GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA
STARRED QUESTION NO.06
ANSWERED ON 22.07.2024

RENEWED EMPHASIS ON FOSSIL FUEL-BASED POWER

06 SHRI JAWHAR SIRCAR:

Will the Minister of **POWER** be pleased to state:

(a) when the country has committed to 50 per cent non-fossil power by 2030, the reasons for new fossil fuel-based power plants being approved and frozen and expansion projects taken up on priority;

(b) the facts and details thereof;

(c) the quantum of expansion of fossil fuel-based plants functional on imported coal;

(d) the manner in which Government plans to tackle pollution and the problems of stranded assets, including investments, infrastructure and human resources as the country plans to cross over to renewable sources of energy in next 5-6 years; and

(e) the plan in place to tackle high and peak demands this year?

A N S W E R

THE MINISTER OF POWER AND HOUSING & URBAN AFFAIRS

(SHRI MANOHAR LAL)

(a) to (e) : A Statement is laid on the Table of the House.

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STATEMENT

STATEMENT REFERRED TO IN REPLY TO PARTS (a) TO (e) IN RESPECT OF RAJYA SABHA STARRED QUESTION NO. 06 FOR REPLY ON 22.07.2024 REGARDING RENEWED EMPHASIS ON FOSSIL FUEL-BASED POWER ASKED BY SHRI JAWHAR SIRCAR.

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(a) & (b): India in its Intended Nationally Determined Contributions (INDCs) stands committed to achieve about 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030. At present India has already achieved 45.5% Installed Capacity from non-fossil fuel-based resources. A plan has been prepared according to which, India will not only meet its commitment of 50% non-fossil fuel-based generation capacity but will surpass the same.

The peak and electrical energy requirement of the country is increasing over the years. In the last three years (i.e., from 2021-22 to 2023-24) the growth in peak and energy requirement is 9.5 % and 8.6% respectively. Due to measures taken to shift the demand during solar hours, the peak demand is now being observed during solar hours. During the solar hours along with various generation resources such as coal, gas, hydro, nuclear and wind, solar generation is available to meet the peak demand. The demand during the non-solar hours even though less than the solar hours is also increasing year on year. The benefit of solar generation is not available during the non-solar hours; accordingly, the demand is required to be met from the generation resources that are from coal, gas, hydro, nuclear and wind. Thus, in order to mitigate the seasonal behavior of hydro, wind and non-availability of domestic gas for gas-based power plants, the coal based generation capacity is required to meet the demand during non-solar hours.

(c) : Expansion of fossil fuel-based generation capacity has been planned based on the domestic coal.

(d): Environment Clearance (EC) is the foremost requirement for establishment of new as well as expansion of thermal power capacity. All other clearances & permissions are processed only on the basis of grant of Environment Clearance; which is based on an elaborate and rigorous process.

(i) Further, the thermal power plants are within the ambit of MoEF&CC's prescribed:

- **Emission norms with respect to**: Suspended Particulate Matter (SPM); Oxides of Sulphur; Oxides of Nitrogen and Mercury (Hg);
- **Effluent Parameters viz** - pH, Total Suspended Solids (TSS), Oil& Grease, Heavy Metals etc; and
- Specific Water Consumption Limits.

(ii) To improve efficiency, all the under-construction/ planned TPPs are based on supercritical and ultra-supercritical technology, thereby reducing coal consumption and emissions.

…….2.

(iii) The entire planning of future capacity additions, including that of thermal capacity addition, are based on Central Electricity Authority's (CEAs) 20th Electric Power Survey (EPS) projections of; All India Peak Electricity Demand and Electrical Energy Requirement, for the years 2026-27 and 2031-32. Considering the projected demand, no power assets are expected to be stranded. Further, the Central Electricity Authority (CEA) has issued an advisory to all the Thermal Power Utilities not to retire or repurpose their coal-based power stations in next 5-6 years and ensure the availability of thermal units after carrying out Renovation & Modernization (R&M) activities, if required, considering the expected energy demand scenario and availability of capacity in future.

(e) : With the following in place measures, the highest ever peak demand of 250 GW has been successfully met in Q1 of FY 2024-25:

(i) Directions have been issued by the Ministry of Power, under Section 11 of the Electricity Act, 2003, for Imported Coal Based (ICB) Plants to continue generation support during high-demand period. These directions have been extended till 15.10.2024, keeping in view the shortages during evening peak periods.

(ii) Similar to the directions issued for ICB Plants, Section 11 directions were also issued to gas-based power plants.

(iii) Planned Maintenance of generating units were reduced to a minimum level, during the summer high-demand period. Partial and forced outages of generating units are also minimized to maximize the availability of generation capacity. Moreover, plants under long outage were sensitized to revive their units to ensure maximum power generation during the high demand period.

(iv) All GENCOs were advised to keep their generating plants under healthy condition to ensure full capacity availability for optimal operation of various generation sources to meet the power demand.

(v) Adequate coal stock was maintained at Coal-Based Thermal stations. Further, Ministry of Power vide order dated 27.06.2024 has advised Central/ State GENCOs and IPPs to take necessary actions to import coal for blending at the rate of 4% by weight, till 15th October'24, through a transparent competitive procurement so as to have sufficient stock at their power plants for smooth operations.

(vi) Optimization of Hydro Power generation was done. All hydro stations were advised to conserve water during solar hours and dispatch maximum generation during non-solar hours to ensure adequacy of power at all times.

……3.

(vii) Any un-requisitioned /surplus power available with the generating stations is to be offered in the market as per provisions of Electricity (Late Payment Surcharge and Related Matters) Rules, 2022 and amendment thereof. This power will be utilized by any other buyer from the power market.

(viii) States were advised to utilize the PUShP portal to tie up power with other states with surplus capacity.

In addition to the measures mentioned at paras: e(i), e(iv), e(v),e(vii) and e(viii), which are still in place, the likely capacity addition from following sources: 15,360 MW from Thermal; 3,200 MW from Hydro and ; 28,900 MW from Renewable Energy, in FY 2024-25, would further improve the availability of power and provide support in meeting the peak demand and energy requirements of the country.

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GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA
UNSTARRED QUESTION NO.150
ANSWERED ON 22.07.2024

MAKING 'AATMANIRBHAR BHARAT' IN THE ENERGY SECTOR WITH THERMAL POWER

150 SMT. SANGEETA YADAV:

Will the Minister of **POWER** be pleased to state:

(a) efforts made by Government to make 'Aatmanirbhar Bharat' in the energy sector with the help of thermal power';

(b) whether Government has drawn any roadmap for enhancing the share of relatively clean thermal power in the total energy basket of the country;

(c) if so, the details thereof;

(d) efforts taken by Government in the last decade for improvement in thermal power's contribution in reducing import dependence in the Energy sector; and

(e) if so, the details thereof and if not, the reasons therefor?

A N S W E R

THE MINISTER OF POWER AND HOUSING & URBAN AFFAIRS

(SHRI MANOHAR LAL)

(a) : The Department for Promotion of Industry and Internal Trade (DPIIT), Government of India issued Public Procurement (Preference to Make in India), Order 2017 and its subsequent amendments for encouraging 'Make in India' and promoting domestic manufacturing and production of goods and services in India.

In accordance with the above provisions, MoP had notified Purchase Preference (linked with local content) for Thermal sector which, inter-alia, identified list of all goods and services or works in respect of which there is sufficient local capacity and local competition is available and mandated that only “Class-I local supplier” shall be eligible to bid for the above goods/services/works with the mandate that minimum local content should be at least 50%, irrespective of value.

(b) & (c): The Government has taken the following steps for enhancing the share of relatively clean thermal power:

(i) Promotion of installation of efficient Ultra Supercritical/Supercritical units over Subcritical Thermal Units as these units are more efficient and their emission per unit of electricity generation is less than subcritical units. 94 Numbers of Super Critical Units having capacity of 65,290 MW and 6 Numbers of Ultra Super Critical units having capacity of 4,240 MW have been commissioned as on 30.06.2024. 267 units in efficient and old thermal power plants having capacity of about 18,802.24 MW have been retired till 30.06.2024.

……..2.

(ii) Ministry of Power issued policy on Bio-mass Utilization for power generation through co-firing in coal based power plants to use 5-10% blend of biomass pellets made, primarily of agro-residue along with coal after assessing the technical feasibility. Further, revised policy for the use of agro residue-based biomass mandated usage of minimum 5% biomass co-fired along with coal for thermal power plants w.e.f. FY 2024-25 has been issued on 16.06.2023.

(iii) With a view to enhance the share of relatively clean thermal power in the total energy basket of the country, MoEF&CC has notified revised and more stringent emission norms for thermal power plants (TPPs) regarding Particulate Matter, Oxides of Nitrogen, Sulphur Dioxide and water consumption dated 07/12/2015. Further, as per MoEF&CC notification dated 05.09.2022 timelines have been given to Thermal Power Plants (TPPs) for complying with the new emission norms.

(d) & (e) : To improve the efficiency of coal fired units in Thermal Power Generation, thrust was given to set up Super-critical/ Ultra Super-critical units in the country. To ensure lifetime support for services and spares as well as to understand the technical know-how of super-critical units, Phased Manufacturing Plan (PMP) was adopted to develop requisite indigenous manufacturing facilities and technology transfer to Indian companies was carried out through Subsidiary/JVs of leading international manufacturers.

As a result PMP initiative, International Manufacturers have set up manufacturing facilities in Joint Ventures (JVs)/Subsidiary format for manufacturing of supercritical boilers/turbine generators in India. As on date, sufficient indigenous manufacturing capacity of Boilers & Turbine Generators of Super-critical/Ultra Super-critical units has been established in country.

Further, it is to be stated that dependence on imported coal for power generation over the last decade has reduced substantially. During 2014-15, domestic coal based plants have imported around 47.6 MT coal for blending (~ 8.8% of total coal receipt of 543 MT) which has reduced to 23.9 MT during 2023-24 (~2.8% of total coal receipt of 864 MT).

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GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA
UNSTARRED QUESTION NO.151
ANSWERED ON 22.07.2024

TOTAL OUTPUT OF INDIA'S THERMAL POWER PLANTS

151 DR. KANIMOZHI NVN SOMU:

Will the Minister of **POWER** be pleased to state:

(a) the details of the total output of country's thermal power plants during the last five years, State-wise;

(b) whether Government has noticed any shortage of coal supply to power plants during the last twelve months;

(c) if so, the details thereof, State-wise;

(d) whether Government has taken any steps to increase the coal supply to power plants, particularly to Tamil Nadu; and

(e) if so, the details thereof?

A N S W E R

THE MINISTER OF POWER AND HOUSING & URBAN AFFAIRS

(SHRI MANOHAR LAL)

(a) : The State/UT-wise details of the total output of thermal power plants (based on coal, lignite, natural gas, naptha and diesel) during the last five years from 2019-20 to 2023-24 and the current year 2024-25 (upto May,2024), are given at **Annexure-I.**

(b) & (c) : State-wise details of total receipt and total consumption of coal in coal based thermal power plants in the country during FY 2023-24 and FY 2024-25 (upto June, 2024), are given at **Annexure-II.**

…….2.

(d) & (e) : The various steps taken by Government to increase the coal supply to power plants of the country, including Tamil Nadu, are as follows:

(i) In order to address the issues of coal supplies to power sector, an Inter-Ministerial Sub Group comprising of representatives from Ministries of Power, Coal, Railways, Central Electricity Authority (CEA), Coal India Limited (CIL) and Singareni Collieries Company Limited (SCCL) meet regularly to take various operational decisions to enhance supply of coal to thermal power plants as well as for meeting any contingent situations relating to Power Sector including to alleviate critical coal stock position in power plants of the country.

(ii) Meetings of Inter-ministerial Secretary-level Committee, comprising of Secretary (Power), Secretary (Coal) and Chairman Railway Board, are being held regularly to monitor coal stocks.

(iii) Ministry of Power has advised all GENCOs on 27.06.2024 to import coal for blending @4% (by weight) up to 15.10.2024 in order to have adequate coal stocks at power plants end for smooth operation. The said advisory will not be applicable to domestic coal based (DCB) plants located within a radius of 200 kms from the linked mine/coal source.

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ANNEXURE-I

ANNEXURE REFERRED IN REPLY TO PART (a) OF UNSTARRED QUESTION NO.151 ANSWERED IN THE RAJYA SABHA ON 22.07.2024.

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The State/UT-wise details of the total output of thermal power plants (based on coal, lignite, natural gas, naptha and diesel) during the last five years from 2019-20 to 2023-24 and the current year 2024-25 (upto May,2024):

(All figures are in Million Units)

Name of State/UT	Actual Generation 2019-20 (MUs)	Actual Generation 2020-21 (MUs)	Actual Generation 2021-22 (MUs)	Actual Generation 2022-23 (MUs)	Actual Generation 2023-24 (MUs)	Actual Generation 2024-25 (Upto May, 2024)
Andaman & Nicobar Islands	96.19	118.48	117.24	214.57	335.79	68.78
Andhra Pradesh	59929.69	49468.95	55421.08	61541.93	71243.65	13743.19
Assam	6738.69	5698.14	7600.55	8393.08	8433.38	1472.93
Bihar	35360.76	33866.14	43940.4	55200.21	58361.8	10810.4
Chhatisgarh	117992.27	134614.5	140870.87	142599.2	162388.63	29855.13
Delhi	6015.11	5304.01	4948.57	3784.3	3755.14	1044.3
Goa	0	0	0	0	0	0
Gujarat	98106.04	95936	56922.27	55481.62	84782.49	19934.54
Haryana	17317.01	14896.38	22967.73	32139.27	28197.43	5443.58
Jammu and Kashmir	0	0	0	0	0	0
Jharkhand	26072.08	27219.97	28338.72	30472.78	35764.81	7108.36
Karnataka	23836.42	19861.24	30505.26	35014.3	44466.58	8417.46
Kerala	12.04	109.24	0	0.12	0	1.53
Lakshadweep	--	--	--	--	64.79	12.85
Madhya Pradesh	114818.28	123089.78	129634.45	135838.47	148680.03	26695.01
Maharashtra	115001.2	104137.26	122610.11	126907.03	136895.63	25973.05
Manipur	0	0	0	0	0	0
Odisha	41525.2	55206.47	60161.29	64874.24	66019.81	11361.07
Puducherry	255.79	232.15	251.13	233.07	224.1	34.85
Punjab	20901.67	17994.79	24175.82	31506.16	32462.85	6248.9
Rajasthan	46884.62	46235.27	51107.41	57418.72	61622.7	11470.18
Tamil Nadu	65746.45	51200.05	61182.76	67083.23	75333.82	14513.8
Telangana	47347.78	44760.76	51550.06	50738.2	56913.73	10629.23
Tripura	6092.94	7043.21	6332.25	7079.48	6353.31	868.18
Uttar Pradesh	119315.45	122063.71	131847.42	152063.22	154124.72	29563.95
Uttarakhand	1986.79	721.97	1012.32	0	609.78	493.5
West Bengal	71395.39	72735.07	83216.77	87612.45	89513.96	15787.24
GRAND TOTAL:	**1042747.86**	**1032513.54**	**1114714.48**	**1206195.65**	**1326548.93**	**251552.01**

Note:

1. Gross generation figures are of Thermal power plants of capacity 25 MW and above only.

2. Thermal power plants comprise plants based on Coal, Lignite, Natural Gas, Naptha & Diesel as fuel.

ANNEXURE-II

ANNEXURE REFERRED IN REPLY TO PARTS (b) & (c) OF UNSTARRED QUESTION NO.151 ANSWERED IN THE RAJYA SABHA ON 22.07.2024.

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State-wise total receipt and total consumption in coal based thermal power plants in the country during F.Y 2023-24 and FY 2024-25 (upto June 2024)

(All Figures in Million Tonnes)

States	FY 2023-24 (April,2023 till March,2024)		FY 2024-25 (April,2024 till June,2024)	
	Total Receipt	Total Consumption	Total Receipt	Total Consumption
DCB Plants				
Haryana	20.5	19.3	4.9	5.5
Punjab	21.5	21.1	5.3	5.8
Rajasthan	33.4	33.6	9.3	9.4
Uttar Pradesh	102.3	99.7	27.3	28.1
Chhattisgarh	117.5	116.2	31.0	32.0
Gujarat	16.4	15.8	4.7	4.8
Madhya Pradesh	93.0	93.4	24.4	24.6
Maharashtra	92.3	90.8	24.4	24.0
Andhra Pradesh	49.8	49.1	13.1	13.4
Karnataka	26.4	25.4	7.0	6.8
Tamil Nadu	32.2	31.7	7.9	7.9
Telangana	37.0	36.9	9.9	9.9
Bihar	42.4	40.9	11.9	11.7
Jharkhand	23.9	23.2	7.0	7.0
Odisha	49.1	48.2	11.9	11.9
West Bengal	61.3	59.3	15.2	15.5
Assam	3.4	3.1	0.8	0.8
DCB Total:	**822.5**	**807.8**	**216.0**	**219.0**
ICB Plants				
Gujarat	23.2	23.3	7.8	7.9
Rajasthan	0.0	0.0	0.2	0.2
Maharashtra	3.4	3.4	0.8	0.9
Andhra Pradesh	1.6	1.6	0.6	0.6
Karnataka	4.5	4.2	1.1	1.1
Tamil Nadu	9.0	9.2	3.6	3.2
ICB-Total:	**41.7**	**41.8**	**14.2**	**13.9**
TOTAL:	**864.2**	**849.6**	**230.2**	**232.9**

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GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA
UNSTARRED QUESTION NO.152
ANSWERED ON 22.07.2024

JUST ENERGY TRANSITION PLAN

152 DR. MEDHAVISHRAM KULKARNI:

Will the Minister of **POWER** be pleased to state:

(a) whether Government will elaborate on the just energy transition plan outlined in the iForest report, with a special focus on steps to transition from coal-based energy to a $1trillion economy, if so, the details thereof; and

(b) the details of specific projects planned to repurpose 13,000 hectares of land available from closed thermal power plants (TPPs) in Maharashtra?

A N S W E R

THE MINISTER OF POWER AND HOUSING & URBAN AFFAIRS

(SHRI MANOHAR LAL)

(a) : No such report has been received by the Ministry of Power, Government of India.

(b) : As per the information of Central Electricity Authority, twenty coal based units with total installed capacity of 3,135 MW in seven different thermal power stations in Maharashtra have been retired since 2011. The spare land, after closure of Parli and Nashik thermal power stations, is being used for development of solar power project.

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GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA
UNSTARRED QUESTION NO.153
ANSWERED ON 22.07.2024

USE OF LIGNITE INSTEAD OF COAL IN POWER GENERATION PLANTS

153 # SHRI MADAN RATHORE:

Will the Minister of **POWER** be pleased to state:

(a) volume of coal currently being consumed for power generation in the country, the details thereof;

(b) whether Government has conducted any study to ascertain whether lignite can be used instead of coal in power generation plants and the likely advantages and disadvantages of the same; and

(c) the States where generation of power had reduced owing to use of lignite instead of coal and the details thereof?

A N S W E R

THE MINISTER OF POWER AND HOUSING & URBAN AFFAIRS

(SHRI MANOHAR LAL)

(a) to (c) : The details of coal consumption in Coal based thermal power plants during last three years and current year are as under:

All Figures in Million Tonnes (MT)

Year	**Domestic Coal Based Plants**		**Imported Coal Based Plants**
	Domestic Coal	**Imported Coal for Blending**	
2021-22	670.7	8.1	18.5
2022-23	723.4	33.1	20.2
2023-24	781.7	24.2	43.8
2024-25 (Apr- June)	**213.5**	**5.8**	**13.8**

The total Lignite based installed thermal capacity is 6620 MW.

Lignite and coal have different physical and chemical properties and the boilers are designed uniquely for them.

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GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA
UNSTARRED QUESTION NO.154
ANSWERED ON 22.07.2024

NATIONAL AVERAGE OF EMPLOYEE COST ON POWER GENERATION

154 SHRI SANJEEV ARORA:

Will the Minister of **POWER** be pleased to state:

(a) the national average of employee cost on power generation; and

(b) details of the same, State/UT-wise?

A N S W E R

THE MINISTER OF POWER AND HOUSING & URBAN AFFAIRS

(SHRI MANOHAR LAL)

(a) & (b) : Power Finance Corporation (PFC) publishes the 'Report on Performance of Power Utilities' annually. Employee cost per unit for state generation companies for FY 2022-23 as per the report is Rs.0.34 per kWh.

State/UTs wise available details are attached at **Annexure -I.**

Central Utilities wise available details are attached at **Annexure -II.**

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ANNEXURE-I

ANNEXURE REFERRED IN REPLY TO PARTS (a) & (b) OF UNSTARRED QUESTION NO.154 ANSWERED IN THE RAJYA SABHA ON 22.07.2024.

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Details of average employee cost on power generation in State/UTs Utilities

Employee cost in Rs/KWh	**2022-23**
Generation	
Andhra Pradesh	
APGENCO	0.52
Assam	
APGCL	0.46
Chhattisgarh	
CSPGCL	0.60
Delhi	
IPGCL	
PPCL	
Gujarat	
GSECL	0.33
Haryana	
HPGCL	0.27
Jammu & Kashmir	
JKSPDC	0.31
Jharkhand	
JUUNL	1.53
Karnataka	
KPCL	0.35
Madhya Pradesh	
MPPGCL	0.19
Maharashtra	
MSPGCL	0.32
Meghalaya	
MePGCL	1.24
Odisha	
OHPC	0.39
OPGCL	0.10
Puducherry	
Puducherry PCL	0.58
Rajasthan	
RRVUNL	0.15
Telangana	
TSGENCO	0.72
Uttar Pradesh	
UPJVNL	0.61
UPRVUNL	0.21
Uttarakhand	
UJVNL	0.57
West Bengal	
WBPDCL	0.26
Grand Total	**0.34**

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ANNEXURE-II

ANNEXURE REFERRED IN REPLY TO PARTS (a) & (b) OF UNSTARRED QUESTION NO.154 ANSWERED IN THE RAJYA SABHA ON 22.07.2024.

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Details of average employee cost on power generation in Central Generating Utilities

Sl. No.	Central Generating Utilities	Employee Cost FY 2022-23 (in Rs/KWh)
1.	Damodar Valley Corporation (DVC)	0.35
2.	National Hydroelectric Power Corporation Ltd (NHPC)	0.48
3.	North Eastern Electric Power Corporation Limited (NEEPCO)	0.61
4.	National Thermal Power Corporation (NTPC)	0.16

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GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA
UNSTARRED QUESTION NO.155
ANSWERED ON 22.07.2024

THERMAL POWER CAPACITY

155 DR. AJEET MADHAVRAO GOPCHADE:

Will the Minister of **POWER** be pleased to state:

(a) whether Government proposes for expansion of thermal power capacity in the country;

(b) if so, the details thereof and the estimated total cost for expansion of thermal power capacity;

(c) the steps taken to reduce dependency on coal-based power plants and to decrease emission levels in such thermal power plants; and

(d) the details of the percentage of electricity generated from various sources such as coal, gas, hydel and renewable energy since 2019?

A N S W E R

THE MINISTER OF POWER AND HOUSING & URBAN AFFAIRS

(SHRI MANOHAR LAL)

(a) & (b) : In order to meet the estimated electricity demand by the year 2031-32, generation planning studies has been carried out by Central Electricity Authority (CEA). As per the study results, it is envisaged that to meet the base load requirement of the country in 2032, the required coal & lignite based installed capacity is 283 GW against the present installed capacity of 217.5 GW. Considering this, Government of India propose to set up an additional minimum 80 GW coal based capacity by 2031-32.

The estimated capital cost for setting up of new coal based thermal capacity as considered in National Electricity Plan is Rs 8.34 Cr/ MW (at 2021-22 price level). Hence, the thermal capacity addition is expected to entail an investment of about Rs. 6,67,200 Crs by 2031-32.

(c) : To reduce the dependency on coal based power plants, Government has planned to augment non fossil fuel based installed electricity generation capacity to over 5,00,000 MW by 2031-32. To achieve this objective following steps have been taken to promote Renewable Energy in the country:

- Permitting Foreign Direct Investment (FDI) up to 100 percent under the automatic route;
- Waiver of Inter State Transmission System (ISTS) charges for inter-state sale of solar and wind power for projects to be commissioned by 30th June 2025,
- Declaration of trajectory for Renewable Purchase Obligation (RPO) up to the year 2029-30;

…….2.

- Setting up of Ultra Mega Renewable Energy Parks to provide land and transmission to RE developers for installation of RE projects at large scale;
- Schemes such as Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM), Solar Rooftop Phase II, 12000 MW CPSU Scheme Phase II; PM Surya Ghar: Muft Bijli Yojana;
- Laying of new transmission lines and creating new sub-station capacity under the Green Energy Corridor Scheme for evacuation of renewable power;
- Notification of standards for deployment of solar photovoltaic system/devices;
- Setting up of Project Development Cell for attracting and facilitating investments;
- Standard Bidding Guidelines for tariff based competitive bidding process for procurement of Power from Grid Connected Solar PV and Wind Projects;
- Government has issued orders that power shall be dispatched against Letter of Credit (LC) or advance payment to ensure timely payment by distribution licensees to RE generators;
- Notification of Promoting Renewable Energy through Green Energy Open Access Rules, 2022;
- Notification of "The Electricity (Late Payment Surcharge and related matters) Rules (LPS rules);
- Launch of Green Term Ahead Market (GTAM) to facilitate sale of Renewable Energy Power through exchanges;
- National Green Hydrogen Mission launched with an aim to make India a global hub for production, utilization and export of Green Hydrogen and its derivatives; and,
- Notification of prescribed trajectory for RE power bids to be issued by Renewable Energy Implementation Agencies from FY 2023-24 to FY 2027-28. Under the trajectory, 50 GW/annum of RE bids to be issued.

Further, for reduction of emission levels of thermal power plants, following measures are taken by the Government:

- MoEF&CC notification dated 07.12.2015 and its subsequent amendments has notified norms in respect of reducing stack emissions such as Suspended Particulate Matter (SPM), SOx & NOx from coal based Thermal Power Plants by using Electro Static Precipitator (ESP), Flue Gas Desulphurization (FGD), NOx Combustion Modification, etc.
- Promotion of installation of efficient Ultra Supercritical/Supercritical units over Subcritical Thermal Units.
- Biomass co-firing- Ministry of Power has issued policy on Bio-mass Utilization for Power Generation through Co-firing in Coal based Power Plants to use 5-10% blend of biomass pellets made, primarily of agro-residue along with coal after assessing the technical feasibility.

(d) : The details of the percentage of electricity generated from various sources such as coal, gas, hydel and renewable energy since 2019 is attached as **Annexure**.

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ANNEXURE

ANNEXURE REFERRED IN REPLY TO PART (d) OF UNSTARRED QUESTION NO.155 ANSWERED IN THE RAJYA SABHA ON 22.07.2024.

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Percentage of Electricity Generated from Various Sources

Year-Wise Generation from 2019-20 to 2024-25 (Up to May, 2024)								
Source Name			**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**	**2024-25 (upto May)**
			% of Total Gen	**% of Total Gen**	**% of Total Gen**	**% of Total Gen**	**% of Total Gen**	**% of Total Gen**
Conventional	**Thermal**	Coal	69.20	68.82	69.81	70.54	72.50	73.29
		Lignite	2.37	2.21	2.49	2.23	1.95	1.94
		Diesel	0.01	0.01	0.01	0.01	0.02	0.03
		Naptha	0.00	0.01	0.00	0.00	0.00	0.00
		Natural gas	3.49	3.68	2.41	1.47	1.80	2.75
	Sub Total		**75.07**	**74.72**	**74.72**	**74.25**	**76.28**	**78.00**
	Nuclear		3.35	3.11	3.16	2.82	2.76	2.76
	Hydro		11.21	10.88	10.16	9.98	7.71	6.42
	Bhutan Import		0.42	0.63	0.50	0.42	0.27	0.06
Conventional Total			**90.04**	**89.34**	**88.54**	**87.47**	**87.01**	**87.24**
Renewable Energy		Wind	4.65	4.35	4.60	4.42	4.79	4.03
		Solar	3.61	4.37	4.93	6.28	6.67	7.65
		Biomass	0.21	0.25	0.23	0.19	0.20	0.18
		Bagasse	0.78	0.82	0.84	0.79	0.62	0.34
		Small Hydro	0.68	0.74	0.70	0.69	0.55	0.41
		Others	0.03	0.12	0.15	0.16	0.16	0.15
Renewable Energy Total			**9.96**	**10.66**	**11.46**	**12.53**	**12.99**	**12.76**
Grand Total			**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

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GOVERNMENT OF INDIA
MINISTRY OF POWER

RAJYA SABHA
UNSTARRED QUESTION NO.156
ANSWERED ON 22.07.2024

NATIONAL SMART GRID MISSION

156 SHRI S NIRANJAN REDDY:

Will the Minister of **POWER** be pleased to state:

(a) current status of AT&C losses in the country and measures taken to reduce these losses in the past two years;

(b) number of fully functional smart grids and smart meters installed each year over the last five years;

(c) the amount of renewable energy integrated into smart grid systems and steps taken to ensure grid stability and efficiency;

(d) the benefits consumers have experienced from the National Smart Grid Mission (NSGM), particularly in terms of reliability, quality of supply and energy savings; and

(e) the details of cybersecurity measures put in place under NSGM to protect smart grid infrastructure from cyber threats?

A N S W E R

THE MINISTER OF POWER AND HOUSING & URBAN AFFAIRS

(SHRI MANOHAR LAL)

(a) : Details of Aggregate, Technical and Commercial **(**AT&C) losses are given below:

	FY 2020-21	**FY 2021-22**	**FY 2022-23**
AT&C loss %	21.91%	16.23 %	15.37 %

The AT&C losses have come down from 21.91% in FY2021 to 15.37% in FY2023. This reduction in losses is a result of a number of reforms and measures taken by the Government which include:

(i) Electricity (Second Amendment) Rules, 2023 mandating timely reconciliation and payment of subsidies declared by State Governments.

(ii) Ensuring that the tariff and true-up orders are issued in time.

(iii) Ensuring Energy Accounting and Audit.

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(v) Additional Prudential Norms for financing which provides that no DISCOM of a State Government will be eligible for loans from PFC/ REC if the DISCOM is making loss, unless the DISCOM, with the approval of the State Government, works out a plan for loss reduction and files it with the Central Government, and adheres to that loss reduction trajectory.

(vi) Incentive of additional borrowing space of 0.5% of GSDP if the DISCOM takes up loss reduction measures including performance against AT&C loss reduction trajectory.

(vii) Providing that loss making DISCOMs will not be able to draw funds under any Power Sector Scheme of GoI unless they put in place measures for loss reduction.

(b): **(i).** 11 Nos. of Smart Grid pilot projects under RAPDRP/ IPDS scheme and 2 Smart Grid projects under NSGM were deployed at various locations in the country to test Smart Grid functionalities.

(ii). Details of smart meters deployed in the country in last five years are below:

FY	**Deployment**	**Cumulative**
Till March 2019		4,15,071
2019-20	13,30,817	17,45,888
2020-21	6,23,112	23,69,000
2021-22	17,45,479	41,14,479
2022-23	15,01,850	56,16,329
2023-24	48,43,966	1,04,60,295
2024-25 (upto 26thJune 2024)	19,47,290	1,24,07,585

(c) : As on 30th June 2024, 147.74 GW of Renewable Energy has been integrated into the Grid. Steps taken to ensure grid stability and efficiency are given below:

i. Construction of Intra-State and Inter-State transmission systems for evacuation of Renewable power.

ii. Under Green Energy Corridor scheme, 12 number of Renewable Energy Management Centre (REMCs) in different parts of the country and one EMC at South Andaman were established mainly to forecast, schedule and monitor the wind and solar Variable Renewable Energy (VRE) resources. These REMCs are co-located with the existing RLDCs/ SLDCs. Two more REMCs are under implementation at UP and Ladakh.

iii. Under Resource Adequacy and Flexibility plan, Regulatory initiatives have been taken which includes specified minimum power level of 40% for thermal generating units, requirement of 1-3% ramp rate by thermal generators, CERC (Terms and Conditions of Tariff) Regulations, 2019, incentivizing generators to provide ramping capability beyond the threshold of 1% etc.

iv. Fast tracking of approvals of transmission schemes through sufficient empowerment of CTU

v. Short-term transmission plan every year on a rolling basis for the next 5 years

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vi. Perspective transmission plan every alternate year on a rolling basis for the next 10 years by CEA.

vii. Implementation plan for inter-state transmission system every year on a rolling basis for up to the next 5 years

viii. Implementation of CERC's General Network Access Regulations w.e.f. 1st Oct 2023

ix. Innovative products like solar-wind hybrid projects, RE projects with energy storage systems and supply of RE power balanced with power from non-RE sources started to reduce intermittency.

x. Implementation of Green Term Ahead Market (GTAM) and Green Day Ahead Market (GDAM) for sale of renewable energy.

xi. Flexibility in Generation and Scheduling of Thermal/Hydro Power Stations through bundling with Renewable Energy and Storage Power.

xii. As per Central Electricity Authority (Flexible operation of thermal power plants) Regulations, 2022, Load Dispatch Centers may schedule all coal based thermal power plants, upto the Minimum Power Level(MPL) of 40%, to support the operation of must run RE stations.

xiii. Regulation 43(4) of the Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022 specifies the centralized remote monitoring and operation of substations including the deployment of SCADA systems. To ensure Grid Stability and efficiency, the transmission system is already having SCADA at Centre & State level.

(d): National Smart Grid Mission (NSGM) was established in 2015 by Government of India, as an institutional mechanism to accelerate Smart Grid deployments and monitor the policies and programs related to Smart Grid activities in the country.

Ajmer Vidyut Vitran Nigam Ltd. (AVVNL), Rajasthan, project became the first successful pilot project to demonstrate benefits of Smart Grid functionalities viz. AMI for automatic energy audit and loss reduction analytics which includes energy theft monitoring and tamper alerts. A case study on the pilot project in AVVNL for 1,000 consumers on single feeder for the period of 6 months starting October 2016, highlighted the following benefits to the DISCOM and the consumers:

i. Improved customer satisfaction level with accurate billing, real time consumption information, outage notification (with mobile app)

ii. Real-time detection and recording of outages, reduced equipment failure- faster fault detection and restoration

iii. Outage time reduction by 20%

iv. Reduction in failure rate of meters by 50%

v. Reduction in failure rate of transformers by 30%

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vi. Automation of meter reading and meter punching with smart meter- removes cost of manual reading and punching

vii. Bill Generation Cycle Reduction from 14 Days to 5 Days

viii. Automatic DT wise energy audit identified high loss area for reducing losses.

ix. AT&C loss reduction from 20% to 13.5%

(e) : CEA published AMI functional requirements in August 2016 which outlines cyber security measures like secure access controls, authorisation controls, event logging, software hardening, network security, malicious software prevention etc. The projects sanctioned under NSGM followed CEA AMI functional requirements and deployed Smart Meters as per IS16444 standard which refers to IS 15959 for secure data exchange protocols based on DLMS/ COSEM, data encryption, authentication etc.

NSGM included a separate module on Cyber Security (Module-8) in the training course developed which has been used in training more than 450 utility professionals till date.

Further, a Standard Bidding Documents (SBD) has been prepared for implementation of Advanced Metering Infrastructure (AMI) under RDSS with the support of NSGM. The SBD incorporates adequate cyber security best practices in-line with the guidelines of Ministry of Electronics and Information Technology (MEITY) and relevant Computer Emergency Response Teams (CERTs) for implementation by all Advanced Metering Infrastructure Service Provider (AMISP).The SBD has been adopted for smart metering implementation under Revamped Distribution Sector Scheme (RDSS).

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