

## Engineering renewable carbon to bio-based products

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Increased use of bio-based products has the potential to accelerate the shift towards a sustainable economy with reduced dependence on fossil based carbon and reduced CO<sub>2</sub> emissions. Many countries through International Energy Agency (IEA) Bioenergy Task 42 and Mission Innovation initiatives have targeted development and deployment of integrated bio-refineries for producing sustainable bio-based products using renewable sources of carbon. Renewable carbons can be a combination of first generation (food derived), second generation (non-food derived), third generation (non-land use change) and fourth generation carbon that can be channeled for production of bio-based products for use as food, feed, fuels and materials. The world has substantial amount of under-utilized renewable carbon in the form of non-fodder

agricultural wastes and other wastes such as municipal solid wastes, municipal liquid waste and industrial waste that put together have the potential to fully substitute all fossil carbon requirements. Sustainable technology platforms have been designed at DBT-ICT Centre for Energy Biosciences, India using a smart combination of chemical processes and biological routes that can convert different renewable carbons to value added bio-based products. The bio-based products include food and feed products, wellness products, chemicals and polymer precursors. The talk shall address the technological roadblocks that need to be overcome to render the bio-based products techno-commercially viable and environmentally sustainable.

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