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STANDING COMMITTEE ON ENERGY

(2023-24)

SEVENTEENTH LOK SABHA

MINISTRY OF NEW AND RENEWABLE ENERGY

BIO-ENERGY AND WASTE TO ENERGY – RECOVERY OF ENERGY FROM URBAN, INDUSTRIAL AND AGRICULTURAL WASTES/RESIDUES AND ROLE OF URBAN LOCAL BODIES IN ENERGY MANAGEMENT

FORTY-FIRST REPORT

LOK SABHA SECRETARIAT
NEW DELHI

December, 2023/Agrahayana, 1945 (Saka)

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Presented to the Lok Sabha on 19th December, 2023

Laid in the Rajya Sabha on 19th December, 2023

सत्यमेव जयते

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SECRETARIAT

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2.	Shri Kulmohan Singh Arora	Additional Director
3.	Ms. Madhumita	Assistant Committee Officer

** Vacant vice Shri Uttam Kumar Nalamada Reddy ceased to be Member of the Committee w.e.f. 13th December, 2023 consequent upon his resignation from membership of the Lok Sabha.*

INTRODUCTION

I, the Chairperson, Standing Committee on Energy, having been authorized by the Committee to present the Report on their behalf, present this Forty-First Report of the Committee on the subject 'Bio-Energy and Waste to Energy – Recovery of Energy from Urban, Industrial and Agricultural Wastes/Residues and role of Urban Local Bodies in Energy Management' pertaining to the Ministry of New and Renewable Energy.

2. The Committee held a briefing on the subject with representatives of the Ministry of New and Renewable Energy, NITI Aayog and Ministry of Housing and Urban Affairs on 19th May, 2023. The Committee again held discussion on the subject with representatives of the Ministry of New and Renewable Energy, Ministry of Housing and Urban Affairs and Ministry of Agriculture and Farmers' Welfare on 1st June, 2023.

3. The Committee took evidence of representatives of the Ministry of Power, Central Electricity Authority, NTPC Limited, Damodar Valley Corporation and NLC India Limited on 15th June, 2023. The Committee wish to express their thanks to all the representatives of the above mentioned Ministries and Organizations for appearing before the Committee and furnishing the desired information in connection with the issues relating to the subject.

4. The Report was considered and adopted by the Committee at their sitting held on 14th December, 2023.

5. The Committee place on record their appreciation for the assistance rendered to them by the officials of the Lok Sabha Secretariat attached to the Committee.

6. For the facility of reference and convenience, the observations and recommendations of the Committee have been printed in bold letters in Part-II of the Report.

New Delhi;
December 14, 2023
Agrahayana 23, 1945 (Saka)

Jagdambika Pal
Chairperson,
Standing Committee on Energy

REPORT

PART I
NARRATION ANALYSIS

CHAPTER I
INTRODUCTORY

1.1 **'Bio-Energy'** or energy from biomass has always been an important energy source for the country considering the benefits it offers. It is renewable, widely available, carbon-neutral and has the potential to provide significant employment in the rural areas. Biomass is also capable of providing firm energy. About 32% of the total primary energy use in the country is still derived from biomass and more than 70% of the country's population depends on it for its energy needs. According to International Energy Agency (IEA) Bioenergy Report 2022, Modern bioenergy is the largest source of renewable energy globally, accounting for 55% of renewable energy and over 6% of the global energy supply.

1.2 **'Waste to Energy'** refers to the recovery of energy in the form of Biogas/BioCNG/Electricity from agricultural, industrial and urban wastes of renewable nature such as municipal solid wastes, vegetable and other market wastes, slaughterhouse waste, agricultural residues and industrial/Solid Treatment Plant (STP) wastes & effluents. In recent years, technologies have been developed that not only help in generating substantial quantity of decentralized energy but also in reducing the quantity of waste for its safe disposal.

1.3 There are different types of waste which are generated from our daily or industrial activities such as organic waste, e-waste, hazardous waste, inert

waste etc. However, organic waste has significant portion in overall waste generation in industrial/urban/ agricultural sector and therefore, it can be used for energy generation. The organic fraction of waste can be further classified as non-biodegradable and biodegradable organic waste.

(i) Biodegradable waste consists of organics that can be utilized for food by naturally occurring micro- organisms within a reasonable length of time. The biodegradable organic comprise of agro residue, food processing rejections, municipal solid waste (food waste, leaves from garden waste, paper, cloths/ rags etc.), waste from poultry farms, cattle farm slaughter houses, dairy, sugar, distillery, paper, oil extraction plant, starch processing and leather industries.

(ii) Non-Biodegradable organic materials are organics resistant to biological degradation or have a very low degradation rate. This primarily includes woody plants, Cardboard, cartons, containers, wrappings, pouches, discarded clothing, wooden furniture, agricultural dry waste, bagasse, rice husk etc.

1.4 In 2022, at CoP-26 in Glasgow, India has made a commitment to increase its non-fossil fuel based installed energy capacity to 500 GW by 2030. The projected installed capacity of biomass energy is 14.5 GW by the year 2030. The total estimated energy generation potential from urban and industrial organic waste in India is approximately 5.69 GW. The current capacity of Bio-Energy and Waste to Energy in the Country is given in the table below:

Ministry of New & Renewable Energy (MNRE)		
Programme/Scheme wise Cumulative Physical Progress as on 31.10.2023 Installed RE Capacity (CAPACITIES IN MW)		
S. No.	**Sector**	**Cumulative Achievements**

1	Biomass (Bagasse) Cogeneration	9,433.56
2	Biomass(non bagasse)Cogeneration	828.25
3	Waste to Power	249.74
4	Waste to Energy (off-grid)	323.72
Total		10,835.19

1.5 Since 1980s, the Bio-Energy sector has been promoted by providing financial assistance through targeted schemes. Separate Central Sector Schemes were implemented by MNRE between 2018 to 2021. Under these schemes, Central Financial Assistance (CFA) to project developers were provided for setting up of projects for generation of Biogas/Producer gas/BioCNG/Power. The details of schemes along with their achievements has been provided in the table below:

Sector	**Cumulative Achievement till 31.03.2021**
Waste to Energy Projects (Biogas, BioCNG& Power)	394 MWeq (Mega Watt equivalent) (228 nos. of projects)
Biomass Power/Cogen Projects	10,145 MW (Mega Watt)
Small &Medium Biogas Plants	50.8 Lakhs

1.6 To support a greater number of projects and promote ease of doing business in the Country, MNRE expanded the Bio-Energy programme by bringing all three separate schemes under one umbrella programme viz. **National Bioenergy Programme (NBP)**. The Programme has a budget outlay of Rs. 1,715 crore and is to be implemented in two phases. In Phase-I of the programme, a total outlay of Rs. 858 crore have been sanctioned which also

includes the committed liabilities of the sanctions issued under the various schemes of the programme upto 31st March 2021. The period of Phase-I is from 2021-22 to 2025-26. Component wise details of capacity to be added along with expected investment and budget outlay is given in the table below:

Sector	**Envisaged capacity to be added**	**Expected Investment (Rs in crore)**	**Budget outlay of Phase-I (Rs in crore)**
Waste to Energy Programme	Compressed Bio Gas (CBG) Projects: 200 no.	6,000	600
Biomass Programme	Pellet/briquettes manufacturing plants: 800 no. (2400tonnes per hour) Biomass cogen projects: 40 no (200MW)	4,000	158
Biogas Programme	Small & Medium- 1.66 Lakh no projects	650	100
		Rs. 10,650 crore	**Rs. 858 crore**

1.7 The main features of NBP are as follows:

(i) Online submission of applications

(ii) Minimal documentation

(iii) Self-funded projects eligible for CFA.

(iv) Advance CFA for bank financed BioCNG projects under SATAT

(v) 20% higher CFA for special category states (NE Region, Sikkim, Himachal Pradesh and Uttarakhand and UTs of Jammu & Kashmir, Ladakh, Lakshadweep and Andaman & Nicobar Island) and Gaushalas.

(vi) Registered corporate entities also allowed for scheme implementation under Biogas programme in consultation with SPIAs

(vii) CFA for small and medium size biogas plants increased.

(viii) MSW to Power projects are now supported by MoHUA.

1.8 Convergence of MNRE's Bioenergy Programme

The BioCNG component of the programme supports the SATAT (Sustainable Alternative Towards Affordable Transportation) initiative of the Ministry of Petroleum and Natural Gas (MoPNG) and GOBARdhan (Galvanizing Organic Bio-Agro Resources Dhan) scheme of Department of Drinking Water and Sanitation, Ministry of Jal Shakti. NBP also finds convergence with Swachh Bharat Mission (Urban) 2.0 of MoHUA and National Mission on Co-firing of Biomass in Thermal Power Plants (SAMARTH Mission) of the Ministry of Power. Details of these schemes are given below:

(i) Gobar-Dhan component of Swachh Bharat Mission (Grameen) under Department of Drinking Water and Sanitation (DDWS) provides financial assistance of up to Rs. 50 lakh per district for setting up biogas plants. Cluster and community level biogas plants can be constructed at village/block/district levels (being implemented in modified form since 2020).

(ii) SATAT of MoPNG has the objective of establishing 5000 Compressed Bio Gas (CBG) plants across the country with an estimated production of 15

MMT CBG per annum by 2023. Under the Scheme, the Oil and Gas Marketing Companies will have a long-term assured purchase prices agreement with the CBG plants (being implemented since 2018).

(iii) Under **Swachh Bharat Mission (Urban)** of MoHUA, funds are provided for various activities of Solid Waste Management including setting up of waste biomethanation plants and Waste to Electricity plants. Under SBM-U 2.0, projects under PPP mode are encouraged.

(iv) The Biomass Programme promotes manufacturing of pellets and briquettes for use in power generation. This component of the programme supports the **SAMARTH Mission** of the Ministry of Power.

1.9 When asked about the estimated time of completion, money spent so far and the details of investments made upto this point under Phase-I of NBP, the Ministry of New and Renewable Energy in a written reply stated that:
"Phase-I of the National Bioenergy Programme is scheduled to be completed by March 31, 2026. In terms of expenditure under Phase-I, Rs 72 crore has been spent thus far from committed liabilities. However, expenditure pertaining to new proposals received under the NBP have not been made yet as it will be processed after the receipt of proposals for disbursement of Central Financial Assistance (CFA). Under Phase-I, a total investment of approximately Rs. 2,700 crore has been made towards projects that have received approval or are currently under the process of approval by the Ministry of New and Renewable Energy."

1.10 The details of different components of NBP as well as the measures of different Ministries have been dealt with in subsequent chapters viz.

(i) Energy from Waste

(ii) Energy from Biomass

(iii) Recovery of Energy in the form of Biogas

CHAPTER II
ENERGY FROM WASTE

2.1 The objective of MNRE's Waste to Energy programme is to support the setting up of Waste to Energy projects for generation of Biogas/BioCNG/Power/Producer or Syngas from urban, industrial and agricultural wastes/residues.

2.2 As per the Ministry of Housing and Urban Affairs (MoHUA), the waste generation in urban areas of the country is currently around 1.5 lakh tonnes per day (TPD), which is expected to rise to 4.5 lakh TPD by 2031 and by 2050, it will be close to 12 lakh TPD.

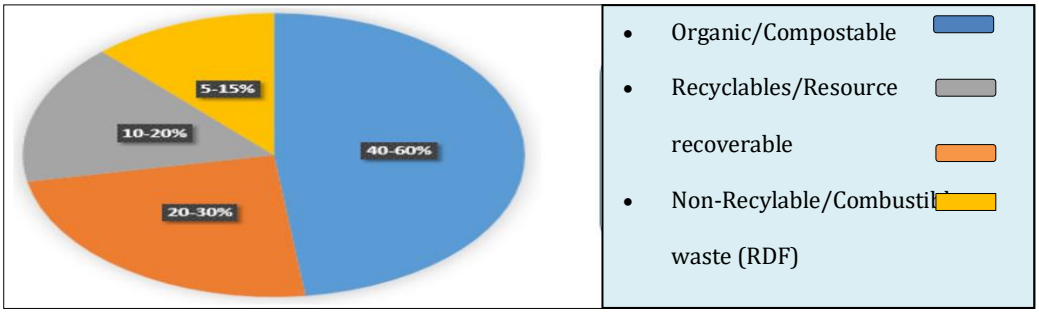
2.3 The Solid Waste Management (SWM) Rules 2016 notified by the Ministry of Environment, Forests and Climate Change (MoEFCC) clearly define the rules for different statutory bodies in carrying out the municipal solid waste management (MSWM) and describe clearly the methods to be followed. The principles on which MSWM stands are:

(i) segregation of waste at source i.e., at the waste generation stage itself into two basic streams of wet (Biodegradable) waste and dry (Non-Biodegradable) waste, and,

(ii) door to door collection of waste.

Without these two principles, the MSWM is not successful.

2.4 The normative characterisation of MSW is as follows:



2.5 Regarding the processing of MSW, several methods and technologies have been used in the country such as:

(i) Composting

(ii) Biomethanation

(iii) Recycling of dry waste and

(iv) Incineration of non- recyclable combustible dry waste.

To support these infrastructure, Government has started Swachh Bharat Mission (SBM) Urban (U).

2.6 Intervention of SBM (U)

The Swachh Bharat Mission- Urban was launched on 1st October 2014 as a national flagship programme aimed at eradicating open defecation and establishing efficient solid waste management practices. The continued mission i.e. Swachh Bharat Mission Urban 2.0 was launched on 1st October 2021 with the vision of realizing Garbage Free Cities by 2026. The key components of the Mission comprise of:

(i) Sustainable Sanitation

(ii) Sustainable Solid Waste Management

(iii) Used Water Management

(iv) Information, Education and Communication (IEC)

(v) Capacity Building.

Under SBM (U) 2.0, Additional Central Assistance (ACA) is being provided to Urban Local Bodies (ULBs). The ACA varies between different States & ULBs depending upon their characteristics as follows:

S. No.	Type of State/UT	Central Share per Unit(%)	Minimum State/UT share per unit (%)	Balance (from 15th Finance Commission funds, ULB share, private sector share)
1.	UTs without Legislature	100	0	-
2.	UTs with legislature	80	20	-
3.	North East and Hilly States	90	10	-
4.	Other States :ULBs with population of above 10 lakh	25	16	59
5.	Other States :ULBs with population between 1-10 lakh(both included	33	22	45
6.	Other States :ULBs with population of less than 1 lakh	50	33	17

2.7 Waste processing infrastructure under SBM (U):

Details of existing & proposed waste processing facilities under SBM (U) are as below:

Existing Facilities		**Proposed under SBM (U) 2.0**
Type of Project	**Designed Capacity (TPD)**	**Designed Capacity (TPD)**
Waste to Compost	98,544	30,700
Waste to Electricity	11,114	9,700
Bio-methanation	3,135	15,200
Materials Recovery Facility (MRF)	74,830	45,200
Total	1,87,623	1,00,700

It is seen from the above that two kinds of Waste to Energy infrastructure is proposed i.e., Bio-methanation plants, and Waste to Electricity plants.

(i) Bio-methanation plants

This is for processing of the segregated wet waste fraction through the process of anaerobic digestion generating methane, carbon dioxide, water and traces of hydrogen sulphide. The process yields 50-60% methane only, hence, there is need to remove carbon dioxide and H2S and enrich the biogas to confirm to IS:16087 with minimum 92% methane. This enriched biogas is a substitute to natural gas. The Bio-methanation process plants have been adopted in SBM 2.0 proposals for cities or cluster of cities with total population of minimum 3 lakhs from which minimum of 50-60 TPD segregated wet waste can be processed. The compressed biogas yield is about

3%. CFA of Rs. 18 crore/100 TPD is being provided under SBM (U) 2.0 for Bio-methanation.

(ii) Waste to Electricity plants

These plants typically process the dry fraction of MSW through incineration. Sometimes, pre-processed mixed waste is also incinerated. In these plants, the entire waste gets burned to generate heat energy. As per SWM rules, only the non-recyclable combustible waste can be used in these plants. These plants generate power at the rate of 1MWe per 20-30 TPD dry waste (i.e., about 100 TPD mixed waste). After the incineration of waste, the process is typically the same as in the thermal power plants. The major difference is that MSW fuel characteristics are variant throughout the operation unlike that of coal in a thermal power plant.

Waste to Electricity plants are fully industrial kind of units which reduce the volume of waste and leave about 20-25% bottom ash at much less volume which can be landfilled in a sanitary landfill (SLF).

Government has classified the power generated from Waste to Electricity plants as renewable power and the DISCOMs are obligated to evacuate entire such power under the tariff policy. CFA of Rs. 18 crore/MWe is being provided under SBM (U) 2.0 for this plant. Waste to Electricity infrastructure proposed under SWM (U) 2.0 is 9,700 TPD.

2.8 Some of the initiatives under SBM in setting up Waste to Energy plants (Bio- methanation & Electricity) are:

(i) Under SBM-Urban 2.0, impetus is on creating sustainable infrastructure for efficient and scientific Waste to Electricity and Bio-methanation projects.

(ii) Engineers India Limited (EIL) has been engaged for providing Technical and Transaction Advisory support to States/cities. Shortlisted States/ULBs can avail these services at no-cost basis.

(iii) With EIL the Ministry is in process to finalize around 25-30 million plus population and other cities having potential for developing Waste to Electricity and Bio-methanation projects.

(iv) Assisting State Governments and Cities for planning and setting up integrated waste to energy plants to ensure sustained supply of waste.

(v) The Ministry is providing Model request for proposals (RFPs) and Concession Agreement for setting up Waste to Energy plants.

(vi) Determination/revision of unified tariff for Waste to Electricity is proposed.

(vii) Development of different financial models for sustainability of large SWM projects/Waste to Electricity and enabling finances from Multilateral agencies.

(viii) Non-funded guarantee instrument through Urban Infrastructure Development Fund (UIDF) for waste processing/waste to energy units to increase credit worthiness.

(ix) 5% Compressed Bio-Gas (CBG) blending mandate for all companies marketing natural gas.

(x) Exemption of excise duty on amount of GST paid blended with CNG.

(xi) Budget Announcements enabling development of waste to energy projects. As per para no. 56 "Enhanced focus will be provided for 100% scientific management of dry and wet waste in all the cities town"

2.9 When asked about the reason for only 10 States having Waste to Electricity plants that are operational, planned or under-construction and the

ways in which the remaining States can be persuaded to follow suit, MoHUA in a written reply furnished the following:

"Municipal Solid Waste (MSW) is heterogeneous in nature and has high moisture content. Segregation of waste and avoiding moisture is the key factor for ULBs to achieve before planning Waste to Electricity plants. Further, Waste to Energy plants need substantial quantum of waste and guaranteed supply of the same on daily basis. Only large cities more than, say 20 lakh population having sound door to door collection and transportation system are suitable to plan Waste to Electricity plants.

The CERC in 2015-16 had determined Power Tariff from Waste to Electricity as Rs. 7.04/KWH for mass incineration plants and 7.90/kilowatt hour (KWH) for Refused Derived Fuel (RDF) based plants. This tariff is higher than that of other renewable energy such as Solar. Hence, DISCOMs have concerns to execute PPAs with these plants. The generation capacity is also small.

The Waste to Electricity Plants have to be treated essentially as waste processing plants because of their proven capacity to guzzle waste. Hence, the Ministry is supporting and guiding States/ UTs to set up these Plants in large cities. It has also made a Memorandum of Understanding (MoU) with EIL for complete project development and Transaction Advisory Support in the Waste to Electricity sector without any cost to State/UTs/ULBs as an incentive to Waste to Electricity proposals."

2.10 When the issues of environmental concerns, noise, odor and safety concerns of locals residing beside Waste to Electricity plants and their agitation to the setting up or operation of such plants was raised and the ways in which these issues could be addressed, the experience regarding

existing operational plants and the standards in other countries regarding bad odor was inquired, the MNRE in a written reply furnished to the Committee that:

"The existing norms for setting up of Waste to Electricity Plants and their operations & maintenance are examined and consented to by CPCB/SPCB/PCCs including that for buffer spaces. The problem is the lack of segregation on the part of citizens. Segregation, if done properly at least as dry and wet waste- will minimize leachate generation and reduce odor issues thereby.

In other countries, the population pressure around the Waste to Electricity Plants is far less that in India due to dense urban population. The Waste to Electricity plants in other countries are set up as fee-based industry hence located in industrial areas. However, Waste to Electricity Plants are capable of odour control. Buffer spacing norms implemented in other countries have been adapted in India as well."

2.11 Support provided by MNRE

The Waste to Energy programme provides CFA to project developers and service charges to implementing/inspection agencies in respect of successful commissioning of Waste to Energy plants for generation of Biogas, Bio-CNG/enriched Biogas/Compressed Biogas, Power/generation of producer or syngas. Details of the financial assistance available under the Programme on Energy from Urban, Industrial and Agricultural Wastes/ Residues for setting up Waste to Energy plant is as follows:

(i) Biogas generation: Rs 0.25 crore per 12,000cubic meter/day

(ii) BioCNG generation: Upto Rs 4.0 crore per 4800 kg/day

(iii) Power generation based on Biogas: Upto Rs 0.75 crore/MW

(iv) Power based on bio & agro-industrial waste: Rs 0.4 crore/MW

(v) Biomass Gasifier: Upto Rs 1.5 crore per MW

(vi) 20% higher CFA for special category states (NE Region, Sikkim, Himachal Pradesh and Uttarakhand, Jammu & Kashmir, Ladakh, Lakshadweep, Andaman & Nicobar Islands) and Gaushalas/Shelters.

2.12 Recovering energy from waste - Initiatives by different organizations:

(i) NTPC Limited

(a) NTPC has revived the defunct Municipal Solid Waste Processing Plant of 600 TPD capacity at Karsada, Varanasi and has been operating the same since July 2017. The waste received from the Varanasi Nagar Nigam is processed daily. This plant played an important role in making Varanasi the 'Best Ganga Town' in the Swachh Survekshan 2021.

(b) Municipal Solid Waste (MSW)- Refused Derived Fuel (RDF) Enhanced Steam Gasification & Power:- Waste to Energy includes gasification of MSW-RDF with producer gas cleaning and generation of electricity in a suitable gas engine. The purpose of Phase-I is to first achieve stable gasification, gas cleaning & power generation and subsequently enhancing the percentage of hydrogen inproducer gas. A pilot project of 16 TPD RDF / 4OO kWe capacity is commissioned on 15.08.2022 at NTPC Energy Technology Research Alliance (NETRA).

(c) Waste to Products:- NTPC Vidyut Vyapar Nigam Limited (NVVN) (a wholly owned subsidiary of NTPC) is setting up a 600 TPD Waste to Charcoal project at Ramna, Varanasi to process 600 TPD of MSW into Charcoal.

Performance Guarantee (PG) test for first reactor has been successfully completed and erection work of pre-processing facility is in progress.

(ii) Damodar Valley Corporation (DVC)

(a) Conversion of food/bio-Waste to Energy:- DVC has signed an MoU with NIT Jamshedpur on 13.08.2022 to execute a pilot project on conversion of food/bio-waste to energy at one of its thermal power stations. The project status is as below:

- Sources of food/bio-waste and its quantification done at Mejia Thermal Power Station (MTPS), DVC (food waste-20kg/day approx.)
- Design, Development & Engineering of a small-scale pilot project model (15 kg capacity) is in progress at NIT-Jamshedpur.
- A suitable site (Mega Mess) has been identified. The developed model will be placed nearer to the mess for study (by Aug.2023).
- After feeding the input into the digester model, the performance study and its optimization will be carried out.
- The Project completion timeline is February 2024.
- Based on the results, a large-scale waste to energy digester system including design, engineering, erection & commissioning at MTPS, DVC will be taken up for biogas production and its uses in the canteen.

(b) Municipal Solid Waste (MSW) to Energy at Asansol:- DVC is exploring a pilot project to convert the fresh municipal solid waste generated in Asansol Municipal area into Torrefied charcoal / RDF for cofiring in their existing coal based thermal power plants. The project is in the discussion stage with Asansol Municipal Corporation. The present status of the project is that the Detailed Project Report (DPR) has been prepared and submitted to Asansol Municipal Corporation on 05.06. 2023.

CHAPTER III
ENERGY FROM BIOMASS

3.1 Every year about 22 million tonnes of rice straw is burnt in Punjab and Haryana. Since last few years, Delhi/NCR regions has been facing heavy pollution level and getting covered under the blanket of smog in the month of October-November after harvesting season. Stubble burning in fields emits a large amount of ash/soot/unburnt carbon to the atmosphere which is the real cause of air pollution and elevates the Particulate Matter (PM) 2.5 and PM 10 level in the atmosphere. It is learnt that farmers burn stubble as they find it the cheapest, quickest and easiest means to prepare the land for the next crop because of the short time available. Stubble burning in fields also reduces soil fertility by killing the critical bacterial and fungal populations.

3.2 Agro residue is an untapped resource that is available in huge quantity, estimated at around 250 million metric tonnes (MMT) annually. When agro residue-based fuel, in the form of pellets, is utilized in coal-fired power plants, it burns completely in the power plant, and ash emitted from its combustion gets absorbed in Electro Static Precipitator (ESP) which prevents air pollution while generating power from it.

3.3 Most power plants in India are running on coal. To reduce greenhouse gas emissions from its coal-based thermal power plants, the power plant intends to utilize agro residue-based pellets/torrefied pellets along with coal for power generation through biomass co-firing which is a technology recognized by UNFCCC to mitigate carbon emission.

3.4 Biomass co-firing

A low-cost option for converting biomass efficiently and cleanly to electricity by adding biomass as a partial substitute fuel in high-efficiency coal fired boilers.

3.5 Benefits of Biomass co-firing

(i) Carbon neutral: Net Zero emissions: Enhancing climate

(ii) Existing Infrastructure utilization: Capitalizing on the large investment and infrastructure associated with the existing coal-based power plants.

(iii) Greenhouse Gas (GHG) reduction: Biomass co-firing is a suitable method to reduce GHG emission, because this process reduces net CO2, PM, SO2 and often NOX emissions, compared to coal combustion.

(iv) Reduction in Coal Dependency: It reduces the over reliance on coal for power generation.

(v) Supplement Renewable source: Many coal plants are aging and near replacement, cofiring with biomass could be an excellent survival strategy to bring down specific CO2 emissions of aging plants.

(vi) Income generation**:** Revenue source for MSME entrepreneurs and Farmers.

3.6 Benefits of Biomass co-firing for the stakeholders:

GENCOs	**Pellet Manufacturers**	**Farmers**
Handy solution for Green energy generation with Minimal Infrastructural changes.	New & lucrative - Blue ocean Business strategy	Additional income source for farmers through selling of Agro-residue.
Less dependability on coal	Government Financial assistance schemes for pellet plant set-up.	Employment generation for Marginal farmers.

Lesser Carbon Footprint	Opportunity towards India's Green energy Transition.	Improves soil health by saving from negative effects of stubble burning
Considered under Renewable Purchase Obligation (RPO) by MNRE		Helps the farmers to clear the land for next crop at no cost.

3.7 Current schemes/programmes

The Ministry of Power is implementing a National Mission on use of Biomass in coal based thermal power plants known as **SAMARTH (Sustainable Agrarian Mission on use of Agri Residue in Thermal Power Plant) Mission**. Details of the Mission are as follows:

(i) Under this National Mission, a full time body namely Mission Directorate has been constituted which is coordinating and monitoring the overall policy implementation and the targets of the National Mission. The duration of the proposed National Mission would be a minimum 5 years.

(ii) The mission aims at conversion of Biomass to Power in an eco-friendly and cost effective manner with suitable market mechanism thereby mitigation of air quality deterioration. As a result, the mission is expected to address the issue of air pollution due to farm stubble burning as well as reduce carbon footprints of thermal power generation.

(iii) The objectives of the mission are as follows:

(a) To expand Biomass co-firing across all thermal power plants (TPPs) in the country and to have a larger share of carbon neutral power generation from the TPPs.

(b) To take up R&D activity to handle the biomass pellets with higher amount of silica & alkali.

(c) To facilitate in overcoming the constraints in supply chain of Biomass pellets and agro- residue and its transportation upto the power plants.

(d) To resolve regulatory issues in Biomass co-firing.

3.8 The **Biomass programme** of MNRE aims at supporting the setting up of Biomass Briquette/Pellet manufacturing plants and to support Biomass (non-bagasse) based cogeneration projects in industries in the country. The broader objectives of the scheme are to reduce stubble burning by utilizing surplus agricultural residue, to provide additional source of income to farmers through sale of surplus agro residue and to enable better environmental practices and reduce pollution. For achieving these objectives, the MNRE provides CFA to project developers and service charges to implementing agency and inspection agencies in respect of setting up of Briquette/Pellet manufacturing plants and Biomass (non- bagasse) cogeneration projects in industries.

3.9 Enabling Policies

(i) The revised policy of the Ministry of Power issued on 08.10.2021 on Biomass utilization for power generation through co-firing in coal based power plants states the following:

(a) mandatory use of 5% blend of biomass pellets made, primarily, of agro residue along with coal with effect from one year of the date of issue of this policy.

(b) this obligation shall increase to 7% with effect from two years after the date of issue of above policy and thereafter.

(c) The policy shall be in force for 25 years or till the useful life of TPPs, whichever is earlier.

(d) The increase in cost due to co-firing of biomass pellets shall be passed through in Energy Charge rate (Projects under Sec 62, Electricity Amendment (EA) 2003) or can be claimed under Change in law provisions (Projects under Sec 63, EA 2003).

(e) Additional Impact on ECR shall not be considered in deciding Merit Order Dispatch (MOD) of the power plant.

(f) Addendum to Revised Policy for Biomass was issued on 03.05.2023, which includes Bamboo and its by-products, Horticulture waste, Elephant Grass, Sarkanda etc. for manufacturing Biomass pellets.

(ii) The Ministry of Power (MoP) issued Revised Model Long term contract for Biomass supply on 06.01.2023. The Minimum tenure of Model contract shall be seven years. This is expected to help in developing Biomass supply chain infrastructure.

(iii) As per MNRE, the power generated from co-firing of biomass in TPPs is renewable energy and such power is eligible for meeting other RPO.

3.10 Financial Support

(i) Briquette/ Pellet Manufacturing plants: Rs. 9 Lakh per TPH of capacity with a capping of Rs. 45 Lakh per project by MNRE.

(ii) Biomass (Non-bagasse cogeneration projects): Rs. 40 Lakh per project with a capping of Rs. 5 crore per project by MNRE.

(iii) Central Pollution Control Board (CPCB) financial support under Environment Protection Charge (EPC) Funds which states that in case of both pelletisation plant & torrefaction plant, a maximum amount of Rs. 28 lakh per tonne plant production capacity per hour, or 40% of the capital cost considered for plant and machinery of a 1 TPH plant, whichever is lower, shall be given as one-time financial support by CPCB, subject to a maximum total financial support of Rs. 1.4 crore per proposal.

(iv) Model Standard Operating Procedure (SOP) on co-firing of Biomass pellet in fluidized bed combustion (FBC) and pulverized-fuel (PF) Boilers was issued to all TPPs.

(v) Procurement Provision of Biomass Category has been created on Government e Marketplace (GeM) portal.

(vi) RBI has approved 'Biomass pellet manufacturing' as an eligible activity under Priority Sector Lending (PSL).

(vii) Total purchase order (PO) has been placed for 69.06 lakh metric tonnes (LMT) (NTPC - 45.12 LMT). Tendering of 114 million metric tonnes (MMT) of Biomass pellets is under different stages in the country. 20 new power plants have started co-firing of Biomass in 2022-23.

(viii) As a result of these efforts, a total 1.64 LMT of Biomass has been utilized as Green fuel for co-firing in power plants so far. Till 31.05.2023, 47 TPPs across the country has started utilizing Biomass in the co-firing with coal.

(ix) As per para 6.4 (1) (ii) of Revised Tariff Policy 2016, "Distribution Licensee(s) shall compulsorily procure 100% power produced from all the Waste-to-Energy plants in the State, in the ratio of their

procurement of power from all sources including their own, at the tariff determined by the Appropriate Commission under Section 62 of the Electricity Act, 2003".

(x) As per para 6.4(2) of Revised Tariff Policy 2016, "States shall endeavor to procure power from renewable energy sources through competitive bidding to keep the tariff low, except from the Waste to Energy plants. Procurement of power by Distribution Licensee from renewable energy sources from projects above the notified capacity, shall be done through competitive bidding process, from the date to be notified by the Central Government".

3.11 When asked about the challenges being faced by Biomass sector and the ways in which these challenges can be tackled, a representative of NITI Aayog made the following remarks:

"I think this is sourced from the MNRE that there is availability of some 750 million metric tonnes of biomass per year, and the surplus availability is projected to be around 230 million metric tonnes after using substantial biomass waste for fodder, domestic and other kinds of uses. This potential estimate is something like 28 GW of power if that 230 MMT is taken into consideration. Similarly, the energy generation potential from urban and industrial organic waste is roughly around 5.6 GW, and that has flown from the Report on Circular Economy prepared by the MoHUA. The third aspect is the TIFAC, Technology Information Forecasting and Assessment Council. They have projected 51.35 billion litres of 2G ethanol production from the existing 178 million metric tonnes of surplus crop biomass. Similarly, IOCL has estimated compressed biogas potential of roughly around 62 MMT, and bio-manure potential of around 370 MMT. So, there are different kinds of estimates on the biomass potential. I think we need to take an integrated view

on what exactly is the mapping for biomass because we are now aiming at different kinds of projects, including green hydrogen from biomass. So, that is absolutely critical. We have identified various issues and challenges. We have identified various issues and challenges. One, of course, is related to the raw materials supply chain management. Sometimes, the stock quality and the energy content are compromised due to various reasons like inefficient collection, aggregation, transportation, and storage which really impact the economy for the plant. Another aspect is about multi-feedstock design of the plants. As the crop cycle changes and other crop cycle comes, plants design itself need multifeedstock kind of arrangement for running the plants for the whole year. Sometimes it happens that if there are many economic potentials, then prices of the raw materials certainly go up. That also affects the economies of the plants. The way forward is that adequate supply-chain of raw material is ensured. For that, we need to create regional warehouses/ storages or we may set up biomass trading platform on the regional basis so that raw material can be made available. So far as technology mapping is concerned, the Gross Calorific Values (GCVs) of bioenergy feedstock differs across regions of India. There is a need to undertake research on differing characteristics of feedstock and identify appropriate technologies for utilizing them. Sometimes the efficiencies claimed by the technology providers does not match with whatever they claim. The way forward should be that instead of going through the capital based incentive why not to devise a policy for the generation based incentive. There is also a lack of demand for bio-fertilizers. It is one of the revenue streams for the biomass plants. Since this bio-fertilizer is not attractive and is not being sold in the market, that also impacts the project economies. So, it is imperative to encourage farmers to adopt bio-fertilizers through creating awareness. Here some kind of branding is also required so that it is promoted and if it happens, perhaps this will add to the revenue

stream that would support the biomass plants. Then, data on feedstock should be available across geographies. Unavailability of data at the State, district and block level necessitates case by case investigation. As a result, majority of the stakeholders carry out their own analysis to evaluate feedstock availability. In this regard, MNRE has already created a dashboard/ GIS based waste mapping tools which need to be strengthened, and players should be sensitized to use it. The second aspect is that a comprehensive mapping for effective utilization of different kinds of biomass in different areas should be there because we are promoting all kinds of sources of energy like compressed biogas, bio-ethanol, biomass to power, methanol, green hydrogen, etc. from the single biomass source. So, a complete and clear-cut demarcation on how much potential is available, and how much can be utilized for different kinds of energy resources is required at this stage."

3.12 Biomass Co-firing by thermal power plants of the country

(i) NTPC Limited

(a) In line with the focus of the Government of India (GoI), NTPC has taken the pioneering stride and quantum leap in recent times in Green Energy Transition. Biomass cofiring in its TPPs has been one such initiative. NTPC began testing of cofiring at Dadri in 2016 and started commercial scale firing from November 2019. Till now, NTPC has awarded contracts for supply of 45.52 LMT of Biomass pellets for 20 NTPC projects and 01 joint venture. As of now, 69.06 LMT of Biomass pellets order has been placed by all thermal power stations in India out of which 65% of total orders are placed by NTPC. Till now, 13 NTPC Plants and 1 NTPC-JV plant have already started Biomass cofiring, and other plants are also coming up. As of now, over 1.04 LMT of Biomass has been fired till date. This is the highest amount of Biomass pellets cofired by any thermal power station in India.

(b) Long-term and short-term tenders for around 95 MMT of Biomass for 22 NTPC stations are under progress.

(c) NTPC is also establishing biomass pellets plants as per following details:

- NTPC is establishing 22 TPD non-torrefied pellet plant at Guru Hargobind Thermal Plant (GHTP), Lehra Mohabbat, Bhatinda
- NTPC has awarded tender to set up 100 TPD pellet plant at Aravali Power Company Private Limited (APCPL), Jhajjar
- NTPC has floated tender to set up 100 TPD Torrefaction plant at APCPL-Jhajjar
- NTPC awarded tender for 50 TPD Non-Torrefied Plant at Dadri
- NTPC has sent a letter to Punjab and Haryana Governments for allocation of land to set up 5 pellet plants each in both states.

(d) Other initiatives of NTPC:

- Collection of different types of Biomasses and study the effect of long-term storage on Gross Calorific Value (GCV).
- Detailed characterization of biomass and its ash to evaluate its properties with respect to co-firing in pulverized coal (PC) fired boiler.
- Experimental and Simulation analysis and establishing correlation of Biomass characteristics with PC fired boiler combustion process for optimizing and increasing co-firing ratio of Biomass.
- Experimental and Simulation studies on ash slagging, fouling and high temperature corrosion behavior during burning of biomass in a PC fired Boiler.

The above projects are under various stages of implementation.

(ii) Damodar Valley Corporation (DVC)

(a) After successful completion of pellet formations, particle size distribution test and combustion behavior study, proven experienced vendors in this domain were approached for setting up of a 16 Tonne/Day pellets manufacturing unit in Mejia Thermal Power Station (MTPS) on Build-Own-Operate-Transfer (BOOT) mode. The project completion timeline is March 2024.

(b) Biomass Co-firing status of other power plants of DVC:

- First successful starting of biomass cofiring in DVC was done at Durgapur Steel Thermal Power in February, 2023.
- On trial basis, Non-Torrefied Biomass co-firing was done at Durgapur Steel Thermal Power Station (DSTPS) in Feb-March, 2023 for which small quantity of pellets was procured through GeM.
- Although DVC started procurement action way back in December 2021 for Torrefied & Non-Torrefied though open tendering for Seven years requirement for all plants but could not award the contract as the L1 bidder backed out for both (Torrefied & Non-Torrefied).
- Meanwhile National Biomass Mission (SAMARTH) finalized model contract, based on which four tenders were floated in December-2022 for DSTPS, Raghunathpur Thermal Power Station (RTPS), Bokaro Thermal Power Station (BTPS) and Koderma Thermal Power Station (KTPS). However, purchase order could not be placed for low response of vendors and high price quoted.

(iii) NLC India Limited

Brief status of Biomass co-firing preparedness of NLCIL/JV Thermal Power Plants:

(a) Coal Fired Ghatampur Thermal Power Plant (3x660 MW) (Neyveli Uttar Pradesh Power Limited (NUPPL) - A subsidiary of NLCIL)

This plant is under construction and is in advanced stage of commissioning. Co-firing of Biomass will be taken up after commissioning of this plant.

(b) Coal Fired Talabira Thermal Power Plant (3x800 MW)

This is an up-coming project of NLCIL in Odisha State. Co-firing of Biomass up to 10 % has been included in Technical Specification

(c) Coal Fired NLC Tamil Nadu Power Ltd. (NTPL - A subsidiary of NLCIL) in Tuticorin plant

A sub-committee of NLCIL and NTPL members visited the NTPC Dadri plant for an on-site study on the use of bio-mass pellets.

Summary of preparedness of NLCIL/JV Thermal Power Plants:

No	NLCIL /JV TPPS	Status of Preparedness
1.	Ghatampur Thermal Power Plant (3x660 MW) under construction	Biomass co-firing will be implemented after commissioning of units
2.	Talabira Thermal Power Plant (3x800 MW) – upcoming project	Co-firing up to 10 %, included in Technical Specification
3.	JV- NTPL- Tuticorin (2x500 MW) Pulverised Coal Fired Boilers	Bio-mass Trial order placing under progress for making Fuel specific trial study,
4.	BTPS Thermal (2x125 MW), Barsingsar Lignite fired CFBC Boilers	Placement order to OEM M/s BHEL for conducting the feasibility study of bio-mass co-firing in CFBC lignite fired boilers – in final stages
5.	TPS II (7x210 MW), Neyveli Lignite fired Pulverised Fuel Boilers	Co-firing in PF fired lignite boilers not possible due to higher mill inlet gas temperature and pre-ignition

6.	TPS I - Expn (2x210 MW), Neyveli Lignite fired Pulverised Fuel Boilers	safety constraints. Beater Fan type Mills – not suitable.
7.	NNTPS (2x500 MW), Neyveli Lignite fired Pulverised Fuel Boilers	
8.	TPS II - Expn (2x250 MW), Neyveli Lignite fired CFBC Boilers	Sustainable operation is yet to be achieved due to design issues – modifications in pipeline - trial operation to be taken up in next phase.

3.13 Major constraints being faced by TPPs in Biomass Cofiring:

(i) Irregular supply of Biomass-based pellets- There is a shortage of manufacturing capacity for pelletisation. At present, the estimated pelleted manufacturing capacity is around 7,000 tonnes per day, which falls short of the requirement of approx. 1 lakh tones per day for 5% co-firing. In the NCR region in particular, the pellet manufacturing capacity is approximately 2,000 TPD, whereas the requirement is of 5,000 TPD.

(ii) Unavailability of enough vendors

(iii) Diversion of biomass resources to other sectors where the rates and demand are more attractive.

(iv) Logistic constraints (because of transportation from long distance) etc.

CHAPTER IV
RECOVERY OF ENERGY IN THE FORM OF BIOGAS

4.1 There is ample potential for setting up biogas plants in India considering the livestock population of around 535.78 million, which includes about 302 million total population of bovines (comprising of cattle, buffalo, mithun and yak).

4.2 Biogas contains about 55-65 % of Methane, 35- 44 % of Carbon Dioxide and traces of other gases, such as Hydrogen Sulphide, Nitrogen and Ammonia. Biogas, in its raw form, that is without any purification can be used as clean cooking fuel like LPG, lighting, motive power and generation of electricity. It can be used in diesel engines to substitute diesel up to 80% and up to 100% replacement of diesel by using 100% Biogas Engines. Further, Biogas can be purified and upgraded up to 98% purity of methane content to make it suitable to be used as a green and clean fuel for transportation or filling in cylinders at high pressure of 250 bar or so and called as Compressed Bio-Gas (CBG).

4.3 Initially, Biogas Plants were developed for digesting cattle dung. However, over a period of time, technology has been developed for the bio-methanation of various types of biomass materials and organic wastes. Biogas plant designs are now available from 1 m3 to 1000 m3 unit size or more and multiples of that can be installed for achieving higher Biogas Plant sizes, depending upon availability of the raw material such as for family/ household, small farmers, dairy farmers and for community, institutional and industrial/ commercial applications.

4.4 Under the National Bioenergy Programme of MNRE, Rs. 100 crore has been set aside for the Biogas Programme to support setting up of small (1 m3 to 25 m3 biogas per day) and medium size Biogas plants i.e. above 25 m3 to 2500 m3 biogas generation per day for corresponding power generation capacity range of 3 kW to 250 kW from biogas or raw biogas for thermal energy/cooling applications.

4.5 The MNRE launched the Biogas programme with the following objectives:

(i) To provide clean gaseous fuel mainly for cooking and lighting purposes for individual households by setting up of small biogas plants in the capacity range from 1 m3 to 25 m3;

(ii) To promote setting up of biogas based power generation (off-grid) projects for power generation in the capacity range (3 kW to 250 kW) and thermal energy from the biogas produced from Biogas plants of size greater than 25 m3 and up to 2500 m3 size;

(iii) To mitigate drudgery of rural women and reduce pressure on forests; and

(iv) Creation of a pool of skilled manpower for all activities relating to biogas production.

4.6 The type of projects covered and financial support available under the Biogas Programme are as follows:

(i) CFA for Biogas Plants 1 M3 to 25 M3 Biogas generation per day: The CFA for Biogas plants of size ranging from 1 M3 to 25 M3 of biogas generation per day are as given below:

Particulars of Central Financial Assistance (CFA) and States / UTs, regions & categories of beneficiaries	**Biogas Plants under Biogas Programmeranging from size 1 to 25 cubic Metre biogas per day (In ₹per plant)**					
CFA Applicable	**1 M^3**	**2-4 M^3**	**6 M^3**	**8-10 M^3**	**15 M^3**	**20-25 M^3**
(i) Hilly/NER States (Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Ladakh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura and Uttarakhand) (ii) Island; and (iii) Scheduled Castes (SC)/ Scheduled Tribes (ST).	17,000	22,000	29,250	34,500	63,250	70,400
(iv) All other States and Categories	9,800	14,350	22,750	23,000	37,950	52,800

In addition to above-mentioned CFA, financial support is also available for Turn-Key Job Fee, Administrative Charges payable to PIA for physical target achievement range of biogas plants, Support for Training courses, Support for BDTCs and Incentive for saving fossil fuels & electricity.

(ii) CFA for Medium size biogas plants: The CFA for biogas plants of size above 25 M3 to 2500 M3 biogas generation per day are as given below:

Power generating Capacity (kW)	**CFA limited to the following ceiling limit**		**Administrative Charges for PIA***	
	Power Generation	**Thermal Application**	**Power Generation**	**Thermal application**
3 kW – 50 kW	₹ 45,000 per kW	₹ 22,500 per kWeq thermal/ cooling	10% of the CFA	5% of the CFA
>50 kW – 200 kW	₹ 40,000 per kW	₹ 20,000/- per kWeq thermal/ cooling	₹2,00,000/- (fixed)	₹1,00,000/- (fixed)
>200 kW – 250 kW	₹ 35,000 per kW	₹ 17,500/- per kWeq thermal/ cooling	₹2,50,000/- (fixed)	₹1,00,000/- (fixed)

4.7 During discussion on the Biogas component of National Bioenergy Programme, a representative of the Ministry of New and Renewable Energy made the following submission:

"This caters to the small and individual households which have cattle. Now, this programme is implemented through the State programme implementing agencies. Every State is included and there are a few of the Central agencies, like Khadi and Village Industries Commission (KVIC), National Dairy Development Board (NDDB), Amul on the cooperative side. But for every State, there is a programme implementing agency. They are implementing this

programme on the individual household level. The target that we have kept for this current financial year is 46,000. Out of that, for 30,000, the advance has been released and we are also looking at the balance, that is, 16,000.

In the medium size category, this programme supports smaller industries, especially the dairy industry which actually has their input coming from the cattle. So, there they inherently have the dung and what they do is they use this for biogas plant which can be converted to electricity for their captive needs. We have received already 37 projects equivalent to Rs. 8.31 crore. We are also considering it on a faster scale.

Over the years, we have tried to reach to the end beneficiaries through various advanced digital tools but this time what we have done is we have tried to innovate in the designs, in the models that we can provide, especially in the biogas sector. The earlier designs were based on the brick and cement use. Now, there are flexible biogas plants also which are coming up where the beneficiaries are actually demanding that. We have introduced those into the smaller biogas programmes. We have also introduced a communication plan. Public awareness and information are critical. We are implementing a public awareness campaign through the State nodal agencies and implementing agencies also. One more important thing which we did, which was missing earlier, was the actual codes and standards to support such kinds of plants. The Ministry through its National Institute of Bioenergy worked on a standard and BIS, that is, Bureau of Indian Standards has adopted that. What this will do is this will enable the developers to maintain the quality that is required which will ultimately result in better output."

PART –II

OBSERVATIONS/RECOMMENDATIONS OF THE COMMITTEE

1. The Committee observe that Waste to Electricity plants generate power at the rate of 1 Mega Watt equivalent (MWe) per 20-30 Tonnes Per Day (TPD) dry waste. However, as much as 100 TPD mixed waste is required to generate the same amount of energy. As per Solid Waste Management (SWM) Rules 2016, only the non-recyclable combustible waste can be used in these plants. However, the Committee note frequent instances of mixed waste being incinerated in Waste to Electricity plants without proper segregation. The Committee also feel that waste segregation at source in our country is still far from satisfactory. Therefore, the Committee are of the view that the existing awareness programmes for waste segregation need to be pushed further with active participation of local bodies and reward/incentive should be made part of these programmes to make waste segregation a behavioural practice of every household. The Committee are of the view that it is better to process wet waste through methods other than incineration viz. composting, biomethanation etc. as these are less polluting processes. Further, the Committee are of the opinion that the recyclable waste should necessarily be recycled as recycling plays an important role in reducing the waste stream with lower demand for raw materials, and minimising pollution associated with the manufacturing of new products. The Committee therefore, support the setting up of Materials Recovery Facility (MRF) and appreciate the decision to set up around 45,000 MRF under Swachh Bharat Mission 2.0.

2. The Committee feel that with regard to Waste to Electricity plants, the major issue is the high cost of power from such plants. Many such projects are being pursued under public-private partnership (PPP) model and the main source of revenue for these projects is selling of the power generated from municipal solid waste (MSW) and some by-products which are used as construction material. The power being generated from these projects are sold to the state DISCOMs. However, these plants face huge delays in executing power purchase agreement (PPA) with the State Electricity Departments/DISCOMS as the tariff is typically high at about Rs. 8 per kilowatt hour (KWH) which is higher than that of other renewable energy such as Solar. The generation capacity of these plants is also small. Today, most of the DISCOMS are financially weak and hence, are finding it difficult to purchase costly power from these plants. In such a scenario, it becomes important to devise a mechanism whereby the power from Waste to Electricity plants are surely taken off but at the same time, the DISCOMS are not burdened excessively. The Committee are of the view that a special purpose vehicle (SPV) can be created for this purpose, which can be made procurer of this power. This arrangement can have multiple partners in the form of Central PSUs like Solar Energy Corporation of India (SECI), Indian Renewable Energy Development Agency (IREDA) and also private companies. The SPV, after procuring power from the plant, can then sell this power to interested entities and can also list it for trading on power exchanges. The Committee are of the opinion that such an arrangement will provide guaranteed takeoff of power being generated from waste, instilling further confidence amongst the stakeholders and build a suitable case for attracting low cost capital from the market, while

encouraging more players to invest in this field, thus eventually driving down the cost of Waste to Electricity power.

3. The Committee have noted that Waste to Electricity plants incinerate municipal solid waste to generate electricity which cause pollution. These plants have often been found to violate pollution norms for which they have also been fined a number of times. Local residents have often opposed the setting up and expansion of these plants due to increased pollution levels, noise, foul smell etc. In such a scenario, the Committee are of the view that to achieve the target of setting up around 9,700 TPD of Waste to Electricity plant capacity under Swachh Bharat Mission 2.0 of the Ministry of Housing and Urban Affairs (MoHUA) and around 200 compressed biogas (CBG) plants under National Bioenergy Programme of MNRE, it is important that the issue of pollution from these plants is addressed first. Under SBM 2.0, Engineers India Limited (EIL) has been engaged to provide Technical and Transaction Advisory support to States/UTs/Cities for planning and setting up integrated Waste to Energy plants without any cost to the States/UTs/Cities. The Committee are of the view that EIL, including environmental engineers and scientists, can assist in devising mechanism using technology to reduce emissions from these plants, such as emission filters. The Committee also feel that global best practices should be studied and adopted in our plants to the extent possible.

4. The Committee have noted that the supply chain scenario of biomass-based briquettes/pellets to the Thermal Power Plants (TPPs) of our country is still in the process of development. Currently, the briquettes/ pellets are not consistently available throughout the year to

meet the requirement of co-cofiring in TPPs. At present, the estimated pellet manufacturing capacity in the country is only around 7,000 TPD, which falls short of the requirement of approximately 1 lakh TPD for co-firing. In the NCR region in particular, the pellet manufacturing capacity is approximately 2,000 TPD, whereas the requirement is of 5,000 TPD. In such a scenario, the Committee are of the view that the Farmer Producer Organisations (FPOs)/co-operatives can be encouraged to setup briquette/pellet manufacturing units. Raw materials for briquette/pellet making are readily available with farmers and when a number of farmers will come together in the form of FPOs or cooperatives, they'll have enough quantities to achieve scale and economy. Replication of few successful stories of profitable briquette/pellet manufacturing by FPOs/cooperatives will encourage more such organizations in this sector. Further, the Committee are of the opinion that to develop the market for briquette/pellet manufacturing in the country and to achieve the target of 5% blend of Biomass pellets in thermal power plants, it is important that the procedure for setting up such units is simplified like that of Haryana which has waived off the requirement of land use norms for setting up CBG plants. Apart from simplified procedures, the early resolution of administrative and regulatory issues also needs to be ensured.

5. Apart from inadequate pellet manufacturing units, the Committee have also noted that the Biomass resources are being diverted to other sectors where the rates are more attractive and the demand is higher. This is presenting a major challenge in the development of a steady and reliable supply chain market of Biomass-based briquettes/pellets for co-firing in thermal power plants (TPPs). The Committee are of the

opinion that to attract briquette/pellet manufacturing units to the power sector, it is important to discover the appropriate rate of different categories of briquettes/pellets and offer various incentives to the manufacturing units viz. assured takeoff, timely payment, providing land for unit setup, assisting in infrastructure development etc. There is also an urgent need on the part of the Government to develop requisite number of quality collection/aggregation/storage facilities for storing briquettes/pellets as well as the raw materials for meeting present as well as future use. The Committee appreciate the Ministry of Power for issuing Revised Model Long term contract for Biomass supply on 06.01.2023 under which the minimum tenure of model contract shall be seven years. This is expected to help in developing Biomass supply chain infrastructure. The Committee also support the setting up of Custom Hiring Centers (CHCs) for agriculture machineries which help farmers in custom hiring of machines and equipments for collection and aggregation of agro-residue. The Committee expect such centers to be further developed in large numbers. The Committee also feel that setting up of biomass trading platforms can help in ensuring availability and accessibility of raw materials as well as finished products on a real time basis.

6. The Committee note that there is lack of coherent data with regard to feedstock availability (raw materials used in Waste to Energy, briquette/pellet manufacturing, biogas etc. plants) in the country and the data which is available is not uniform across organisations. As per the Ministry of New and Renewable Energy (MNRE), the biomass availability is around 750 million metric tonnes (MMT) per year out of which surplus availability is around 230 MMT per year (after

subtracting for use as fodder, domestic household use etc.). This corresponds to a potential of 28 GW of power. As per MoHUA, the energy generation potential from urban and industrial organic waste is about 5.6 GW. However, as per the Technology Information, Forecasting and Assessment Council (TIFAC) of the Department of Science and Technology, the 2G ethanol production potential is about 51.35 billion litres from about 178 MMT of surplus crop biomass. Similarly, as per the Indian Oil Corporation Limited (IOCL), the Compressed Biogas (CBG) potential is estimated at 62 MMT with bio-manure potential of 370 MMT. The Committee also note that there is unavailability of data at the State, district and block level as a result of which case-by-case study becomes time consuming. The majority of stakeholders carry out their own analyses to evaluate the feedstock availability. The Committee while appreciating MNRE for developing a dashboard and Geographic Information System (GIS) based waste mapping tools, would also like to recommend that these dashboard/tools be strengthened and all the players be sensitized about its usage. The Committee also feel that robust monitoring mechanism will ensure that authentic data is uploaded on the dashboard which would increase its reliability among the stakeholders. Further, the Committee are of the opinion that a comprehensive mapping of waste/feedstock is needed for effective utilization in different areas (such as CBG, bio-ethanol, biomass to power, methanol, green hydrogen etc.) and such mapping should be carried out regularly to improve the demand supply situation in the market and enable short as well as long term planning with regard to Bioenergy and Waste to Energy in the country.

7. The Committee note that the gross calorific values (GCVs) of bioenergy feedstocks differ across regions of India. This results in variable power generation from Waste to Energy plants. For briquette/pellet manufacturing units, the inconsistent nature of feedstock/biomass poses problem in producing briquettes/pellets that meet the standards specified by Bureau of Indian Standards (BIS). The Committee feel that these shortcomings being faced by power plants can discourage entrepreneurs and private industry players from investing in this sector. The Committee agree with the observation of NITI Aayog that very few technology providers are present in the Indian market currently and the efficiencies claimed by the technology providers is not achieved in certain cases. The Committee note the continuation of the Renewable Energy Research and Technology Development (RE-RTD) programme of MNRE for a period 2021-22 to 2025-26 at a total cost of Rs. 228 crore. This programme aims at scaling research and development (R&D) effort for promoting indigenous technology development and manufacture for wide spread applications of new and renewable energy in efficient and cost-effective manner across the country. The Committee appreciate the Ministry for sanctioning R&D projects in the area of agro-waste and biomass gasification. The Committee would also like to laud NTPC Limited for its initiative to study the effect of long-term storage on GCV of different types of biomasses and to undertake detailed characterization of biomass and its ash to evaluate its properties with respect to co-firing in pulverized coal (PC) fired boiler. However, the Committee are of the opinion that there is a need to undertake more research on the differing characteristics of feedstocks and identify appropriate technologies for utilizing them. To encourage research in this field, the Committee agree with the

suggestion of NITI Aayog that the incentive in this sector should be linked with generation (Generation Based Incentive) instead of capital based.

8. The Committee note that an outlay of Rs. 858 crore has been sanctioned for National Bioenergy Programme (NBP) of MNRE and the Ministry is expecting this programme to bring an investment of about Rs. 10,650 crore. In case of both pelletisation plant & torrefaction plant, a maximum amount of Rs. 28 lakh per tonne plant production capacity per hour, or 40% of the capital cost considered for plant and machinery of a 1 tonne per hour (TPH) plant, whichever is lower, is being given as one-time financial support by Central Pollution Control Board (CPCB), subject to a maximum total financial support of Rs. 1.4 crore per proposal. Under SBM (U) 2.0, Central Financial Assistance (CFA) of Rs. 18 crore/MWe is being provided for Waste to Electricity plants. However, the Committee are of the view that these funds are inadequate to meet the cost required for developing a sustainable ecosystem for effective management of waste in the country and developing Bioenergy sector. Setting up of plants in Waste to Energy sector entails a number of variables such as land, machinery, air pollution control devices and other accessories which escalates the capital cost for the plant. Therefore, the Committee are of the opinion that low cost financing from IREDA and other financial institutions should be made available to such projects in order to attract entrepreneurs, MSMEs and other private players to this sector. The Committee welcome the inclusion of 'Biomass pellet manufacturing' under Priority Sector Lending (PSL) and expect the Government to further facilitate easy financing to this sector.

9. The Committee note that our country generates municipal solid waste (MSW) of about 1,50,000 TPD and around 1,87,000 TPD of waste processing facility is already existing in the country. Out of the total existing facilities, around 98,544 TPD facility is available for converting waste into compost. Further, a capacity of 30,700 TPD for converting waste into compost is proposed under SBM (U) 2.0. However, the Committee note that the demand for bio-fertilizers or compost is lacking in the country, despite its numerous benefits for the crops and environment. The Committee are of the view that easy availability of chemical fertilizers, lack of awareness about the benefits of bio-fertilizers among farmers and fragmented market of bio-fertilizer are some of the reasons for weak demand in this sector. Therefore, the Committee would like to recommend that a robust market for bio-fertilizers be developed through public awareness campaigns, information & education (I&E) programmes, incentivization of farmers, development of supply chain etc.

10. The Committee note that under National Bioenergy Programme, Gaushalas have also been made beneficiaries whereby they get 20 per cent additional CFA over the normal CFA. This is expected to help them in bringing and utilising the dung that is produced into a useful energy, that is, bio-CNG. The Committee expect MNRE to provide all help to Gaushalas and popularize the scheme amongst farmers and rural areas so that they avail this fund for setting up plants to generate energy from their waste.

Likewise, the Committee are of the view that wastes of industries may be better dealt in a captive manner i.e., within or near the industrial plant itself. Setting up Waste to Energy plants within the jurisdiction of

industrial townships would not only help in reducing the net waste generation but also save the transportation cost of such waste. Further, mandatory setting up of these plants would also aid in achieving the goals of Extended Producer Responsibility (EPR).

11. The Committee note that the National Bioenergy Programme (NBP) of MNRE supports the SATAT (Sustainable Alternative Towards Affordable Transportation) initiative of the Ministry of Petroleum and Natural Gas (MoPNG) which has the objective of establishing 5000 CBG plants across the country. Similarly, the NBP finds convergence with the GOBARdhan (Galvanizing Organic Bio-Agro Resources Dhan) scheme of Department of Drinking Water and Sanitation, Ministry of Jal Shakti which provides financial assistance for setting up biogas plants at village/block/district levels. The programme of MNRE and SBM (U) 2.0 already share the similar objective of setting up Waste to Energy plants for effective waste management. The SAMARTH Mission (National Mission on Co-firing of Biomass in Thermal Power Plants) of the Ministry of Power promotes manufacturing of pellets and briquettes for use in power generation and finds convergence with the Biomass Programme component of MNRE's NBP. The Committee are of the view that better convergence and interlinking of schemes amongst various Ministries of the Government of India can be utilized to achieve greater coherence and better outcomes for sustainable waste management and recovery of energy from waste in the country. There is also a need to finetune these schemes in order to avoid overlaps, duplication and prevent avoidable conflicts in their operation. For instance, MoHUA has requested MoPNG

to reduce the SATAT condition to 1 TPD CBG, so that more urban local bodies can be covered. The Committee are of the opinion that an empowered coordination mechanism comprising representatives from all these different Ministries can be formed, which can work in tandem to achieve the combined targets of these schemes.

New Delhi;
December 14, 2023
Agrahayana 23, 1945 (Saka)

Jagdambika Pal
Chairperson,
Standing Committee on Energy

STANDING COMMITTEE ON ENERGY

MINUTES OF TWENTY FOURTH SITTING OF THE STANDING COMMITTEE ON ENERGY (2022-23) HELD ON 19th MAY, 2023, IN MAIN COMMITTEE ROOM, PARLIAMENT HOUSE ANNEXE, NEW DELHI

The Committee met from 1500 hrs to 1830 hrs

LOK SABHA

Shri Jagdambika Pal - Chairperson

2 Shri Gurjeet Singh Aujla
3 Shri Sunil Kumar Mondal
4 Shri Praveen Kumar Nishad
5 Shri Dipsinh Shankarsinh Rathod
6 Shri P. Velusamy

RAJYA SABHA

7 Shri Gulam Ali
8 Shri Narain Dass Gupta
9 Shri Javed Ali Khan
10 Shri Muzibulla Khan
11 Dr. Sudhanshu Trivedi

SECRETARIAT

1.	Dr. Ram Raj Rai	Joint Secretary
2.	Shri R.K. Suryanarayanan	Director
3.	Shri Kulmohan Singh Arora	Additional Director

WITNESSES		
MINISTRY OF NEW AND RENEWABLE ENERGY		
1	Shri Bhupinder Singh Bhalla	Secretary
2	Shri Lalit Bohra	Joint Secretary
3	Shri Ajay Yadav	Joint Secretary
4	Shri Dinesh Dayanand Jagdale	Joint Secretary
MINISTRY OF HOUSING AND URBAN AFFAIRS		
5	Shri Manoj Joshi	Secretary
6	Ms. Roopa Mishra	Joint Secretary
NITI Aayog		
7	Shri Rajnath Ram	Adviser
MINISTRY OF PETROLEUM AND NATURAL GAS		
8	Shri Praveen Mal Khanooja	Additional Secretary
9	Shri Ashish Anand Gupta	CGM, GAIL (India) Ltd.
10	Shri Shantanu Gupta	ED, Indian Oil Corporation Ltd. (IOCL)
DEPARTMENT OF DRINKING WATER AND SANITATION		
11	Shri Samir kumar	Economic Adviser
MINISTRY OF AGRICULTURE AND FARMERS' WELFARE		
12	Smt. S. Rukmani	Joint Secretary

2. At the outset, the Hon'ble Chairperson welcomed the Members of the Committee and representatives of the Ministry of New and Renewable Energy, Ministry of Housing and Urban Affairs and NITI Aayog to the Sitting and informed that the Sitting had been called for briefing on the subject 'Bio-Energy and Waste to Energy – Recovery of Energy from Urban, Industrial and Agricultural Wastes/Residues and role of Urban Local Bodies in Energy Management'. The Chairperson also apprised them about the provisions of Directions 55(1) and 58 of the Directions by the Hon'ble Speaker.

3. During the discussion, a power-point presentation was made on the subject by the representative of Ministry of New and Renewable Energy

which, *inter-alia,* covered MNRE'S Major Bioenergy Programmes; Progress made under different components of National Bioenergy Programme (NBP) viz. Waste to Energy Programme, Biomass Programme and Biogas Programme; Innovations and Achievements in Bioenergy Sector; etc.

4. During the discussion, a power-point presentation was also made by the representative of Ministry of Housing and Urban Affairs which, *inter-alia,* covered India's Urban Waste Generation projection till 2050, Major Technologies for processing of solid waste; Waste processing infrastructure under Swachh Bharat Mission-Urban (SBM-U); Operational, under construction and planned plants of Bio-methanation; Waste to Electricity (WtE) plants; major budget announcements with regard to waste management and enablers for waste to energy; etc.

5. Thereafter, a representative of NITI Aayog made a power point presentation which, *inter-alia,* covered NITI Aayog's initiatives on Bio-energy and Waste-to-Energy; Estimates of Bioenergy and Waste-to-Energy potential; Issues & Challenges and the Way Forward; etc.

6. The Committee, *inter-alia,* deliberated upon the following points with representatives of the Ministry of New and Renewable Energy, Ministry of Housing and Urban Affairs, NITI Aayog, Ministry of Petroleum and Natural Gas, Department of Drinking Water and Sanitation, Ministry of Agriculture and Farmers' Welfare:

(i) Measures taken to reduce carbon emissions, as envisioned at CoP-26 at Glasgow in 2021;

(ii) Performance of Urban Local Bodies in waste management;

(iii) NITI Aayog's role in developing policy framework for Waste-to-Energy (WtE);

(iv) Need for innovative technologies and solutions to improve waste management;

(v) Need for coordination between various Ministries and agencies in building and operating Waste-to-Energy and Bio-methanation projects;

(vi) Need for increasing the number of Waste-to-Energy plants in big cities;

(vii) Issues related to successful operation of Waste-to-Energy plants;

(viii) Issues related to assured take off of power produced from Waste-to-Energy plants;

(ix) Environmental and safety concerns over setting up or operation of Waste to Energy plants;

(x) Need for change in land use norms for setting up Waste-to-Energy plants;

(xi) Challenges being faced in supply chain management of dry and wet waste;

(xii) Experience of developed nations in the area of Waste-to-Energy;

(xiii) Strategy of Government to provide financial and other support to Waste-to-Energy projects;

(xiv) Efforts being made to attract investment in the area of Waste-to-Energy.

7. The Members also sought clarifications on various other issues relating to the subject and representatives of the Ministries responded to the same. The Committee directed the representatives to furnish written replies to those queries which could not be fully responded within 10 days.

The Committee then adjourned.

The verbatim proceedings of the sitting have been kept for record.

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STANDING COMMITTEE ON ENERGY

MINUTES OF TWENTY SIXTH SITTING OF THE STANDING COMMITTEE ON ENERGY (2022-23) HELD ON 1st JUNE, 2023, IN COMMITTEE ROOM D, PARLIAMENT HOUSE ANNEXE, NEW DELHI

The Committee met from 1100 hrs to 1415 hrs

LOK SABHA

Shri Jagdambika Pal - Chairperson

2 Shri Gurjeet Singh Aujla
3 Dr. A. Chellakumar
4 Shri Sunil Kumar Mondal
5 Shri Dipsinh Shankarsinh Rathod
6 Shri Shivkumar Chanabasappa Udasi
7 Shri P. Velusamy

RAJYA SABHA

8 Shri Gulam Ali
9 Shri Narain Dass Gupta
10 Shri Javed Ali Khan
11 Shri Muzibulla Khan
12 Shri Krishan Lal Panwar
13 Dr. Sudhanshu Trivedi

SECRETARIAT

1. Dr. Ram Raj Rai — Joint Secretary
2. Shri R.K. Suryanarayanan — Director
3. Shri Kulmohan Singh Arora — Additional Director

WITNESSES		
MINISTRY OF NEW AND RENEWABLE ENERGY		
5	Shri Bhupinder Singh Bhalla	Secretary
6	Shri Pradip Kumar Das	CMD, IREDA
7	Shri Dinesh Dayanand Jagdale	Joint Secretary
MINISTRY HOUSING AND URBAN AFFAIRS		
4	Ms. Roopa Mishra	Joint Secretary
MINISTRY OF AGRICULTURE & FARMERS' WELFARE		
5	Shri Rakesh Ranjan	Additional Secretary
6	Dr. P.K. Singh	Commissioner, Agriculture (DA&FW)
7	Dr. Yogita Rana	Joint Secretary (DA&FW)

2. At the outset, the Hon'ble Chairperson welcomed the Members of the Committee and representatives of the Ministry of New and Renewable Energy, Ministry of Housing and Urban Affairs and Ministry of Agriculture & Farmers' Welfare to the Sitting and informed that the Sitting had been called for briefing on the subject 'Bio- Energy and Waste to Energy – Recovery of Energy from Urban, Industrial and Agricultural Wastes/Residues and role of Urban Local Bodies in Energy Management'. The Chairperson also apprised them about the provisions of Directions 55(1) and 58 of the Directions by the Hon'ble Speaker.

3. During the discussion, the representative of Ministry of New and Renewable Energy informed the Committee about their major programmes and initiatives which, *inter-alia,* included MNRE's previous Bioenergy Programmes and their continuation; Major achievements in Bioenergy sector; Major policy changes under National Bioenergy Programme (NBP); Bioenergy sector for future development; Objectives and scope of different components of NBP viz. Waste to Energy Programme, Biomass Programme and Biogas

Programme; Convergence of MNRE's Bioenergy programme with other Ministries' programmes viz. GOBARdhan of Department of Drinking Water and Sanitation, Sustainable Alternative Towards Affordable Transportation (SATAT) of Ministry of Petroleum & Natural Gas, Swachh Bharat Mission (Urban) 2.0 of Ministry of Housing and Urban Affairs and National Mission on Co-firing of Biomass in Thermal Power Plants (SAMARTH Mission) of Ministry of Power; etc.

4. Thereafter, the representative of Ministry of Housing and Urban Affairs apprised the Committee about the role of Urban Local Bodies in Energy Management; Intervention of Swachh Bharat Mission-Urban (SBM(U)); Waste processing infrastructure under SBM(U); Infrastructure proposals for waste processing to energy recovery under SBM(U) 2.0; Status of Bio-methanation and Waste to Electricity (WtE) plants; SBM initiatives in setting up Waste to Energy plants; etc.

5. Later, the representative of Ministry of Agriculture & Farmers' Welfare briefed the Committee about the issue of paddy straw burning and their impact on air pollution over the northern belt of India; Features of the Central Sector Scheme on 'Promotion of Agricultural Mechanization for In-Situ Management of Crop Residue in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi'; Achievements of the scheme; Satellite based data on paddy residue burning events in 2022 season; etc.

6. The Committee, *inter-alia,* deliberated upon the following points with representatives of the Ministry of New and Renewable Energy, Ministry of Housing and Urban Affairs and Ministry of Agriculture & Farmers' Welfare:

i) Issues related to classification of different kinds of waste in India;

ii) Weak implementation of laws/rules on management of different categories of waste;

iii) Challenges being faced in enforcing behavior change around source segregation;

iv) Issues related to scientific remediation of legacy dumpsites;

v) Progress of decentralized facilities for processing fresh waste;

vi) Status of operational and planned Waste to Energy (WtE) plants in the country;

vii) Issues related to land, clearance, supply chain, high cost of power etc. for Waste to Energy plants;

viii) Concerns of residents over setting up or operation of Waste to Energy plants;

ix) Need for close coordination between different Ministries/Departments for resolving the issues being faced by Waste-to-Energy plants;

x) Need for upgradation in existing infrastructure for waste management;

xi) Need for a fee-based model for landfill dumping;

xii) Need for attracting financial and technical assistance from international lenders;

xiii) Status of old biogas plants and Government subsidy for setting up new biogas plants;

xiv) Need for popularizing flexible designs in small biogas sector;

xv) Issues related to stubble burning in Punjab, Haryana, Uttar Pradesh and NCT of Delhi and their impact on degrading air quality;

xvi) Issues related to In-Situ and Ex-Situ management of crop residues;

xvii) Need for periodic assessment of programmes for crop residue management;

xviii) Reasons for poor state of Bio-fertilizers and Organic Fertilizers in the country;

xix) Issues related to 1st and 2nd generation of ethanol production;

xx) Challenges in biomass supply chain for ethanol production;

xxi) Fund sharing model of the 12 Ministries under GOBARdhan scheme.

7. The Members also sought clarifications on various other issues relating to the subject and representatives of the respective Ministries responded to the same. The Committee directed the representatives to furnish written replies to those queries which could not be fully responded to within 10 days.

The Committee then adjourned.

The verbatim proceedings of the sitting have been kept for record.

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STANDING COMMITTEE ON ENERGY

MINUTES OF TWENTY-SEVENTH SITTING OF THE STANDING COMMITTEE ON ENERGY (2022-23) HELD ON 15th JUNE, 2023 IN MAIN COMMITTEE ROOM, PARLIAMENT HOUSE ANNEXE, NEW DELHI

The Committee met from 1100 hrs to 1315 hrs

LOK SABHA

2 Dr. A. Chellakumar
3 Shri Sanjay Haribhau Jadhav
4 Shri Kishan Kapoor
5 Shri Sunil Kumar Mondal
6 Shri Shivkumar Chanabasappa Udasi *(in the Chair)*

RAJYA SABHA

7 Shri Gulam Ali
8 Shri Narain Dass Gupta
9 Shri Javed Ali Khan
10 Shri Muzibulla Khan
11 Shri K.R.N. Rajeshkumar
12 Dr. Sudhanshu Trivedi

SECRETARIAT

1.	Dr. Ram Raj Rai	Joint Secretary
2.	Shri R.K. Suryanarayanan	Director
3.	Shri Kulmohan Singh Arora	Additional Director

WITNESSES		
MINISTRY OF POWER		
1	Shri Ajay Tewari	Additional Secretary
2	Shri Piyush Singh	Joint Secretary
3	Shri Hemant Kumar Pandey	Chief Engineer
CENTRAL ELECTRICITY AUTHORITY		
4	Shri Ghanshyam Prasad	Chairperson
5	Shri Praveen Gupta	Member
6	Shri Hemant Jain	Chief Engineer
NTPC LIMITED		
7	Shri Gurdeep Singh	CMD
8	Shri Ramesh Babu V.	Director
DAMODAR VALLEY CORPORATION		
9	Shri R.N. Singh	Chairperson
10	Shri M. Raghuram	Member
MINISTRY OF COAL		
11	Shri Anandji Prasad	Advisor
NLC INDIA LIMITED		
12	Shri M. Venkatachalam	Director

2. Since the Hon'ble Chairperson could not attend the Sitting, Shri Shivkumar Chanabasappa Udasi, a Member of the Committee chaired the sitting in accordance with Rule 258(3) of the Rules of Procedure and Conduct of Business in Lok Sabha.

3. At the outset, the acting Chairperson welcomed the Members of the Committee and representatives of the Ministry of Power, Central Electricity Authority, NTPC Limited, Damodar Valley Corporation and NLC India Limited to the sitting and informed that the sitting had been called for briefing on the subject 'Bio-Energy and Waste to Energy - Recovery of Energy from Urban, Industrial and Agricultural Wastes/Residues and role of Urban Local Bodies in Energy Management'. The acting Chairperson also apprised them about the provisions of Directions 55(1) and 58 of the Directions by the Hon'ble Speaker.

4. During the discussion, a power-point presentation was made by representative of the Ministry of Power on the subject which, *inter-alia,* covered Enabling Policies, Introduction to Biomass Co-firing, Benefits for Stakeholders, Progress in Co-firing of Biomass in TPPs, Progress in Procurement by different TPPs, Major Developments, On-going Transformational Initiatives, Constraints and Challenges to achieve desired Co-firing Levels, Way Forward, etc.

5. A power-point presentation was also made by representative of the NTPC Limited on the subject which, *inter-alia,* covered Agro Residues – A Carbon Neutral Opportunity, Pelletized Biomass Requirements, NTPC Initiatives – Biomass Co-firing and Biomass Market Creation, Challenges and Support Required, NTPC Projects, Waste to Energy, Waste to Products, etc.

6. Thereafter, a power-point presentation was made by representative of the Damodar Valley Corporation on the subject which, *inter-alia,* covered Biomass Co-firing Status in DVC TPPs, Development of Biomass Pellets, Municipal Solid Waste to Energy, Conversion of Food and Bio-waste to Energy, Challenges and Support Required, etc.

7. Representative of NLC India also made a power-point presentation on the subject which, *inter-alia,* covered NLCIL Overview, Pan India Presence, Vision 2030 of NLCIL, Major Highlights of FY 2022-23, Biomass Co-firing - NLCIL Progress and Status of Preparedness, etc.

8. The Committee, *inter-alia,* deliberated upon the following points with representatives of the Ministry of Power, Central Electricity Authority, NTPC Limited, Damodar Valley Corporation and NLC India Limited:

i) Action plan, implementation strategy, current status and constraints in implementation of the Policy regarding use of Biomass in coal-fired thermal power plants;

ii) Coordination Mechanism to resolve the inter-ministerial issues and constraints;

iii) Role and contribution of NTPC Limited, Damodar Valley Corporation and NLC India Limited in implementation of Samarth Mission;

iv) Progress regarding mandated 5% blend of pallets in thermal power plants;

v) Comparative Green-House-Gas Emission from thermal power plants with and without co-firing of pallets;

vi) Issues related to shortage of manufacturing capacity for pellets;

vii) Reasons for low participation of Private and State Sector with respect to this policy;

viii) Incentives offered by the Government to increase the utilization of biomass in thermal power plants;

ix) Issues related to eligibility for Carbon Credit, Renewable Energy Certificates and Renewable Energy Obligation;

x) Need to create a balance between the concerns of DISCOMs and successful offtake of power from Waste to Energy plants.

9. The Members also sought clarifications on various other issues relating to the subject and representatives of the Ministry and concerned Organizations responded to the same. The Committee directed the representatives to furnish within 10 days, written replies to those queries which could not be fully responded to.

The Committee then adjourned.

The verbatim proceedings of the sitting have been kept for record.

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STANDING COMMITTEE ON ENERGY

MINUTES OF EIGHTH SITTING OF THE STANDING COMMITTEE ON ENERGY (2023-24) HELD ON 14th DECEMBER, 2023 IN COMMITTEE ROOM-3, PARLIAMENT HOUSE ANNEXE EXTENSION, NEW DELHI

The Committee sat from 1500 hours to 1530 hours

LOK SABHA

PRESENT

Shri Jagdambika Pal - Chairperson

MEMBERS - LOK SABHA

2 Shri Chandra Sekhar Bellana
3 Shri Pradeep Kumar Chaudhary
4 Dr. A. Chellakumar
5 Shri Kishan Kapoor
6 Shri Sunil Kumar Mondal
7 Shri Jai Prakash
8 Shri Rajveer Singh (Raju Bhaiya)
9 Shri Shivkumar Chanabasappa Udasi

MEMBERS - RAJYA SABHA

10 Shri Rajendra Gehlot
11 Shri Narain Dass Gupta
12 Shri Javed Ali Khan
13 Shri Muzibulla Khan
14 Shri Maharaja Sanajaoba Leishemba
15 Shri Krishan Lal Panwar
16 Dr. Sudhanshu Trivedi
17 Shti K.T.S. Tulsi

SECRETARIAT

1. Shri Ramkumar Suryanarayanan — Joint Secretary
2. Shri Kulmohan Singh Arora — Additional Director
3. Shri S. Lakshmikanta Singh — Deputy Secretary

2. At the outset, the Chairperson welcomed the Members of the Committee and apprised them about the agenda of the sitting. The Committee then took up for consideration and adoption the following draft Reports:

(i) Report on action taken by the Government on observations/ recommendations contained in 34th Report (17th Lok Sabha) on Demands for Grants (2023-24) of the Ministry of New and Renewable Energy.

(ii) Report on action taken by the Government on observations/ recommendations contained in 35th Report (17th Lok Sabha) on Demands for Grants (2023-24) of the Ministry of Power.

(iii) Report on the subject 'Bio-Energy and Waste to Energy - Recovery of Energy from Urban, Industrial and Agricultural Wastes/ Residues and role of Urban Local Bodies in Energy Management'.

3. After discussing the contents of the Reports in detail, the Committee adopted the draft Report on 'Action taken by the Government on observations/recommendations contained in 34th Report (17th Lok Sabha) on Demands for Grants (2023-24) of the Ministry of New and Renewable Energy and draft Report on 'Action taken by the Government on observations/ recommendations contained in 35th Report (17th Lok Sabha) on Demands for Grants (2023-24) of the Ministry of Power without any amendment/ modification. The draft Report on the subject 'Bio-Energy and Waste to Energy - Recovery of Energy from Urban, Industrial and Agricultural Wastes/ Residues and role of Urban Local Bodies in Energy Management' was adopted with minor modifications/amendments.

4. The Committee authorized the Chairperson to finalize the above-mentioned Reports and present the same to both Houses of the Parliament during the current session.

The Committee then adjourned.

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