Shiv Nadar Institution of Eminence

Policy Development for Clean Energy Technology

Shiv Nadar University is committed to inform, collaborate and support the government in clean energy and energy-efficient technology. We have partnered with many public sector industries to develop and strengthen clean and energy-efficient technologies. Many of our research projects are funded by the government of India for pioneering the development of clean energy technologies which are instrumental in shaping governmental policies supporting these initiatives.

Some of these are:

- The University has partnered with Bharat Petroleum's Corporate Research & Development Centre (CRDC), towards advancing sustainable chemical processing technologies. By focusing on process intensification for highly exothermic reactions, the project aims to develop novel reactor designs that enhance energy efficiency and reduce waste.
- Dr. Rajesh VM, Associate Professor, Department of Chemical Engineering has also collaborated with Bharat Petroleum's Corporate Research and Development Centre in producing maleic anhydride the proverbial pivot that propels industries worldwide. This would help the country become self-reliant in the production of the compound.
- The Nanoscience and Energy Research Lab (NERL), at Shiv Nadar University develops advanced nanomaterials for sustainable energy storage and conversion, accelerating progress toward SDG 7 and strengthening climate action under SDG 13. Dr. Binson Babu's work on nanoscience and clean energy is one of the focus areas of the Government energy priority areas.
- Dr. Sanjeev Yadav, Associate Professor, Department of Chemical Engineering, and his group are working on thermochemical conversion of waste biomass into different forms of bioenergy through an experimental and simulation study. The research group offers an alternative to waste management by using thermochemical conversion methods to generate energy. This year's experimental studies involved the conduct of steam gasification and fast pyrolysis of mixed food waste. Steam gasification was conducted in the presence of a novel catalyst, which significantly enhanced hydrogen production. It also helped reduce the tar generation effectively from the steam gasification of mixed food waste. The second experimental work studied the effect of hot vapor residence time (HVRT) on bio-oil production via fast pyrolysis of mixed food waste. It showed that HVRT seriously affected the occurrence and disappearance of the important phase separation phenomenon. Additionally, this study showed that the bio-oil contained a large fraction

(80–95 %) of fatty acid alkyl esters (FAAEs), the potential blend for fossil-based diesel. The third study was a modelling and simulation work done using Aspen Plus for groundnut shell gasification using a bubbling fluidized bed gasifier. The developed model agrees in terms of composition, yield, and higher heating value of the syngas generated experimentally.

- Dr H S Grewal, Associate Professor, Department of Mechanical Engineering and colleagues are working on rice husk-derived self-healing superhydrophobic films using a solvent-less approach for drag reduction and oil absorption behaviour. This research focuses on a sustainable approach to transforming rice-husk waste into self-healing superhydrophobic films with potential application for drag-reduction and oil absorption.