

4. PM JI-VAN Yojana- Environment

Government Boosts Advanced Biofuel Production Through Expanded JI-VAN Yojana
The Pradhan Mantri JI-VAN Yojana, recently expanded in 2025, aims to create a sustainable biofuel ecosystem by funding Second (2G) and Third (3G) Generation ethanol projects using agricultural residues and industrial waste. This initiative simultaneously addresses energy security, environmental pollution from stubble burning, and farmer income augmentation.

About PM JI-VAN & Its 2024 Upgrades

Launch and Ministry- The scheme was launched in 2019 under the Ministry of Petroleum and Natural Gas (MoP&NG).

Implementation Agency- It is implemented by the Centre for High Technology (CHT), which operates under the MoP&NG.

Financial Outlay- The scheme has a total allocation of ₹1,950 crore. ₹1,800 crore is designated for 12 commercial-scale projects. ₹150 crore is designated for 10 demonstration-scale projects.

Support Mechanism- The scheme provides Viability Gap Funding (VGF) and capital assistance to render these advanced biofuel projects commercially viable.

Objectives of the Scheme

Infrastructure Creation- To establish commercial and demonstration-scale advanced biofuel projects utilizing lignocellulosic biomass and other renewable feedstocks.

Farmer Income- To provide remunerative income to farmers for agricultural residues (stubble) that would otherwise go to waste.

Employment- To create employment opportunities in both rural and urban areas through the biofuel supply chain.

Pollution Control- Address air pollution caused by stubble burning. Reduce soil and water pollution caused by municipal solid waste.

Strategic Alignment- To contribute to the Swachh Bharat Mission and support the Ethanol Blended Petrol (EBP) Programme.

Energy Independence- To reduce India's dependency on crude oil imports and support the nation's climate change mitigation goals.

Key Biofuel Projects Under PM JI-VAN

The scheme promotes different generations of biofuel technologies. The distinction between the projects highlights the diversity in feedstock utilization.

Feature	Second Generation (2G) Bio-Ethanol	Third Generation (3G) Ethanol
Feedstock Source	Agricultural Residues (Paddy straw, Bamboo).	Industrial Waste Gases (Refinery off-gas).
Project Locations	1. Panipat, Haryana- Established by IOCL using paddy straw. 2. Numaligarh, Assam- A bamboo-based biorefinery established by Numaligarh Refinery Ltd. (via ABEPL).	1. Panipat, Haryana- Commissioned by IOCL.
Significance	Focuses on managing crop waste and boosting rural economy.	Marks a leap towards innovative carbon utilization from industrial processes.

Policy Framework Supporting Biofuel Expansion

National Policy on Biofuels (Amended 2022)- This policy promotes the use of diverse feedstocks to ensure supply chain stability.

Key Feedstocks Identified- Damaged/Surplus Food Grains- Broken rice, maize, cassava, and rotten potatoes.

Agricultural Residues- Rice straw, corn cobs, cotton stalk, sawdust, and bagasse.

Sugar Derivatives- Sugarcane juice and molasses.

Regulatory Oversight- The usage of sugarcane juice and molasses is regulated through the National

Biofuel Coordination Committee (NBCC) to ensure there are no conflicts with food security.

Annual Calibration- Feedstock utilization is calibrated annually based on four critical factors-

1. Availability
2. Cost
3. Market Demand
4. Sustainability Considerations

Impact on Sugar and Maize Sectors

Sugar Sector (Season 2024-25)

Production- Total sugar production reached 340 LMT.

Diversification- 34 LMT of sugar was diverted for ethanol production.

Stability- With domestic demand at 281 LMT, ethanol production helped stabilize sugar inventories and ensured timely payments to sugarcane farmers.

Maize Sector (Growth)-

Production Surge- Maize output increased by nearly 30%, rising from 337.30 LMT (2021-22) to 443 LMT (2024-25).

Driver- This growth is driven by government encouragement for crop diversification, moving farmers away from water-intensive crops like rice and sugarcane.

Achievements of the Ethanol Blended Petrol (EBP) Programme

Timeline- Data reflects progress from Ethanol Supply Year (ESY) 2014-15 up to October 2025.

Farmer Support- Total payments to farmers have exceeded ₹1,36,300 crores.

Economic Impact- The country has achieved foreign exchange savings of more than ₹1,55,000 crores.

Environmental Benefits- There has been a Net CO₂ reduction of approximately 790 lakh metric tonnes.

Import Substitution- The programme has successfully substituted over 260 LMT of crude oil imports.

Conclusion

Cornerstone of Vision- The Pradhan Mantri JI-VAN Yojana represents a cornerstone of India's clean energy and circular economy vision.

Holistic Ecosystem- It paves the way for a sustainable biofuel ecosystem by linking farmers' livelihoods, waste management, and energy security.

Future Trajectory- The initiative strengthens India's journey toward a low-carbon, energy-secure future, supported by favourable policies and technological innovations.

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