviStats India from Ministry of Statistics and Programme Implementation (MoSPI) (2022 and 2023) https://mospi.gov.in/documents/213904/301563//EnviStats%20Vol%20I%202022%20Final1648726317580.pdf/19be7cfd-5627-acb6-31bf-3bcb06e86862 https://mospi.gov.in/sites/default/files/reports_and_publication/statistical_publication/EnviStats/Complete_ES1_2023_Vol1.pdf

Environment

Parameter		Year	Details	Source and Link
Air Quality	Station-wise NO2, SO2, PM2.5 and PM10 data	2010 onwards	State-wise data for air quality has been taken from Central Pollution Control Board.	
Biodiversity	State-wise Forest Cover	2004 2006 2008-09 2010-11	State-wise annual data (available biennially) on forest density-wise area and total forest area from India State Forest reports published between 2004 and 2020.	India State Forest Report https://fsi.nic.in/forest-report-2021

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Parameter		Year	Details	Source and Link
		2013-14 2015-16 2017-18 2019-20		
	Wildlife	As of January, 2023	Data from ENVIS Centre on Wildlife & Protected Areas, Ministry of Environment, Forest and Climate Change. Globally identified biodiversity hotspots in India	http://wiienvis.nic.in/Database/wls_8230.aspx http://www.wwfenvis.nic.in/ViewMajorActivity.aspx?Id=6833 http://awsassets.wwfindia.org/downloads/list_of_existing_wildlife_sanctuaries__as_on_december_2006__1.pdf and other state specific sources
	National Park	As of January, 2023	Data from ENVIS Centre on Wildlife & Protected Areas, Ministry of Environment, Forest and Climate Change. Biodiversity data card on homepage shows: 1) India's share in global biodiversity 2) India's ranking in species endemicity	http://wiienvis.nic.in/Database/npa_8231.aspx http://www.wwfenvis.nic.in/ViewMajorActivity.aspx?Id=6833 http://awsassets.wwfindia.org/downloads/list_of_existing_wildlife_sanctuaries__as_on_december_2006__1.pdf http://www.bsienvis.nic.in/database/biodiversity-hotspots-in-india_20500.aspx and other state specific sources

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Parameter		Year	Details	Source and Link
Natural Disasters	Earthquake	2019	Data collected from Building Materials & Technology Promotion Council (BMTPC), Ministry of Housing & Urban Affairs, GOI: Vulnerability Atlas of India – 3rd Edition.	https://www.bmtpc.org/DataFiles/CMS/file/VAI2019/eq.html
	Floods	2019	Data collected from Building Materials & Technology Promotion Council (BMTPC), Ministry of Housing & Urban Affairs, GOI: Vulnerability Atlas of India – 3rd Edition.	https://www.bmtpc.org/DataFiles/CMS/file/VAI2019/flood.html
	Wind Hazard	2019	Data collected from Building Materials & Technology Promotion Council (BMTPC), Ministry of Housing & Urban Affairs, GOI: Vulnerability Atlas of India – 3rd Edition.	https://www.bmtpc.org/DataFiles/CMS/file/VAI2019/wind.html
Land	Land cover and Land use change	2011-12 & 2015-16	State-wise areas under different land use classes	EnviStats India from MoSPI 2022 report https://mospi.gov.in/documents/213904/301563//EnviStats%20Vol%20I%202022%20Final1648726317580.pdf/19be7cfd-5627-acb6-31bf-3bcb06e86862
		2005-06	State-wise areas under different land use classes	2020 Report http://164.100.161.63/sites/default/files/reports_and_publication/statistical_publication/EnviStats/Compleater_ES2020_Vol1.pdf

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Water

Parameter		Year	Details	Source and Link
Ground Water Levels	Pre-monsoon and Post-monsoon water levels	2014-15 onwards	The ground water levels given in the website for each power plant, is primarily the ground water levels for the entire district and not just the location of the power plant. The source of this data is the Central Ground Water Board (CGWB) and Central Water Commission (CWC).	http://cgwb.gov.in/GW -Year-Book-State.html
Per Capita Water Availability	Per Capita Water Availability by 2025 and 2050	2025 and 2050	The source of this data is the Central Water Commission. CWC projects the per-capita water availability for the period of 2025 and 2050 across various river basins of India. We identified all districts that fall in the respective river basins and assumed that the per-capita water availability projections for the said river basins, applies to all districts that fall in the said river basin. In the case of a few districts that fall in multiple river basins, we have assumed that predominant river basin, that covers the majority area of the district.	Sourced and assumed, Central Water Commission (CWC) Link for Per capita Water Availability - 2025 and 2050: http://nwm.gov.in/sites/default/files/water%20and%20related%20statistic%20in%20india.pdf
Per Capita Water Availability (National)	Per Capita Water Availability by 2025 and 2050	2025 and 2050	The source of this data is the Water and Related Statitics report published by the Central Water Commission.	https://cwc.gov.in/sites/default/files/water -and-related-statistics-2021compressed-2.pdf
Reservoirs	Storage and Water Level	April-2019 onwards	Water storage and level data for the selected reservoir taken from India Water Resources Information System.	https://indiawris.gov.in/wris/#/Reservoirs
Ground Water Resources		Year 2022	Stage of Ground Water Extraction (national) & Categorization of Assessment Units	National Compilation on Dynamic Ground Water Resources of India, 2022 https://cgwb.gov.in/documents/2022 -11-11-GWRA%202022.pdf

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ECONOMY & DEMOGRAPHY

Key Economic Indicators

Parameter		Year	Details	Source and Link
GDP	National GDP	1950-51 to 2017-2018	At current and constant prices, 2011-12 series, from: Economic Survey 2021-2022	GDP Estimates - National Statistical Office https://www.indiabudget.gov.in/economicsurvey/
		2018-19 onwards	National Statistical Office (NSO) report	Annual and Quarterly Estimates of GDP at current and constant prices, 2011-12 series, MoSPI (Link 12 and 13) https://www.mospi.gov.in/data
	GDP Growth Rate	2006-07 onwards	GDP growth rates are calculated using the formula = (GDP of year x - GDP of year y)/GDP of year y, where year x and y are consecutive and year x is the most recent.	
	Gross State Domestic Product (GSDP)	2011-12 onwards	At current and constant prices, 2011-12 Series	State domestic product and other aggregates, MoSPI (link 17) https://www.mospi.gov.in/data
GVA	National GVA	2011-12 onwards	Annual estimates of sectoral GVA at constant and current prices, 2011-12 series	Annual and quarterly estimates of GDP at current and constant prices, 2011-12, MoSPI (Link 12 and 13) https://www.mospi.gov.in/data
	State GVA	2011-12 onwards	All States GVA by economic activities at constant and current prices, 2011-12 series	MoSPI https://www.mospi.gov.in/GSVA -NSVA

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Parameter		Year	Details	Source and Link
Balance Of Payments	Balance of Payments as per IMF Balance of Payments Manual 5 (in Rs. Crore)	2000-01, 2010-11 onwards	Overall balance	Economic Survey https://www.indiabudget.gov.in/economicsurvey/doc/Statistical-Appendix-in-English.pdf
Index of Industrial Production		2012-13 onwards	Industry-based and use-based classification (Base: 2011-12)	Part 1: Annual series from handbook of statistics on Indian economy published by RBI Annual, Table no. 28 & 30. https://www.rbi.org.in/scripts/AnnualPublications.aspx?head=Handbook%20of%20Statistics%20on%20Indian%20Economy
Socio-economic Parameters	Net State Domestic Product (at constant and current prices)	2004-05 to 2010-11 2011-12 onwards	Base 2004-05 Base 2011-12	Annual Series from Handbook of Statistics on Indian Economy published by RBI Annual https://rbidocs.rbi.org.in/rdocs/Publications/PDFs/16T_241121E38C1EC7A0CE444BB1D875B6CBAC913B.PDF
	Per Capita Net National Income (at constant and current prices)	2004-05 to 2010-11	Economic Survey 2020-2021	https://www.indiabudget.gov.in/budget2021-22/economicsurvey/index.php
		2011-12 onwards	Economic Survey 2021-2022	https://www.indiabudget.gov.in/economicsurvey/doc/Statistical-Appendix-in-English.pdf
	Per Capita Electricity Consumption	2012-13 onwards	State-wise per capita electricity consumption on annual basis has been collated from CEA dashboard.	https://cea.nic.in/dashboard/?lang=en
	Human Development Index	2011-12 & 2017-18	State-wise Human Development Index has been taken from Gendering Human Development report published by National Statistical Office, MoSPI	http://www.indiaenvironmentportal.org.in/files/file/Report%20on%20Gendering%20Human%20Development.pdf

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Demography

Parameter		Year	Details	Source and Link
Population	Actual	1961 to 2011 (decadal)	State-wise: Male/female population	https://censusindia.gov.in/cens us.website/data/census-tables
			Rural/urban population	https://m.rbi.org.in/Scripts/AnnualPublications.aspx?head=Handbook+of+Statistics+on+Indian+States#
			Rural and urban population of Ladakh (1961 to 1981) has been taken from	http://lsi.gov.in:8081/jspui/bitstream/123456789/5956/1/40921_1981_GPT.pdf
			Census of India 1998, J&K, Series-8, Paper-2, General population Tables.	http://lsi.gov.in:8081/jspui/bitstream/123456789/85/1/36922_2001_FPT.pdf
			Rural and urban population of Ladakh for 2001 has been taken from Census of India 2001	https://main.mohfw.gov.in/sites/default/files/Population%20Projection%20Report%202011-2036%20-%20upload_compressed_0.pdf
			Population of Andhra Pradesh and Telangana for the year 2011 has been taken from Population Projection report of Census	
			Calculations:	
			Population data of Jammu & Kashmir for years 1961-1981 & 2001 has been adjusted taking into account the population of Ladakh (Leh & Kargil).	
			Population of Andhra Pradesh and Telangana (1961 to 2001) has been calculated using the proportion of 60:40 respectively. This is based on the population share of districts prior to the bifurcation of Andhra Pradesh.	
	Population Projections	2012-2036	Projected rural population has been calculated by taking the difference of total projected population and the Urban projected population.	https://main.mohfw.gov.in/sites/default/files/Population%20Projection%20Report%202011-2036%20-%20upload_compressed_0.pdf

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ANALYTICS

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Parameter		Year	Details	Source and Link
Operational and Financial Performance of the DISCOMs	DISCOM-wise Accumulated Surplus or Deficit	2015-16 onwards	Year-on-year accumulated loss/profit of the DISCOMs has been taken from annual report on Performance of Power Utilities report published by Power Finance Corporation Ltd.	2017-18 report: https://bit.ly/42L9yUh 2018-19 report: https://bit.ly/3zBeCNL 2019-20 report: https://bit.ly/3M2NkqJ 2020-21 report: https://bit.ly/3lY9m3d
The shift to Electric Vehicles in the Road Transport Sector	Vehicle and Fuel category wise data on vehicle registration	2013-14 onwards	National and state level annual data on fuel and vehicle category wise registration has been taken from VAHAN dashboard.	https://vahan.parivahan.gov.in/vahan4dashboard/vahan/vahan/view/reportview.xhtml

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