

Parliament Question: Indigenous Development of Bio-Bitumen from the stubble

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Indigenous Development of Bio-Bitumen from the stubble

(a)	Council of Scientific and Industrial Research (CSIR), through its constituent laboratories namely, CSIR-Central Road Research Institute (CSIR-CRRI), New Delhi and CSIR-Indian Institute of Petroleum (CSIR-IIP), Dehradun, has jointly developed an indigenous technology to produce bio-bitumen from agricultural residue (notably rice straw) by pyrolysis. The process converts crop residue into bio-oil via pyrolysis which is subsequently upgraded through chemical processing and blended/modified to produce a bio-binder suitable for use in bituminous roads.
(b)	Bio-bitumen developed indigenously has the potential to partially replace conventional petroleum-based bitumen without compromising pavement performance. Studies and pilot-scale evaluations indicate that bio-bitumen can replace up to 30 per cent of conventional bitumen. Even at a conservative blending level of 15 per cent, the adoption of bio-bitumen across road projects in the country is estimated to result in foreign exchange savings of approximately ₹4,000 crore per annum through reduction in petro-bitumen imports. However, the actual savings will depend on blending ratio, availability of feedstock, and extant market prices.

(c) & (d)	Yes. The developed technology has been transferred on a non-exclusive basis to 14 industries from different parts of the country for commercial manufacturing and scale-up on 7th January 2026. The technology transfer, inter alia, includes provisions relating to payment of upfront technology transfer fees (premia) and royalties, adherence to prescribed technical specifications and quality standards, protection of intellectual property rights, confidentiality obligations, and compliance with the scope and conditions stipulated in the licence agreements. The details of the 14 licensees is at Annexure-I. The likely impact of the adoption of bio-bitumen on cost reduction, import substitution, carbon emissions and rural/agricultural waste utilization is as under: • Cost reduction and import substitution: Partial replacement of petroleum bitumen with domestically produced bio-binder reduces the volume of imported bitumen required thereby result in foreign exchange savings for the country. • Reduction in carbon emissions: Adoption of bio-bitumen is expected to result in a significant reduction in carbon emissions compared to conventional petroleum-based bitumen. Bio-bitumen is derived from renewable agricultural biomass, and its partial substitution for petro-bitumen reduces the consumption of fossil fuels and the associated lifecycle greenhouse gas emissions. In addition, utilisation of agricultural residues such as crop stubble for bio-bitumen production helps prevent open-field burning, which is a major source of carbon dioxide, particulate matter, and other air pollutants. The diversion of biomass from open burning to productive use, therefore, leads to both direct and indirect reductions in carbon emissions. • Rural/agricultural waste utilisation: Use of rice straw and crop residue as feedstock creates an economic use for agricultural waste, opening new value-chains (collection, transport, pyrolysis units) in rural areas. This could provide additional income streams to farmers and rural entrepreneurs and reduce the need to burn stubble.
(e)	To enable nationwide production and supply, the developed technology has already been transferred to 14 industries from different regions of the country on a non-exclusive basis to facilitate decentralized manufacturing and commercial scale-up. Further, CSIR-CRRI is working with the Ministry of Road Transport and Highways (MoRTH) to evaluate long term performance of Bio-bitumen roads to draft standards and specifications for Bio-bitumen. In addition CSIR-CRRI is also working with the Bureau of Indian Standards (BIS) for the formulation of material specifications, test protocols and usage guidelines to ensure uniform quality, safety and long-term performance of bio-bitumen in road construction.

This Information was submitted by Union Minister of State (Independent Charge) Science and Technology Dr. Jitendra Singh in Loksabha on 4th February 2026.

S. No.	Company Name	City	State
1	Bitumenking India Private Limited	Patiala	Punjab
2	Catalyst Petrochem LLP	Delhi	Delhi
3	Engrow Carbon Energy Private Limited	Erode	Tamil Nadu
4	Future Universal Petrochem Private Limited	Yamuna Nagar	Haryana
5	Jalnidhi Bitumen Specialities Private Limited	Kolkata	West Bengal
6	Kotak Nova Green Energy LLP	Jamnagar	Gujarat
7	Negam Care Private Limited	Namsai	Arunachal Pradesh
8	Neptune Petrochemicals Limited	Ahmedabad	Gujarat
9	Nexxus Petro Industries Limited	Ahmedabad	Gujarat
10	Ooms Polymer Modified Bitumen Private Limited	Gurugram	Haryana
11	Rex Fuels Management Private Limited	Mumbai	Maharashtra
12	RK Truevalue LLP	Mumbai	Maharashtra
13	Terra Climate Tech Private Limited	Jaipur	Rajasthan
14	VR Petrochem India LLP	Vadodara	Gujarat

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