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STANDING COMMITTEE ON ENERGY

(2024-25)

EIGHTEENTH LOK SABHA

MINISTRY OF NEW AND RENEWABLE ENERGY

[Action-taken by the Government on observations/recommendations contained in Forty First Report (17th Lok Sabha) 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']

THIRD REPORT

LOK SABHA SECRETARIAT
NEW DELHI

March, 2025/ Phalguna, 1946 (Saka)

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Presented to Lok Sabha on 12th March, 2025

Laid in Rajya Sabha on 12th March, 2025

LOK SABHA SECRETARIAT
NEW DELHI

March, 2025/ Phalguna, 1946 (Saka)

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1.	Shri Ramkumar Suryanarayanan	Joint Secretary
2.	Shri Kulmohan Singh Arora	Director
3.	Shri Ajitesh Singh	Deputy Secretary
4.	Ms. Madhumita	Assistant Committee Officer

INTRODUCTION

I, the Chairperson, Standing Committee on Energy, having been authorized by the Committee to present the Report on their behalf, present this Third Report on action-taken by the Government on observations/recommendations contained in Forty First Report (17th Lok Sabha) 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'.

2. The Forty First Report was presented to the Lok Sabha on 19th December, 2023 and was laid on table of the Rajya Sabha on the same day. Replies of the Government to the observations/recommendations contained in this Report were received on 21st February, 2025.

3. The Report was considered and adopted by the Committee at their Sitting held on 11th March, 2025.

4. An Analysis of action-taken by the Government on the observations/ recommendations contained in the Forty First Report (17th Lok Sabha) of the Committee is given at Appendix-II.

5. For facility of reference and convenience, the observations and recommendations of the Committee have been printed in bold letters in the body of the Report.

New Delhi;
11 March, 2025
Phalguna 20, 1946 (Saka)

Shrirang Appa Barne
Chairperson,
Standing Committee on Energy

CHAPTER – I

This Report of the Standing Committee on Energy deals with action-taken by the Ministry of New and Renewable Energy on observations/ recommendations contained in the Forty First Report (17th Lok Sabha) 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'.

2. The Forty First Report was presented to the Lok Sabha on 19th December, 2023 and was laid on table of the Rajya Sabha on the same day. The Report contained 11 Observations/Recommendations.

3. Action Taken Notes in respect of all the observations/ recommendations contained in the Report have been received from the Government. These have been categorized as follows:

(i) Observations/Recommendations which have been accepted by the Government:
Serial Nos. 1,2,3,6,7,8,9, 10 and 11 Total - 9
Chapter-II

(ii) Observations/Recommendations which the Committee do not desire to pursue in view of the Government's replies:
Nil Total - 00
Chapter-III

(iii) Observations/Recommendations in respect of which the replies of the Government have not been accepted by the Committee and which require reiteration:
Serial Nos. 4 and 5 Total– 2
Chapter-IV

(iv) Observation/Recommendation in respect of which the final replies of the Government are still awaited:
Nil Total - 00
Chapter-V

4. The Committee further desire that Action-taken Statement on the Recommendations/Observations contained in Chapter-I of this Report

may be furnished to the Committee within three months of the presentation of this Report.

5. The Committee will now deal with action-taken by the Government on some of their Recommendations that require reiteration or merit comments.

Recommendation No. 2

6. The Committee had recommended as under:

"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."

7 . In the action-taken reply, the various Ministries and Organisations have stated as under:

"(i) MoHUA: A SPV maybe formed under the guidance of Ministry of Power having participation from multiple partners such as State Urban Development Departments, DISCOMS, SERCs, and central PSUs such as SECI and IREDA.

(ii) WTE Division, MNRE: It has been observed that, the Waste to Electricity plants set up in the country are mainly utilizing Municipal Solid Waste as feedstock. Moreover, the process used are mainly incineration of the MSW. However, as per the direction of DoE, the MSW to power component had to be excluded under the National Bioenergy Programme, as the component is supported under the Swachh Bharat Mission (2.0) of MoHUA.

(iii) IREDA: IREDA is dedicated NBFC for financing of renewable energy projects and not engaged in power trading. However, in order to make Waste to Energy (WTE) power plants commercially viable, the following are submitted:

a. Government support in the form of generation / manufacturing linked incentives may help improve project viability

b. Interest subvention for WTE / pallet manufacturing plants on the loans to be extended by banks / financial institutions for eligible projects may be explored

c. A WTE energy procurement direction may be introduced in line with Renewable Purchase Obligation (RPO) and Hydro Power Purchase Obligation (HPO) mandating Discoms to source minimum percentage of WTE based generated power out of their total procurement.

(iv) SECI: SECI is open to the recommendations of the Committee. As suggested, a procurement intermediary will guarantee off-take of power from waste to energy projects thereby instill confidence among private investors and other stakeholders. As per the applicable guidelines that may be issued by Government, SECI will issue tenders and take on the role of intermediary power procurer in these projects.

- Further, in the year 2022, SECI had endeavored to work in this direction. A tender was issued for setting up of 8 MW Waste to Energy Project in Kanpur, through a tariff-based competitive bidding mechanism, on behalf of the Uttar Pradesh DISCOMs. SECI was envisaged to play the role of the intermediary trader for such power, to provide payment security to the bidders. However, during the various stakeholder consultations held, the estimated tariffs were not in line with expectations of the final off-taker, due to which assured offtake of power could not be ascertained. As a result, SECI was constrained to cancel the tender due to lack of response."

8. The Committee while highlighting the issues of high cost of power from Waste to Electricity (WtE) plants and the inability of DISCOMs in purchasing the power so generated, had suggested for creation of a Special Purpose Vehicle (SPV) for this purpose. The Committee had opined that such an arrangement would ensure complete takeoff of power from WtE plants and at the same time the DISCOMs would not be burdened excessively. The Committee were further of the view that the SPV could have multiple partners in the form of government and private companies and the power so produced could either be sold to interested entities or traded at power exchanges. In their reply, the Ministry of Housing and Urban Affairs (MoHUA) and Solar Energy Corporation of India (SECI) have agreed with the Committee's suggestion of creating a SPV for procuring Waste to Electricity power. The Ministry of New and Renewable Energy has referred to the direction of Department of Expenditure whereby the Municipal Solid waste (MSW) to power component has been excluded from National Bioenergy Programme as the component is supported under the Swachh Bharat Mission (2.0) of MoHUA. IREDA has suggested for working on the direction of a WtE procurement mechanism on the lines of Renewable Purchase Obligation (RPO) and Hydro Power Purchase Obligation (HPO) mandating DISCOMs to source minimum percentage of WtE based generated power out of their total procurement. The Committee note the SECI's efforts to work in the direction of becoming a procurement intermediary for WtE power in the year 2022 whereby SECI was envisaged to provide payment security to the bidders of a 8 megawatt (MW) WtE project in Kanpur. However, the tender had to be cancelled as consensus on tariff could not be reached between the stakeholders. The Committee note the constraints in forming a SPV for procuring WtE power and are of the view that if all the stakeholders come together and work towards identifying the issues and finding solutions, a successful SPV in this direction can be formed. The Committee feel that MoHUA, Ministry of Power and Ministry of New and Renewable Energy can together work towards developing the mandate of SPV for the appropriate utilization of power generated from WtE plants.

Recommendation No. 4

9. The Committee had recommended as under:

> "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-firing 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.''

10. In its action-taken reply, the Ministry of New and Renewable Energy has stated as under:

> "Biomass Division MNRE: At present, no scheme regarding Biomass Supply Chain is under consideration in the Ministry."

11. The Committee in their recommendation highlighted the issue of inadequacy of briquettes/pellets for the Thermal Power Plants (TPPs) in the country. To enhance briquette/pellet manufacturing capacity, the Committee had recommended that Farmer Producer Organizations (FPOs)/co-operatives be encouraged to setup briquette/pellet manufacturing units. The Committee believed that raw materials for making briquettes/pellets are readily available with farmers as a result

of which scale and economy could be achieved under this setup. The Committee were also of the view that the procedure related to setting up of briquette/pellet manufacturing in the country needs to be simplified along with early resolution of the related administrative and regulatory issues. The Ministry of New and Renewable Energy, in its reply, has only stated that no scheme regarding Biomass Supply Chain is under the consideration of Ministry at present. The Committee are of the view that there might be no scheme related to Biomass Supply Chain in particular but under the National Bioenergy Programme of the Ministry, one component is Biomass programme which aims at supporting the setting up of Biomass Briquette/Pellet manufacturing plants and Biomass (non-bagasse) based cogeneration projects in industries. To meet the objectives of Biomass Programme, the Ministry also provides Central Financial Assistance (CFA) to project developers. Therefore, the Committee are of the opinion that the Ministry is closely associated with briquette/pellet manufacturing in the country and should provide its inputs on the Committee's recommendation. The Committee would also urge the Ministry to seriously consider their recommendation and apprise the Committee about the Ministry's view on encouraging farmers to form FPOs and engage in briquette/pellet manufacturing. The Committee may also be apprised of the measures, if any, being undertaken in this direction.

Recommendation No. 5

12. The Committee had recommended as under:

"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.''

13. In the action-taken reply, Indian Oil Corporation and the Ministry of New and Renewable Energy have stated as under:

"Indian Oil: Presently biomass / agricultural residue like paddy straw, etc. has multiple uses in Compressed Bio Gas (CBG) Plants, 2G Ethanol Plants, power plants for co-firing with coal, briquettes, etc. As multiple biomass-based plants come up in a certain area, there is competition and increase of biomass supply rates making the biofuels projects unviable. It is accordingly proposed to create biomass clusters by all states to ensure that biomass from the cluster formed with group of villages selected based on biomass availability and the capacity of the project is assigned to a certain Plant to ensure long term biomass supply at viable rates. This has already been implemented in Haryana for IndianOil's 2G Ethanol Plant.

- Additional 30% subsidy (in line with S-MAM provisions) may be provided by State Governments to make the procurement of the equipment by Farmer Producer Organization (FPO) more viable. The same is being provided under Uttar Pradesh Bio-Energy Policy. In addition, State Governments should ensure placement of adequate number of agriculture residue collection and aggregation equipment near the agriculture residue based CBG Plant locations as per the Plant capacity.
- There are already existing private players who have set up biomass trading platforms.

(ii) Biomass Division MNRE: At present, no scheme regarding Biomass Supply Chain is under consideration in the Ministry."

14. The Committee in their recommendation highlighted the issue of inadequate pellet/briquette manufacturing units as well as the diversion of biomass resources to other sectors that are offering

attractive rates. The Committee were of the opinion that discovering appropriate rates of different categories of briquettes/pellets and offering incentives to manufacturing units play an important role in attracting briquette/pellet manufacturing units to power sector. The Committee had further recommended for development of quality collection/aggregation/storage facilities for storing briquettes/pellets/raw materials as well as Custom Hiring Centres for hiring of agricultural machineries by farmers for collection/aggregation of agro-residue. To ensure availability and accessibility of raw materials and finished products on a real time basis, the Committee had recommended for setting up biomass trading platforms. In its reply, Indian Oil Corporation Limited (IOC) has broadly agreed with the Committee's recommendation. IOC has proposed for creation of biomass clusters by all States and assigning biomass plants to dedicated projects in order to ensure long term biomass supply at viable rates. IOC has further proposed for additional subsidies on procurement of farm equipments by Farmer Producer Organisations (FPOs). IOC has also informed the Committee about the existence of private players in biomass trading. The Ministry of New and Renewable Energy has replied with a single line statement that no scheme regarding Biomass Supply Chain is under consideration in the Ministry at present. The Committee are of the view that the reply of Ministry appears evasive as Biomass Programme is one of the major component of the National Bioenergy Programme that is being implemented by the Ministry. The Committee feel that since the Ministry is associated with the setting up of briquette/pellet manufacturing plants under its Biomass Programme, the onus lies with them for developing a steady and reliable biomass supply chain in the country and should invariably share its knowledge and expertise for generation of clean energy from biomass and reducing dependence on fossil fuels which is the ultimate aim of the Government.

Recommendation No. 6

15. The Committee had recommended as under:

"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.''

16. In the action-taken reply, the various Ministries and Organisations have stated as under:

"(i) MoHUA: The Committee's recommendations highlight the crucial need for precise data monitoring, thorough waste and feed stock mapping, and strategic planning to optimize waste use in the bioenergy and waste-to-energy (WtE) sectors. Adopting these recommendations could enhance waste management efficiency, boost energy production, and ensure better alignment with market needs and regulatory standards.

- Integrating the dashboard created by MNRE with the schemes of various Ministries dealing with various organic waste feed stock could further strengthen data management and strategic planning. This

approach will help the country advance its bioenergy and WtE objectives more effectively.

- MoHUA supports the recommendation.

(ii) ASCI: 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.

The 2020-21 ASCI biomass power generation potential and surplus agriculture biomass availability study, given the scope could consider 254 districts and 54 crops across India and projected it forward to the entire country's potential. For biomass to power generation, co-incineration process is widely used.

- 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.

The 2018 TIFAC study considered 19 states, 43 districts and 11 crops. Both of these studies, considered secondary data on crop type, crop acreage, crop production/ yield from the state level agriculture departments. Therefore, this estimate by TIFAC is only a subset of the total crop residue biomass availability and that is specifically meant for 2G ethanol production, which is produced from digestible 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.

Like in the case above, digestible biomass can be used for generation of bio-gas so once again, the above quantity estimate is only a subset of the total crop residue biomass availability.

- As per MoHUA, the energy generation potential from urban and industrial organic waste is about 5.6 GW.

Not applicable for agriculture biomass as MoHUA is considering urban industrial organic waste

- 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.

The above secondary data is available at the district and crop level and at regular Intervals (such as weekly, quarterly) only for some states. However, what fraction of the crop is available as residue feedstock for biomass-based end-products/ end-uses (bio-ethanol, biomass to power generation, etc.), is not readily accessible.

In addition to that, to arrive at surplus residue biomass available for biomass to energy use, has to be arrived at after subtracting the amount of biomass being used for other uses (domestic, cottage and non-cottage industrial use as well as other use) from the total crop residue quantity. However, this estimation involves deep understanding of the local supply chains for these end-uses and therefore becomes complex. This understanding however can be developed in collaboration with unit/ local offices of State Agriculture Departments and State Nodal Agencies of MNRE that are spread across the state typically.

Further, past studies for estimating agriculture crop residue feedstock availability for Waste to Energy (WTE) did not have a scope to cover in detail crops and information gathering at each block, district and state level.

Given the inputs above, it is essential to gather surplus crop residue feedstock availability at the block, district and state level specifically for Waste to Energy (specifically crop residue biomass to energy) end-uses.

- Inputs proposed to address the above:

1. Standardized Data Collection and Data Reporting

- Develop and implement a standardized framework for data collection and reporting on agriculture feedstock availability. This framework should include uniform definitions, methodologies, and metrics to ensure consistency across different organizations and regions.
- Define clear parameters for categorizing residual agriculture biomass/ bagasse feedstock based on:
- Crop Type
- Crop Residue quantity available at the Block, District and State level
- Crop Residue being used for other end-uses (domestic, cottage/ non-cottage industry and other end use applications)
- Surplus Crop Biomass Residue available at the Block, District and State level
- Seasonality in the Crop Residue availability
- Suitability of various crop feedstocks for different end-products and/ or end-uses (bio-ethanol, methanol, biomass to power generation, green hydrogen etc.)
- Amount of biomass feedstock utilized linked to the end-product and/ or end-use (and the number of existing biomass to energy plants that are utilizing the same)

This would ensure that the data is comparable, integrated and holistic and would be useful as multiple agencies/ departments are assessing potential for different end-products and end-uses from the same finite source of agriculture feedstock

- Formulate detailed guidelines for reporting agriculture feedstock data at multiple administrative levels (block, district and state)
- Data Collection at regular intervals could be done by the respective State Nodal Agencies (SNAs) of MNRE and their various local/ unit offices in coordination with the State Agriculture Department and their local/ unit offices that are spread across the state.
- Here mechanisms can be created to gather granular and real-time access to information covering type of crops, crop acreage, crop production/ yield, residual feedstock availability for Waste to Energy end-use.
- These guidelines should address data collection methods, reporting intervals, and quality assurance practices

2. Enhance Dashboard and GIS Tools for Real-time Data Reporting and Monitoring

- Strengthen the MNRE's dashboard and Geographic Information System (GIS) tools by incorporating advanced features such as real-time data updates along with predictive analytics for future projections and appropriate mapping of the data at the block, district and state level.
- Ensure that the tools are accessible and user-friendly, with interfaces designed to facilitate the following:
- Easy data entry on agriculture feedstock at the state, the district and the block level, by the State Nodal Agencies (SNAs) of MNRE in coordination with respective state agriculture departments and their local/ unit offices
- Verification, additional analysis, reporting and regular monitoring by MNRE
- Access to real-time updates on agriculture feedstock availability by various stakeholders

3. Promote Stakeholder Engagement and Training

- Conduct Training Programs: Organize regular training sessions and workshops for stakeholders to ensure they are proficient in using the dashboard and GIS tools. Include training on data entry standards, tool functionalities, and data interpretation. ASCI is keen to take up this effort jointly with MNRE
- Ongoing Support: Provide ongoing support and resources to stakeholders to address any issues related to data reporting and tool usage.
- Foster Collaboration and Information Sharing: Encourage collaboration between government agencies, private sector entities, and research institutions to enhance data sharing and coordination. Create platforms for regular dialogue and exchange of information

By implementing these recommendations, the Standing Committee can address the inconsistencies and gaps in feedstock data, leading to more effective planning and utilization of bioenergy resources in India.

(iii) SSS NIBE: The data as per MNRE and TIFAC report is based on agricultural residues utilization for bioenergy generation. MNRE data indicates the bioenergy potential in the form of biomass-based power and TIFAC indicates the bioenergy potential in the form of Bioethanol. The data from MoHUA is based on urban and industrial organic waste.

The SATAT CBG potential considers Surplus agro-residues, spent wash/press mud, STPs, and animal and poultry waste. Further the data is considered for different periods of time in these different reports.

The data on biomass availability from different ministries is based on their area of interest and relevance to their respective ministerial activity. However, a convergence in efforts from all the relevant ministries is necessary in order bring uniformity on the feedstock availability at the national level. Therefore, it is suggested that:

- As there are different schemes from different ministries in the country, for more uniformity in data, one ministry may be made a nodal point for data collection, compilation and information dissemination. All the concerned ministries should timely provide the annual data pertaining to respective bioenergy targets, status of implementation, biomass utilization and bioenergy generation through their respective schemes. This will facilitate annual updation of the biomass utilization and availability scenario in the country along with the actual annual bioenergy generation in the country under different pathways such as CBG, biomass pellets/briquettes, bioethanol, green hydrogen etc.
- Further for the annual updation of biomass potential data, Ministry of agriculture may be directed to annually provide the crop production data at a district and state level to the designated nodal ministry for yearly updation of the theoretical surplus biomass potential in the country. This will facilitate the regular and updated availability of biomass potential information at a district level in the country and help in short and long term planning of biomass utilization for bioenergy generation.
- To streamline the assessment initially, a committee of relevant agencies coordinated by the identified nodal agency such as MNRE, MoPNG, MoA&FW, MoHUA, MoP, DDWS, TIFAC, NIBE etc. can be formed to establish a mechanism for biomass assessment and bioenergy potential estimation under different pathways. Once it is established, then year on year the updation can be done.

Since SSS NIBE (an autonomous institution of MNRE) has worked on developing the existing dashboard of biomass atlas at the national level, it has a self-appointed task of bringing improvisation. In this regard, the institute is currently working on the following activities:

1. Estimation of data at district level for all the states in the country

2. Dynamic updated portal where estimations on the biomass availability and bioenergy potential will be based on the latest available crop production data (sourcing from MoA&FW)

3. Extending the atlas to estimate the livestock manure-based energy potential in the country.

4. Planning and Development of interactive biomass atlas – query-based system.

Efforts are on to make the data available online in 2025.

(iv) TIFAC: It is agreed that various data sources provide divergent data on various feedstocks of Biofuels projects. There is a requirement of creation of uniform data source and a comprehensive mapping of waste/feedstock. This will also assist in creation of feedstock clusters to ensure that the number of Plants in a cluster is limited by the feedstock availability, which will further ensure Plant viability.

- TIFAC in collaboration with NRSC, in past has geospatially mapped the residual biomass availability across India and is working towards updating the projections of biomass crop residues potential to cover under the existing portal named BHUVAN JAIVOORJA, with involvement of different stakeholders, and enable it dynamic.
- Further, the competing uses of feedstock for various end users (bioethanol/ biogas/ CBG/ methanol/ biohydrogen) is also being considered. The existing database would be further expanded with addition of other important crops with updating the data. This initiative is planned in collaboration with office of PSA and MNRE.
- Preparation of detailed projects (DPR), has started and stakeholders' meetings were held to discuss the work packages, roles and responsibilities of different stakeholders.

(v) Indian Oil: The following data sources are used to estimate major feedstock for Biofuels projects:"

S No.	**Feedstock**	**Data Source**	**Data mentioned in the report**

S No.	Feedstock	Data Source	Data mentioned in the report
1	Agriculture Residue	Estimating Surplus Crop Residues in India for Biofuel Production prepared by Center for Environment Science and Climate Resilient Agriculture, Indian Agricultural Research Institute, New Delhi submitted to Technology Information, Forecasting & Assessment Council (TIFAC), Department of Science & Technology	Surplus Agriculture Residue: 178 MMT
2	Sewage Waste	National Inventory of Sewage Treatment Plants prepared in March 2021 by Central Pollution Control Board	Sewage Generation: 72,368 MLD Operational Treatment Capacity: 26,869 MLD
3	Organic MSW	Annual Report 2020-21 on Implementation of Solid Waste Management Rules, 2016	Solid Waste Generated: 1,60,038 TPD Solid Waste Collected: 1,52,749 TPD (Organic waste is considered as 50% of total waste)
4	Press Mud	Indian Sugar Mill Association (ESY 2020-21)	Press Mud Generated: 12 MMT
5	Cattle Dung	20th Livestock Census (2019)	The total number of cattle in the country: 192.49 million

17. The Committee highlighted the lack of coherent data on feedstock/biomass availability in the country. The Committee appreciated the Ministry of New and Renewable Energy for developing dashboard and Geographic Information System (GIS) based waste mapping tools and called for strengthening the system for enhancing its reliability among stakeholders. Further, the Committee recommended for regular and comprehensive mapping of waste/biomass/feedstock in order to improve their supply in the market and thus, enabling planning with regard to generation of energy from these sources. Against this recommendation, the Ministry of Housing and Urban Affairs (MoHUA),

Administrative Staff College of India (ASCI), National Institute of Bio-Energy (NIBE), Technology Information Forecasting and Assessment Council (TIFAC) and Indian Oil Corporation (IOC) have submitted their replies. MoHUA as well as all the abovementioned Organisations have broadly supported the Committee's recommendation on the need for uniformity in data collection on feedstock availability in the country. MoHUA has proposed for integration of MNRE dashboard with schemes of other Ministries dealing with organic waste feedstock. ASCI, in its reply, referred to its study of 2020-21 on biomass power generation potential and surplus biomass availability and also talked about the complexities involved with such studies. Further, ASCI stated that comprehensive data can be developed if unit/local offices of State Agriculture Departments collaborate with State Nodal Agencies (SNAs) of MNRE as these are spread across the States. ASCI has also provided in detail its suggestions to address the challenges faced in data collection related to agriculture feedstock. The National Institute of Bio-Energy (NIBE) has called for convergence in efforts from all relevant Ministries to bring uniformity in feedstock availability at national level and has also suggested measures for achieving this uniformity. NIBE has further talked about its work on the biomass dashboard of MNRE, the ongoing work on upgradation of the dashboard and the efforts to make biomass related data online in 2025. TIFAC has informed the Committee about its collaboration with National Remote Sensing Centre (NRSC) on geospatial mapping of residual biomass availability across India and its work related to the BHUVAN JAIVOORJA portal in collaboration with the office of the Principal Scientific Adviser (PSA) and MNRE. Indian Oil Corporation (IOC) has furnished the various data sources that are used to estimate major feedstock for biofuel projects. The Committee are happy to note the work done by various Organisations in collecting and collating data related to feedstock/biomass availability in the country and would also like to appreciate ASCI, NIBE and TIFAC for their detailed submission and suggestions on the issue. The Committee, while reiterating their recommendation, would like to urge the Ministry of New and Renewable Energy to study the suggestions provided by the abovementioned Organisations and collaborate with other Ministries/Organisations to develop a robust mechanism for comprehensive mapping of feedstock/biomass in the country. In particular, the Committee would like the Ministry to work on engaging its State Nodal Agencies in data collection and reporting on agriculture feedstock availability, as suggested by ASCI. Further, the Committee may be apprised with the status of MNRE's biomass dashboard and BHUVAN JAIVOORJA portal.

CHAPTER – II

Observations/Recommendations which have been accepted by the Government

Recommendation No. 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.

Reply of the Government

(i) MoHUA: Sanitation is a State subject under 7th schedule of the constitution. It is the responsibility of State/ULBs to plan, design and execute sanitation projects in the urban areas of the country. Ministry of Housing & Urban Affairs (MoHUA) supplements the efforts of States/UTs through the Swachh Bharat Mission-Urban by providing policy directions, financial and technical support to deal with various issues concerning management of Municipal Solid Waste (MSW).

- Also, Solid Waste Management Rules, 2016 clearly states that it is the responsibility of the waste generators to segregate the waste generated by them in bio–degradable, non-biodegradable (recyclable and combustible), sanitary waste and domestic hazardous wastes.

- Under Swachh Bharat Mission-Urban (SBM-U) financial assistance is provided to States/UTs on the basis of demand made by the State/UT in the form of complete proposals/action plans duly approved by State Level Technical Committees (SLTC) for setting up of various waste processing facilities such as transfer stations, Waste-to-Compost (WtC) plants, Waste-to-Energy (WtE) plants, bio-methanation plants, Construction and Demolition (C&D) waste plants, sanitary landfill including Material Recovery Facilities (MRFs). Funds are also provided for Information, Education and Communication (IEC) to ensure awareness creation along-with large scale citizen outreach to intensify 'Jan Andolan' and institutionalize swachh behavior and related set of actions, towards achieving the vision of Garbage Free cities.
- A key component of the Swachh Bharat Mission (Urban) 2.0 has been citizen engagement for source segregation which will result in clean cities. Over the past years, the Mission has facilitated several citizen-based interventions to promote the concept of source segregation and waste management.
- Moreover, under the Mission the ULBs are encouraged to setup material recovery facilities for sorting of recyclable materials to enable authorised waste pickers and waste collectors to separate recyclables and provide easy access to waste recyclers for collection of segregated recyclable waste thus promote recycling and the non-recyclable combustible portion maybe channelized for energy recovery. Waste to Electricity plants generate power at the rate of 1 Mega Watt equivalent (MWe) per 35-40 Tonnes Per Day (TPD) from non-recyclable combustible portion of dry waste.
- For management of organic waste, the ULBs are also encouraged to setup compost plants and biomethanation plants for which additional central assistance is provided under as per the mission guidelines.

(ii) Indian Oil: Bio-methanation should be the preferred method to process organic waste, as the waste is used to produce Methane, which is used as fuel for vehicles, industries and commercial establishments thereby reducing import of fossil fuel and assisting in climate change mitigation. The process also produces Fermented Organic manure which increases the soil organic carbon and reduces chemical fertilizer consumption thereby promoting organic / natural farming. The Biogenic CO2 produced in the process can be used in various downstream industries.

- This is as against incineration of mixed waste which produces pollution, Green House Gases like CO2, NOX, etc., various volatile organic compounds which are harmful for the environment as well as ash.

(iii) WTE Division, MNRE: MNRE has been supporting the biomethanation based projects under the Waste to Energy sub-component of National

Bioenergy Programme (Phase-I), utilizing the organic waste and addressing its proper disposal.

- Further, it has been observed that, the Waste to Electricity plants set up in the country are mainly utilizing Municipal Solid Waste as feedstock. Moreover, the process used are mainly incineration of the MSW. However, as per the direction of DoE, the MSW to power component had to be excluded under the National Bioenergy Programme, as the component is supported under the Swachh Bharat Mission (2.0) of MoHUA.

[Ministry of New and Renewable Energy
O.M. No. 372-12/8/2017-PU, Dated: 21/02/2025]

Recommendation No. 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.

Reply of the Government

(i) MoHUA: A SPV maybe formed under the guidance of Ministry of Power having participation from multiple partners such as State Urban Development Departments, DISCOMS, SERCs, and central PSUs such as SECI and IREDA.

(ii) WTE Division, MNRE: It has been observed that, the Waste to Electricity plants set up in the country are mainly utilizing Municipal Solid Waste as feedstock. Moreover, the process used are mainly incineration of the MSW. However, as per the direction of DoE, the MSW to power component had to be excluded under the National Bioenergy Programme, as the component is supported under the Swachh Bharat Mission (2.0) of MoHUA.

(iii) IREDA: IREDA is dedicated NBFC for financing of renewable energy projects and not engaged in power trading. However, in order to make Waste to Energy (WTE) power plants commercially viable, the following are submitted:

a. Government support in the form of generation / manufacturing linked incentives may help improve project viability

b. Interest subvention for WTE / pallet manufacturing plants on the loans to be extended by banks / financial institutions for eligible projects may be explored

c. A WTE energy procurement direction may be introduced in line with Renewable Purchase Obligation (RPO) and Hydro Power Purchase Obligation (HPO) mandating Discoms to source minimum percentage of WTE based generated power out of their total procurement.

(iv) SECI: SECI is open to the recommendations of the Committee. As suggested, a procurement intermediary will guarantee off-take of power from waste to energy projects thereby instill confidence among private investors and other stakeholders. As per the applicable guidelines that may be issued by Government, SECI will issue tenders and take on the role of intermediary power procurer in these projects.

- Further, in the year 2022, SECI had endeavored to work in this direction. A tender was issued for setting up of 8 MW Waste to Energy Project in Kanpur, through a tariff-based competitive bidding mechanism, on behalf of the Uttar Pradesh DISCOMs. SECI was envisaged to play the role of the intermediary trader for such power, to provide payment security to the bidders. However, during the various stakeholder consultations held, the estimated tariffs were not in line with expectations of the final off-taker, due to which assured offtake of power could not be ascertained. As a result, SECI was constrained to cancel the tender due to lack of response.

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Comments of the Committee
(Please see Para No. 8 of Chapter – I of the Report)

Recommendation No. 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.

Reply of the Government

(i) MoHUA: Waste to Energy (Electricity) Plants are subjected to emissions and as per Clause 16 of the Solid Waste Management Rules 2016, it is the duty of the State Pollution Control Board or Pollution Control Committee to monitor environmental standards and adherence to conditions as specified under the Schedule I and Schedule II for waste processing and disposal sites.

- Latest WtE plants leverage advanced technologies to significantly mitigate the environmental impact of waste incineration. High-efficiency scrubbers, advanced filters, real-time emission monitoring, and catalytic reduction systems all play critical roles in controlling emissions and ensuring that these facilities operate within stringent environmental standards. These advancements help make WtE plants a more sustainable option by minimizing its impact on air quality and public health.

(ii) EIL: Waste to Electricity (WtE) plants incinerate municipal solid waste (MSW) to generate electricity. The plants shall be designed with adequate air pollution control measures to treat these pollutants to comply with the applicable statutory norms before being venting out to atmosphere. The MSW used for incineration contains various components like carbon, hydrogen, nitrogen, oxygen, volatile matter, ash, chlorine, silica, etc. Combustion of this waste or waste derived fuels results in generation of mixture of gases termed as flue gas consisting of air, water vapour, carbon dioxide, acid gases like HCL, HF, HI, SO2, NOx, organic substances, dioxins, furans, heavy metals, fly ash particles, etc, which need to be controlled through appropriate operating conditions and flue gas treatment technology to meet the standards. The flue gas generated can be treated by using a suitable flue gas cleaning system before releasing into the atmosphere. Flue gas cleaning system (FGCS) refers to a range of processes imposed on untreated combustion gas to limit harmful pollutants. Particulate matter consists primarily of entrained non-combustible matter in the flue gas, and the products of incomplete combustion that exist in solid or aerosol form, which can be removed using different technologies like Cyclone Separators, bag filters, Electro Static Precipitators (ESPs), Venturi Scrubbers, etc. NOx can be treated in a separate system with deNOx process options like Selective Non-Catalytic Reduction (SNCR) and Selective Catalytic Reduction (SCR). Typical gaseous contaminants generated from waste incinerators like HCL, HI (Hydrogen Iodide), SOx, etc can be removed by various technological options like Dry, Semi-dry & Wet scrubbing system. Removal of the toxic substance like dioxins, furans and mercury can take place by injection of finely divided activated carbon particles into the flue gas stream. The Waste to Electricity plants shall be monitored by Online Continuous Emission Monitoring System to monitor the treated flue gas quality. Globally also, the Flue gas cleaning system (FGCS) in Waste to Electricity plants are equipped with similar air pollution control equipment as discussed above.

Waste to Gas plant involves bio-methanation of biodegradable wet waste to generate bio-gas. This is comparatively environmentally clean process. 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, can be purified and upgraded to make it suitable to be used as a green and clean fuel for transportation. Various technologies available for gas purification includes pressure swing adsorption (PSA) process, Water Scrubbing System, Membrane and Solvent based technologies, etc.

With proper design of pollution control measures, better housekeeping and above specified technologies implemented, it is feasible to address the environmental concerns associated with operation of Waste to Energy plants.

(iii) WTE Division MNRE: MNRE has been supporting the biomethanation based projects under the Waste to Energy sub-component of National Bioenergy Programme (Phase-I), utilizing the organic waste and addressing its proper disposal. After the notification of Phase-I of NBP, 60 BioCNG projects with cumulative installed capacity of 489 TPD have been supported, under the Waste to Energy sub-component. The budget for Phase I of National Bioenergy Programme (NBP) of MNRE is almost fully allocated. An Interim evaluation of Scheme for Phase-II of NBP, is under process.

- Moreover, the Waste to Energy projects developers have to submit the Consent to Established/Consent to Operate from the respective State Pollution Control Board, for availing the CFA under Waste to Energy programme of MNRE.

[Ministry of New and Renewable Energy
O.M. No. 372-12/8/2017-PU, Dated: 21/02/2025]

Recommendation No. 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.

Reply of the Government

(i) MoHUA: The Committee's recommendations highlight the crucial need for precise data monitoring, thorough waste and feed stock mapping, and strategic planning to optimize waste use in the bioenergy and waste-to-energy (WtE) sectors. Adopting these recommendations could enhance waste management efficiency, boost energy production, and ensure better alignment with market needs and regulatory standards.

- Integrating the dashboard created by MNRE with the schemes of various Ministries dealing with various organic waste feed stock could further strengthen data management and strategic planning. This approach will help the country advance its bioenergy and WtE objectives more effectively.
- MoHUA supports the recommendation.

(ii) ASCI: 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.

The 2020-21 ASCI biomass power generation potential and surplus agriculture biomass availability study, given the scope could consider 254 districts and 54 crops across India and projected it forward to the entire country's potential. For biomass to power generation, co-incineration process is widely used.

- 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.

The 2018 TIFAC study considered 19 states, 43 districts and 11 crops. Both of these studies, considered secondary data on crop type, crop acreage, crop production/ yield from the state level agriculture departments. Therefore, this estimate by TIFAC is only a subset of the total crop residue biomass

availability and that is specifically meant for 2G ethanol production, which is produced from digestible 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.

Like in the case above, digestible biomass can be used for generation of bio-gas so once again, the above quantity estimate is only a subset of the total crop residue biomass availability.

- As per MoHUA, the energy generation potential from urban and industrial organic waste is about 5.6 GW.

Not applicable for agriculture biomass as MoHUA is considering urban industrial organic waste

- 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.

The above secondary data is available at the district and crop level and at regular Intervals (such as weekly, quarterly) only for some states. However, what fraction of the crop is available as residue feedstock for biomass-based end-products/ end-uses (bio-ethanol, biomass to power generation, etc.), is not readily accessible.

In addition to that, to arrive at surplus residue biomass available for biomass to energy use, has to be arrived at after subtracting the amount of biomass being used for other uses (domestic, cottage and non-cottage industrial use as well as other use) from the total crop residue quantity.

However, this estimation involves deep understanding of the local supply chains for these end-uses and therefore becomes complex. This understanding however can be developed in collaboration with unit/ local offices of State Agriculture Departments and State Nodal Agencies of MNRE that are spread across the state typically.

Further, past studies for estimating agriculture crop residue feedstock availability for Waste to Energy (WTE) did not have a scope to cover in detail crops and information gathering at each block, district and state level.

Given the inputs above, it is essential to gather surplus crop residue feedstock availability at the block, district and state level specifically for Waste to Energy (specifically crop residue biomass to energy) end-uses.

- Inputs proposed to address the above:

1. Standardized Data Collection and Data Reporting
    - Develop and implement a standardized framework for data collection and reporting on agriculture feedstock availability. This framework should include uniform definitions, methodologies, and metrics to ensure consistency across different organizations and regions.
    - Define clear parameters for categorizing residual agriculture biomass/ bagasse feedstock based on:
    - Crop Type
    - Crop Residue quantity available at the Block, District and State level
    - Crop Residue being used for other end-uses (domestic, cottage/ non-cottage industry and other end use applications)
    - Surplus Crop Biomass Residue available at the Block, District and State level
    - Seasonality in the Crop Residue availability
    - Suitability of various crop feedstocks for different end-products and/ or end-uses (bio-ethanol, methanol, biomass to power generation, green hydrogen etc.)
    - Amount of biomass feedstock utilized linked to the end-product and/ or end-use (and the number of existing biomass to energy plants that are utilizing the same)

This would ensure that the data is comparable, integrated and holistic and would be useful as multiple agencies/ departments are assessing potential for different end-products and end-uses from the same finite source of agriculture feedstock

- Formulate detailed guidelines for reporting agriculture feedstock data at multiple administrative levels (block, district and state)
- Data Collection at regular intervals could be done by the respective State Nodal Agencies (SNAs) of MNRE and their various local/ unit offices in coordination with the State Agriculture Department and their local/ unit offices that are spread across the state.
- Here mechanisms can be created to gather granular and real-time access to information covering type of crops, crop acreage, crop production/ yield, residual feedstock availability for Waste to Energy end-use.
- These guidelines should address data collection methods, reporting intervals, and quality assurance practices

2. Enhance Dashboard and GIS Tools for Real-time Data Reporting and Monitoring

- Strengthen the MNRE's dashboard and Geographic Information System (GIS) tools by incorporating advanced features such as real-time data updates along with predictive analytics for future projections and appropriate mapping of the data at the block, district and state level.
- Ensure that the tools are accessible and user-friendly, with interfaces designed to facilitate the following:
- Easy data entry on agriculture feedstock at the state, the district and the block level, by the State Nodal Agencies (SNAs) of MNRE in coordination with respective state agriculture departments and their local/ unit offices
- Verification, additional analysis, reporting and regular monitoring by MNRE
- Access to real-time updates on agriculture feedstock availability by various stakeholders

3. Promote Stakeholder Engagement and Training

- Conduct Training Programs: Organize regular training sessions and workshops for stakeholders to ensure they are proficient in using the dashboard and GIS tools. Include training on data entry standards, tool functionalities, and data interpretation. ASCI is keen to take up this effort jointly with MNRE
- Ongoing Support: Provide ongoing support and resources to stakeholders to address any issues related to data reporting and tool usage.

- Foster Collaboration and Information Sharing: Encourage collaboration between government agencies, private sector entities, and research institutions to enhance data sharing and coordination. Create platforms for regular dialogue and exchange of information

By implementing these recommendations, the Standing Committee can address the inconsistencies and gaps in feedstock data, leading to more effective planning and utilization of bioenergy resources in India.

(iii) SSS NIBE: The data as per MNRE and TIFAC report is based on agricultural residues utilization for bioenergy generation. MNRE data indicates the bioenergy potential in the form of biomass-based power and TIFAC indicates the bioenergy potential in the form of Bioethanol. The data from MoHUA is based on urban and industrial organic waste. The SATAT CBG potential considers Surplus agro-residues, spent wash/press mud, STPs, and animal and poultry waste. Further the data is considered for different periods of time in these different reports.

The data on biomass availability from different ministries is based on their area of interest and relevance to their respective ministerial activity. However, a convergence in efforts from all the relevant ministries is necessary in order bring uniformity on the feedstock availability at the national level. Therefore, it is suggested that:

- As there are different schemes from different ministries in the country, for more uniformity in data, one ministry may be made a nodal point for data collection, compilation and information dissemination. All the concerned ministries should timely provide the annual data pertaining to respective bioenergy targets, status of implementation, biomass utilization and bioenergy generation through their respective schemes. This will facilitate annual updation of the biomass utilization and availability scenario in the country along with the actual annual bioenergy generation in the country under different pathways such as CBG, biomass pellets/briquettes, bioethanol, green hydrogen etc.
- Further for the annual updation of biomass potential data, Ministry of agriculture may be directed to annually provide the crop production data at a district and state level to the designated nodal ministry for yearly updation of the theoretical surplus biomass potential in the country. This will facilitate the regular and updated availability of biomass potential information at a district level in the

country and help in short and long term planning of biomass utilization for bioenergy generation.

- To streamline the assessment initially, a committee of relevant agencies coordinated by the identified nodal agency such as MNRE, MoPNG, MoA&FW, MoHUA, MoP, DDWS, TIFAC, NIBE etc. can be formed to establish a mechanism for biomass assessment and bioenergy potential estimation under different pathways. Once it is established, then year on year the updation can be done.

Since SSS NIBE (an autonomous institution of MNRE) has worked on developing the existing dashboard of biomass atlas at the national level, it has a self-appointed task of bringing improvisation. In this regard, the institute is currently working on the following activities:

1. Estimation of data at district level for all the states in the country
2. Dynamic updated portal where estimations on the biomass availability and bioenergy potential will be based on the latest available crop production data (sourcing from MoA&FW)
3. Extending the atlas to estimate the livestock manure-based energy potential in the country.
4. Planning and Development of interactive biomass atlas – query-based system.

Efforts are on to make the data available online in 2025.

(iv) TIFAC: It is agreed that various data sources provide divergent data on various feedstocks of Biofuels projects. There is a requirement of creation of uniform data source and a comprehensive mapping of waste/feedstock. This will also assist in creation of feedstock clusters to ensure that the number of Plants in a cluster is limited by the feedstock availability, which will further ensure Plant viability.

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- Further, the competing uses of feedstock for various end users (bioethanol/ biogas/ CBG/ methanol/ biohydrogen) is also being considered. The existing database would be further expanded with

addition of other important crops with updating the data. This initiative is planned in collaboration with office of PSA and MNRE.

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S No.	Feedstock	Data Source	Data mentioned in the report
1	Agriculture Residue	Estimating Surplus Crop Residues in India for Biofuel Production prepared by Center for Environment Science and Climate Resilient Agriculture, Indian Agricultural Research Institute, New Delhi submitted to Technology Information, Forecasting & Assessment Council (TIFAC), Department of Science & Technology	Surplus Agriculture Residue: 178 MMT
2	Sewage Waste	National Inventory of Sewage Treatment Plants prepared in March 2021 by Central Pollution Control Board	Sewage Generation: 72,368 MLD Operational Treatment Capacity: 26,869 MLD
3	Organic MSW	Annual Report 2020-21 on Implementation of Solid Waste Management Rules, 2016	Solid Waste Generated: 1,60,038 TPD Solid Waste Collected: 1,52,749 TPD (Organic waste is considered as 50% of total waste)
4	Press Mud	Indian Sugar Mill Association (ESY 2020-21)	Press Mud Generated: 12 MMT
5	Cattle Dung	20th Livestock Census (2019)	The total number of cattle in the country: 192.49 million

[Ministry of New and Renewable Energy
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Comments of the Committee

(Please see Para No. 17 of Chapter – I of the Report)

Recommendation No. 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.

Reply of the Government

(i) R&D Division, MNRE: Ministry of New and Renewable Energy is implementing a "Renewable Energy Research and Technology Development Programme (RE-RTD)" through various research institutions and industry to develop indigenous technologies and manufacturing for widespread applications of new and renewable energy in efficient and cost-effective manner including Biomass and Biogas research and development. It provides up to 100% financial support to government/non-profit research

organizations and up to 70% to industry, startups, private institutes, entrepreneurs, and manufacturing units.

- Ministry can take up the new R&D projects as per latest thrust areas of Biomass and Biogas research and development which can include more research on the differing characteristics of feedstocks and identify appropriate technologies.

(ii) BIS: The Solid Mineral Fuels and Solid Biofuels Sectional Committee, PCD 7 of BIS, has developed the following two standards related to briquettes and pellets specifications, which are attached for your reference:

- IS 18724: 2024 Solid biofuels - Fuel specifications and classes - Pellets from agro and herbaceous residues
- IS 18725: 2024 Solid biofuels - Fuel specifications and classes - Briquettes from agro and herbaceous residues'

(iii) NTPC: As regards NTPC, it has taken the following research/projects:

- Collection of different types of biomasses and study the effect of long-term storage on GCV (Activity 22)
- Detailed characterization of biomass and its ash to evaluate its properties with respect to co-firing in PC fired boiler (Activity No 23)
- Experimental and Simulation analysis and establishing correlation of biomass characteristics with PC fired boiler combustion process for optimizing and increasing cofiring ratio of biomass. (Activity No 24)
- Experimental and Simulation studies on ash slagging, fouling and high temperature corrosion behavior during burning of biomass in a PC fired Boilers (Activity No 27) Interim reports for all the above-mentioned activities are prepared and final reports are in progress.

(iv) NITI Aayog: A scoping on the differing characteristics of feedstocks and identify appropriate technologies for utilizing them needs to be carried out by MNRE. The identified technologies need to be promoted through Generation-based Incentives scheme by MNRE.

[Ministry of New and Renewable Energy
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Recommendation No. 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.

Reply of the Government

(i) MoHUA: Sanitation is a State subject under 7th schedule of the constitution. It is the responsibility of State/ULBs to plan, design and execute sanitation projects in the urban areas of the country. Ministry of Housing & Urban Affairs (MoHUA) supplements the efforts of States/UTS through the Swachh Bharat Mission-Urban by providing policy directions, financial and technical support to deal with various issues concerning management of Municipal Solid Waste (MSW).

- The project cost of Rs18 Cr/MWe of WtE plants was estimated based on the available data during the preparation of scheme guidelines during the year 2021 and this project cost does not include land costs.
- Also under the mission, projects under PPP mode are encouraged, to invite private capital in urban infrastructure as well as to bring in private sector efficiency in delivery of urban services and O&M

(ii) Biomass Division MNRE: Point has been noted.

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Recommendation No. 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.

Reply of the Government

(i) Indian Oil: An important co-product from the digestate of CBG Plants is Fermented Organic Manure (FOM). Valorisation of this organic manure which is 3-4 times of CBG production is important for the viability of the CBG Plants. Use of this organic manure will increase soil organic carbon, reduce use of chemical fertilizers and propagate organic farming in the long run. India's CBG plants under SATAT scheme are expected to produce about 50 million Metric Tonnes of FOM.

- Chemical fertilizer Companies may be mandated to off-take FOM @ 10% of Chemical fertilizer Sold and market through their channels. The FOM should be off-taken at ~Rs. 5000/ton from CBG Plant gate to ensure CBG Plant viability.

(ii) MoHUA: Ministry supports the recommendation. However, it may be noted that the off-take of city compost still remains a challenge due to the withdrawal of Market Development Assistance (MDA) in Sept 2021 by Dept. of Fertilizers. It is suggested that the MDA for city compost maybe reinstated and FCO norms maybe rationalized/developed (for sludge) in order to ensure improved off-take.

(iii) Dept. of Fertilizers: The Government had formulated a policy on promotion of city compost on 10.02.2016 wherein Market Development Assistance (MDA) of Rs. 1500/M.T in the form of subsidy was provided for scaling up production and consumption of city compost. The scheme of MDA for city compost has been discontinued after 30th September, 2021 based on the review of the MDA Policy and recommendations of Expenditure Finance Committee (EFC) in its meeting dated 2nd August, 2021. Further, the

promotion of bio-fertilizers, awareness campaigns & education, etc. is the subject matter of DA&FW.

(iv) DA&FW: The Government of India promotes the judicious use of nutrient in conjunction with Bio-fertilizer and Organic fertilizer. The various steps have been initiated by the GOI to promote the use of Bio and Organic fertilizers.

1. Steps taken by Government to boost Biofertilizer and Organic Fertilizer Production: -

(i) The Central Government has implemented various schemes for promoting use of bio-fertilizers and organic fertilizers which are as follows:

CISS

- Under CISS Scheme Financial assistance was provided to Municipalities, APMCs, Public sector/Private sector companies, fertilizer companies or any individual entrepreneurs for establishment of fruit/vegetable market/agro waste compost production units and bio-fertilizer/bio-pesticide production units. Financial assistance is provided for Bio-fertilizer unit-25% of TFO or Rs 40.00 lakh whichever is less for setting up of 200 Ton Per Annum (TPA) capacity production unit whereas for fruit/vegetable waste compost units' assistance is provided @ 33% of Total Financial Outlay (TFO) or Rs. 60.00 lakh whichever is less for 100 Ton Per Day (TPD). Total Units funded since 2012-13 under NPOF CISS for which One time/ Advance/Final Instalment of subsidy released are 66 Units.

<u>Paramparagat Krishi Vikas Yojana (PKVY)</u>

- Government is promoting organic farming on priority in the country since 2015-16 through the scheme of Paramparagat Krishi Vikas Yojana (PKVY) in all the States including Uttar Pradesh other-than North Eastern. The scheme stress on end-to-end support to farmers engaged in organic farming i.e from production to processing, certification and marketing and post-harvest management Training and Capacity Building are integral part of the scheme. Under PKVY scheme, total assistance of Rs 31,500 per ha for a period of three years is provided for promotion of organic farming to cover different components like Training & Capacity Building, Data Management, PGS Certification, value addition, marketing and publicity. Out of this, the assistance of Rs. 15,000 per ha for a period of three years is provided to farmers through DBT for on-farm/off-farm organic inputs.

Mission Organic Value Chain Development for North Eastern Region (MOVCNER):

- Government of India has been implementing Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) scheme since 2015-16, exclusively in the 8 North Eastern States, for development of certified organic production in value chain mode to link growers with consumers and to support the development of the entire value chain from

inputs, seeds and certification to the creation of facilities for certification, aggregation processing, marketing and brand building initiatives. Under MOVCDNER, assistance of Rs. 46,500/ha for 3 years is provided for creation of FPO, support to farmers for organic inputs, quality seeds/ planting material and training, hand holding and certification.

Financial assistance @RS 32500/ ha for 3 years is provided to farmers for off-farm /on-farm organic inputs.

RKVY Scheme for Commercial Production Units of Organic Inputs:-

- Initiated in the year 2007 as an umbrella scheme for ensuring holistic development of agriculture and allied sectors. The funding pattern of the scheme has been altered in the ratio of 60:40 between Centre and States (90:10 for North Eastern States and Himalayan States). However, for Union Territories the funding pattern is based on central grant @ 100 %. The scheme has provision for setting up of Bio-fertilizers & Organic Fertilizer Quality Control labs. Around Rs. 3000 per unit financial assistance is provided for establishment of vermi-compost unit and bio-fertilizers and vermi-compost are distributed at subsidized rates.

Mission for Integrated Development of Horticulture (MIDH):-

- Under MIDH provisions have been made for Vermi-compost Units/Organic input production units 50% of cost conforming to the size of the unit of 30'X8'X2.5" dimension of permanent structure to be administered on pro-rata basis whereas for HDPE Vermi-bed financial assistance 50% of cost conforming to the size of 96 cubic foot (12'X4'X2) to be administered on pro-rata basis (Rs 100,000/ unit for permanent structure and Rs. 16,000/unit for HDPE Vermi-bed).

National Mission on Oilseeds and Oil Palm (NMOOP):

- Financial assistance 50% subsidy to the tune of Rs. 300/- per ha is being provided for different components including bio-fertilizers, Supply of Rhizobium culture/Phosphate Solubilizing Bacteria (PSB)/ Zinc Solubilizing Bacteria (ZSB)/ Azotobacter! Mycorrhiza and vermi compost.

National Food Security Mission (NFSM):

- Under NFSM- Pulses, financial assistance is being provided for promotion of Bio-Fertilizer (Rhizobium/PSB) 50% of the cost limited to Rs.300 per ha. Under Bringing Green Revolution to Eastern India (BGREI), a sub scheme of RKVY, also supplied bio-fertilizer 50% of the cost limited to Rs. 300 per ha for Rice and Wheat crops
- The GOI prescribed the standards of various Organic and Bio-fertilizer under FCO, 1985 to ensure that good quality of these to be provided to farmers. FCO prohibits the sale of any Bio-fertilizer/Organic/Chemical which are not of prescribed standards.

(ii) Steps taken by Ministry to create awareness among farmers about long term benefits of using Bio-fertilizers:-

DA&FW, Ministry of Agriculture through NCONF has promoted the use of bio-fertilizers and organic fertilizers among farmers in different ways which are as follows:

- By organizing HRD Trainings for various stakeholders to popularize the use of Bio- fertilizers and Organic Fertilizers
- Through Publication of Training Literature (OFNL, BFNL & Compilation of various ITKs)
- Dissemination of region and crop specific best Package of Practices/Success Stories etc.
- IEC activities (organizing/participating in National/International Exhibitions/ Trade Fairs, Seminars)

Way Forward: -

- ❖ To ensure the wider adaptability of bio-fertilizers in the country, the proposal on setting up of 500 mini Bio-fertilizer production units is at the level of consideration in MoA&FW, Gol. The proposed scheme offers a significant opportunity to promote bio-fertilizers in rural areas by establishing local enterprises with institutes like SAUs will act as handholding institutions for establishing these enterprises. It advocates for the exemption of sales certificate requirements for bio-fertilizer units, similar to existing exemptions for other products, with mandatory quality checks through periodic sampling.
- ❖ IEC activities will be taken up through online webinars and developing multilingual printed material for easy understanding of stakeholders.

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Recommendation No. 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).

Reply of the Government

(i) WTE Division, MNRE: Under the Waste to Energy sub-component of MNRE, projects set up on Gaushalas are eligible for 20% enhanced CFA than the standard CFA pattern for Waste to Energy projects.

- Under the Waste to Energy sub-component of MNRE, industrial waste-based power projects are eligible for Central Financial Assistance (CFA), which includes the captive consumption-based projects also.

(ii) Biogas Division, MNRE: There is ample potential of setting up biogas plants in India considering the livestock population of 535.78 million, which includes about 300 million total population of bovines (comprising of cattle, buffalo, mithun and yak). The livestock sector contributes about significantly to India's GDP and will continue to increase. The dissemination of biogas technology is a boon for Indian farmers with its direct and collateral benefits. So far about Up to 31.07.2024, a total of 51.04 Lakhs of small biogas plants has been installed and 349 medium sized biogas plants have been installed with a cumulative off-grid power generation capacity of about 10.6 MWeq in the country.

About the Biogas Programme

i. The Ministry of New and Renewable Energy (MNRE), Government of India has notified the National Bioenergy Programme on November 2nd, 2022. MNRE has continued the National Bioenergy Programme for the period from FY 2021-22 to 2025-26 with an outlay Rs. 858 crores, which included Rs. 100 Crore 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.

ii. Objectives: The objective of this programme is to support setting up of biogas plants for clean cooking fuel, lighting, meeting thermal and small power needs of users which ultimately results in GHG reduction, improved sanitation, women empowerment and creation of rural employment. The details of Central Financial Assistance (CFA) for different components under this programme is as follows:

(a) For small biogas plants (1-25 cubic meter/day plant capacity): Rs. 9800/- to Rs. 70,400/- per plant based on size of the plant in cubic meter;

(b) For Power generation and thermal application (25 - 2500 cubic meter/day plant capacity): Rs. 35,000/- to Rs. 45,000/- per kilowatt for power generation and Rs. 17,500 /- to Rs. 22,500/- per kilowatt equivalent for thermal applications (25 -2500 cubic meter/day plant capacity) (The

eligible CFA would be 20% higher than Standard CFA in for NER, Island, Registered Gaushalas and SC/ST beneficiaries).

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Recommendation No. 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.

Reply of the Government

(i) MoHUA: In order to achieve convergence of schemes a Joint Working Group (JWG) was constituted between MoHUA and MoPNG for fast tracking implementation, facilitate consultation between States & OGMCs, monitor progress, resolve issues related to MSW based CBG projects and off-take of CBG under SATAT

(ii) MoPNG/Indian Oil: Presently, the SATAT initiative on CBG is in a nascent stage with 71 commissioned CBG Plants and about 60 CBG Plants in

various stages of construction. There are issues in viability of CBG Plants due to various reasons including: -

- Sourcing of feedstock at long term viable rates.
- Marketing of Fermented Organic Manure, which is about 3 to 6 times of CBG production at remunerative rates.
- Standardization of technologies for setting up CBG Plants, etc.

Government has introduced various enablers to support the CBG Plants. There is a requirement of continuation of such support mechanisms to ensure the progress of CBG Plants.

The viability of CBG sales through a single Retail Outlet (RO) is at ~2 TPD and hence 2 TPD was proposed for supply to RO under SATAT scheme. In case there are CBG plants of less than 2 TPD, the CBG from multiple Plants can be aggregated and supplied to a RO to ensure sale as well as RO viability. Alternatively, MoP&NG has already announced the CBG-CGD Synchronization scheme for injection of CBG in CGD network, through which CBG Plants of less than 2 TPD can explore injection of CBG in CGD network.

A Coordination Mechanism on CBG has been established under the Chairmanship of Additional Secretary, MoP&NG with representatives of DDWS, MNRE, DFS, MoHUA, Dept. of Fertilizers, DoA&FW, MoEF&CC, DPIIT, representatives from Bureau of Indian Standards and representatives of Oil & Gas Marketing Companies to track developments in the CBG sector, resolution of issues in implementation of CBG initiatives and suggest changes to existing support measures / introduction of new measures.

- The Ministry of Petroleum and Natural Gas (MoPNG) acknowledges the need for better convergence and coordination among various ministries to achieve sustainable waste management and energy recovery from waste. In this regard, several committees and groups have been established to ensure effective collaboration across ministries:

1. Inter-Ministerial Committee (IMC): An IMC has been constituted by DAFW to strategize the convergence of various initiatives and schemes from different ministries/departments, specifically focusing on the ex-situ management of paddy straw. The committee includes representatives from the Department of Agriculture and Farmers Welfare, the National Bioenergy Program of the Ministry of New and Renewable Energy, the Ministry of Petroleum and Natural Gas, the Ministry of Power, and the Department of Food and Public Distribution. It is chaired by the Special Secretary of the Department of Agriculture and Farmers Welfare (DAFW).
2. Inter-Ministerial Task Force for GOBARdhan: To steer the implementation of the GOBARdhan initiative, an Inter-Ministerial Task Force has been set up. This task force is chaired by the Secretary of the Department of Drinking Water and Sanitation (DDWS) and includes representatives from the Department of Agriculture, Cooperation and Farmers Welfare, the

Department of Agricultural Research and Education (or ICAR), the Department of Animal Husbandry and Dairying, the Ministry of Environment, Forest and Climate Change, the Department of Fertilizers, the Ministry of New and Renewable Energy, the Ministry of Petroleum and Natural Gas, the Department of Rural Development, and the Department of Science and Technology

3. Joint Working Group between MoPNG and MoHUA: A Joint Working Group between MoPNG and the Ministry of Housing and Urban Affairs (MoHUA) has been established to enhance coordination and expedite the implementation of approved CBG projects in urban areas.

4. Coordination Mechanism (CM): MoPNG has also established a Coordination Mechanism to monitor developments and suggest resolutions for issues related to the CBG ecosystem. This mechanism includes members from the Department of Drinking Water and Sanitation, the Ministry of New and Renewable Energy, the Department of Financial Services, the Ministry of Housing and Urban Affairs, the Department of Fertilizers, the Department of Agriculture and Farmers Welfare, the Ministry of Environment, Forest and Climate Change, the Department for Promotion of Industry and Internal Trade, the Bureau of Indian Standards, and Oil and Gas Marketing Companies.

5. Committee of Secretaries (CoS) Meetings: Regular meetings of the Committee of Secretaries (CoS), chaired by the Cabinet Secretary, are held to review the GOBARdhan Scheme.

- These coordination efforts aim to align the objectives of various ministries and prevent overlaps and duplication, ensuring a cohesive approach for effective implementation of Waste to Energy program.

(iii) Ministry Of Power: 1. The Government of India has established the Inter-Ministerial Committee (IMC) to coordinate Schemes related to ex-situ paddy straw management under the Department of Agriculture & Farmers Welfare, Ministry of Agriculture. The IMC constituted has representations from relevant Ministries and agencies Including Ministry of Power (MoP), Ministry of New and Renewable Energy (MNRE), Ministry of Petroleum and Natural Gas (MoPNG), Ministry of Environment, Forest, and Climate Change (MoEFCC), and the Central Pollution Control Board (CPCB).

2. The IMC has been actively monitoring and facilitating the Implementation of various Schemes to combat paddy stubble burning. It has held eight meetings to ensure effective implementation and convergence of Scheme. The IMC meetings were held on 4th & 13th December 2023, 15th February 2024, 25th April 2024, 11th & 27th June 2024, 16th July 2024, and 21 August 2024.

3. Based on the IMC's recommendations, the Ministry of New and Renewable Energy (MNRE) has revised the Rate of Central Financial Assistance for pellet manufacturing units under its 'National Bioenergy

Programme'. The Scheme now has enhanced rate of CFA for non-torrefied and torrefied pellet manufacturing units. Further revisions are under consideration. Additionally, the Central Pollution Control Board Scheme is slated to be phased out once the MNRE scheme is fully revised.

(iv) DDWS: Galvanizing Organic Bio-Resources dhan (GOBARdhan), launched in 2018 under SBM(G), is an integral component of biodegradable waste management under SBM(G) Ph-II for ensuring cleanliness in villages by converting organic/ biodegradable waste including cattle dung, crop residue, market waste etc. into biogas and bio-slurry. Financial assistance of up to Rs 50 lakh per district is available for the entire programme period.

- Further, GOBARdhan "Waste to Wealth" initiative of GoI is based on a whole of Government approach. It covers the entire gamut of schemes/programmes aimed at converting organic waste like cattle dung/ agri-residue etc. to biogas/ Compressed Biogas (CBG) and organic manure. GOBARdhan initiative provides a common platform for schemes of different Ministries/ Departments such as the Ministry of New and Renewable Energy (MNRE); Ministry of Petroleum and Natural Gas (MoPNG);
- Department of Animal Husbandry and Dairying; Department of Agriculture and Farmers Welfare; Ministry of Housing & Urban Affairs etc. DDWS is the nodal coordinating Dept. at GoI level for implementation of the initiative. As on date, a total of 709 CBG plants and 1325 biogas plants registered under different categories on the Unified Registration Portal for GOBARdhan (https://gobardhan.co.in/)"
- Joint Secretary, DDWS, has been designated as Mission Director for GOBARdhan initiative to ensure smooth coordination between stakeholder Ministries.

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CHAPTER – III

Observations/Recommendations which the Committee do not desire to pursue in view of the Government's Replies

Nil

CHAPTER – IV

Observations/Recommendations in respect of which the Replies of the Government have not been accepted by the Committee and which require Reiteration

Recommendation No. 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.''

Reply of the Government

Biomass Division MNRE: At present, no scheme regarding Biomass Supply Chain is under consideration in the Ministry.

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Comments of the Committee

(Please see Para No. 11 of Chapter – I of the Report)

Recommendation No. 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.

Reply of the Government

Indian Oil: Presently biomass / agricultural residue like paddy straw, etc. has multiple uses in Compressed Bio Gas (CBG) Plants, 2G Ethanol Plants, power plants for co-firing with coal, briquettes, etc. As multiple biomass-based plants come up in a certain area, there is competition and increase of biomass supply rates making the biofuels projects unviable. It is accordingly proposed to create biomass clusters by all states to ensure that biomass from the cluster formed with group of villages selected based on biomass availability and the capacity of the project is assigned to a certain Plant to ensure long term biomass supply at viable rates. This has already been implemented in Haryana for Indian Oil's 2G Ethanol Plant.

- Additional 30% subsidy (in line with S-MAM provisions) may be provided by State Governments to make the procurement of the equipment

by Farmer Producer Organization (FPO) more viable. The same is being provided under Uttar Pradesh Bio-Energy Policy. In addition, State Governments should ensure placement of adequate number of agriculture residue collection and aggregation equipment near the agriculture residue based CBG Plant locations as per the Plant capacity.

- There are already existing private players who have set up biomass trading platforms.

(ii) Biomass Division MNRE: At present, no scheme regarding Biomass Supply Chain is under consideration in the Ministry.

[Ministry of New and Renewable Energy
O.M. No. 372-12/8/2017-PU, Dated: 21/02/2025]

Comments of the Committee

(Please see Para No. 14 of Chapter – I of the Report)

CHAPTER – V

Observations/Recommendations in respect of which the final Replies of the Government are still awaited

Nil

New Delhi;
11 March, 2025
Phalguna 20, 1946 (Saka)

Shrirang Appa Barne
Chairperson,
Standing Committee on Energy

APPENDIX-I

STANDING COMMITTEE ON ENERGY

MINUTES OF TENTH SITTING OF THE STANDING COMMITTEE ON ENERGY (2024-25) HELD ON 11TH MARCH, 2025 IN COMMITTEE ROOM-3, PARLIAMENT HOUSE ANNEXE EXTENSION, NEW DELHI

The Committee sat from 1500 hours to 1530 hours

MEMBERS - LOK SABHA

Shri Shrirang Appa Barne - Chairperson

2. Shri Shyamkumar Daulat Barve
3. Shri Devusinh Chauhan
4. Captain Brijesh Chowta
5. Shri Malaiyarasan D.
6. Shri Chandra Prakash Joshi
7. Dr. Shivaji Bandappa Kalge
8. Dr. Kirsan Namdeo
9. Shri Nilesh Dnyandev Lanke
10. Shri Dulu Mahato
11. Shri Ramprit Mandal
12. Smt. Bijuli Kalita Medhi
13. Shri Jagdambika Pal
14. Smt. Shambhavi
15. Shri Chandubhai Chhaganbhai Shihora
16. Dr. Shrikant Eknath Shinde
17. Shri Abhay Kumar Sinha

MEMBERS - RAJYA SABHA

18. Shri Gulam Ali
19. Dr. Laxmikant Bajpayee
20. Shri Ajit Kumar Bhuyan
21. Shri R. Dharmar
22. Shri N.R. Elango
23. Shri Javed Ali Khan
24. Shri Harsh Mahajan
25. Smt. Mamata Mohanta

SECRETARIAT

1.	Shri Ramkumar Suryanarayanan	Joint Secretary
2.	Shri Kulmohan Singh Arora	Director
3.	Shri Ajitesh Singh	Deputy Secretary
4.	Ms. Deepika	Under 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 the 41st Report (17th Lok Sabha) 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'.

(ii) Report on Demands for Grants (2025-26) of the Ministry of Power.

(iii) Report on Demands for Grants (2025-26) of the Ministry of New and Renewable Energy.

3. After discussing the contents of the Reports in detail, the Committee adopted the abovementioned three draft Reports without any amendment/ modification.

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

The Committee then adjourned.

APPENDIX II

(*Vide Introduction of the Report*)

Analysis of action-taken by the Government on Observations/ Recommendations contained in the Forty First Report (17th Lok Sabha) of the Standing Committee on Energy

(i)	Total number of Recommendations	11
(ii)	Observations/Recommendations which have been accepted by the Government: Sl. Nos. 1, 2, 3, 6, 7, 8, 9, 10 and 11	
	Total:	9
	Percentage:	81.82 %
(iii)	Observations/Recommendations which the Committee do not desire to pursue in view of the Government's replies: Sl. No. Nil	
	Total:	Nil
	Percentage:	00
(iv)	Observations/Recommendations in respect of which the replies of the Government have not been accepted by the Committee and which require reiteration: Sl. Nos. 4 and 5	
	Total:	2
	Percentage:	18.18 %
(v)	Observations/Recommendations in respect of which final replies of the Government are still awaited: Sl. No. Nil	
	Total:	Nil
	Percentage:	00