PURDUE UNIVERSITY | Environmental and Ecological Engineering

EEE Research Seminar

Date: October 4, 2022 at 10:30 AM
Location: POTR 234 (Fu Room)

Neha Shakelly

Graduate Student
Ecological Sciences and Engineering
Environmental and Ecological Engineering
Purdue University

Key Economic Uncertainties and Life Cycle Impact of Sustainable Aviation Fuel Production

Abstract

The emissions from transportation have been increasing rapidly in the last decade, accounting for the highest greenhouse gas emissions by sector. Replacing crude oil-based fuels with bio-fuels derived from bio-based feedstocks can significantly reduce the carbon footprint of transportation. The aviation industry contributes 11% of emissions from the transportation sector. Hence, commercial aviation is undergoing a rapid adoption of renewable biofuel to counter the carbon emissions of the industry. The production of a high-performance jet-fuel blend from biomass-derived ethanol is one approach for mitigating fossil fuel consumption. This talk will focus on the techno-economic performance and life cycle impact of Sustainable Aviation Fuels (SAF) production. Process modeling and techno-economic analysis (TEA) were done for Alcohol-To-Jet (ATJ) production pathway with ethanol as an intermediate and the effects of uncertainties in the process were analyzed. Further Life Cycle Assessment (LCA) was done to compare the impacts of different feedstocks in the production of jet fuel. A part of this work won the 2022 NREL's clean energy technology regional level under the category of fossil energy and carbon management.

Bio

Neha Shakelly is a Ph.D. student being advised by Dr. John W. Sutherland. She has a bachelor's degree in Aerospace Engineering from India and a Master's degree in Aeronautics and Astronautics Engineering from Purdue. Her research interest is in the application of optimization and operations research methods in the field of Sustainable Aviation Fuels (SAF) and renewable energy. She is currently working on Techno-Economic Analysis (TEA) and Life Cycle Assessments (LCA) of SAF manufacturing in collaboration with Pacific Northwest National Laboratory and Lanza Tech.