Title: **Feasibility of biogas production from sugar industry wastes**

Prof. Prasad Kaparaju
School of Engineering and Built Environment,
Griffith University, Brisbane, QLD 4111
AUSTRALIA
Email:p.kaparaju@griffith.edu.au
Tel:+61-7-37357761

Abstract:

Sugarcane is one of the major agricultural crop in Australia. The biomass from sugar mill is considered as renewable resource and can be used for producing biogas for heat/power and/or biomethane for natural grid injection. In this presentation, three different scenarios on the use of biogas are evaluated: electricity and heat generation in a combined heat and power (CHP) plant (Scenario 1), upgraded to compressed biomethane, BioCNG (Scenario 2) or upgraded to biomethane for grid injection, BioRNG (Scenario 3). In Scenarios 2 and 3, a part of the biogas was used for CHP to meet the plant energy demands and the remaining biogas was used to produce biomethane for grid or vehicle fuel (BioCNG). The carbon dioxide from biogas upgrading process was recovered and liquefied for sale ($BioCO_2$). The study shows that a 2.2 MW biogas plant is feasible and can generate approximately 9.35 million Nm^3 of biogas per year through co-digestion of 20,000 tonnes per year of sugarcane bagasse and 30,000 tonnes per year of mill mud with locally available 5,000 tonnes per year of chicken manure. Financial analyses showed that total investment required for the biogas plant could vary from $20.43 - $24.95 million and is dependent on the technology and equipment used for biogas use. However, ROI is dependent on the revenues generated especially from variable parameters such as feedstock gate fee, government investment grants and guaranteed feed-in tariffs, ACCUs and green certificates. Internalising the environmental benefits of avoided GHG emissions through inclusion of ACCUs and green certificates, ROI for the studied scenarios are 4.8%, 10.6% and 6.7% for Scenario 1, 2 and 3, respectively. Conversely, ROIs without ACCUs and green certificates would be -1.9% to 4.2%. Sensitive analyses showed that AD plant of 6.6 MW will significantly reduce the costs and become most competitive technologies in the renewable and carbon market with ROIs of with ROI of 27-33%. Thus, onsite production and/or use of renewable energy will enable the agricultural farmers to achieve sustainable management of these agricultural wastes and achieve decarbonising of agricultural sector.