

CSIR Transfers Indigenous Bio-Bitumen Technology: Turning Farm Residue into Sustainable Roads

Jointly developed by CSIR-Central Road Research Institute and CSIR-Indian Institute of Petroleum

The use of farm residue for high-value infrastructure applications offers additional income opportunities for farmers while reducing stubble burning: Shri Shivraj Singh Chouhan

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In a significant step towards sustainable and circular infrastructure development, the Council of Scientific and Industrial Research (CSIR) today organised a Technology Transfer Event for its innovative technology titled *“Bio-Bitumen from Lignocellulosic Biomass – From Farm Residue to Roads”* for large-scale industry adoption in New Delhi.



The event was attended by Union Minister Shri Shivraj Singh Chouhan; Union Minister of State (Independent Charge) for Science & Technology and Earth Sciences, Dr. Jitendra Singh; Director General, CSIR & Secretary, DSIR, Dr. N. Kalaiselvi, along with senior officials from Ministries, CSIR institutes, industry stakeholders, and policymakers.

Speaking on this occasion, Union Minister for Agriculture & Farmers' Welfare and Rural Development, Shri Shivraj Singh Chouhan described the development of bio-bitumen technology as a “historic and transformative step” that connects agriculture with infrastructure and innovation. Shri Shivraj Singh

Chouhan added that the adoption of bio-bitumen aligns strongly with India's climate commitments, Net Zero targets, and flagship initiatives such as Atmanirbhar Bharat, the National Bio-Energy Mission, and circular economy frameworks. The use of farm residue for high-value infrastructure applications also offers additional income opportunities for farmers while reducing stubble burning and environmental pollution.

Dr. Jitendra Singh in his address highlighted that this initiative reflects India's commitment to self-reliance, clean energy transition, and the principle of "Waste to Wealth." He underlined that the technology demonstrates effective convergence of multiple sectors, including agriculture, science and technology, and infrastructure development, supported by strong public-private partnerships. He added that the bio-bitumen technology has demonstrated promising performance in terms of durability, compatibility with conventional bitumen, and reduced carbon footprint, making it suitable for large-scale implementation in national highway projects.

Dr. N. Kalaiselvi stated that the development marks a paradigm shift from petro-based to bio-based materials and reiterated CSIR's commitment to regular technology rollouts for national development.

The event also witnessed participation from senior officials of the Ministry of Agriculture & Farmers Welfare, Ministry of Road Transport and Highways (MoRTH), CSIR leadership, scientists, industry stakeholders, farmers and policymakers, marking a major milestone in translating laboratory-scale innovation into real-world, field-ready solutions for India's road sector.



The technology transfer pertains to the bio-bitumen production process developed by CSIR–Central Road Research Institute (CSIR-CRRI) and CSIR–Indian Institute of Petroleum (CSIR-IIP).

Developed through years of research, the bio-bitumen technology utilises agricultural biomass and crop residues as feedstock through a thermochemical conversion process, producing a renewable and environmentally friendly alternative to petroleum-based bitumen. The technology has demonstrated performance equivalent to conventional bitumen while offering substantial environmental and economic benefits, and has been developed for adoption by the Ministry of Road Transport and Highways (MoRTH) in road construction.

The breakthrough enables the production of bio-bitumen from agricultural residues, offering a renewable, low-carbon alternative to conventional bitumen and directly addressing the twin national challenges of pollution arising from agricultural waste and increasing dependence on imported bitumen.

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