ALBERTA INNOVATES

CLIMATE CHANGE INNOVATION AND TECHNOLOGY FRAMEWORK

Awardee Summary

CCITF PROGRAM	Clean Technology Development
PROJECT TITLE	Plastic-To-Hydrocarbon Oil Conversion Project
SECTOR	Cleaner Oil and Gas Waste to Value-Added
ORGANIZATION	White Water Management Ltd. ("Whitewater")
PROJECT LEAD	Derrick Frechette
AI PROJECT ADVISOR	Mehr Nikoo
GRANT AMOUNT	$712,500
START DATE	10/15/2018
END DATE	TBD

PROJECT OBJECTIVE: Development and demonstration of an innovative plastic-to-oil (PTO) technology based on radio frequency (RF) thermolysis.

PROJECT PROFILE: This proposal seeks Alberta Innovates support in developing and demonstrating an innovative plastic-to-oil (PTO) technology based on radio frequency (RF) thermolysis. RF thermolysis uses unique multiple wave guidelines to more rapidly and effectively break down plastic polymer chains into petroleum products with signicantly less CO2 and otheremissions. Coupled with the emissions during processing, the Resynergi's PTO system further reduces greenhouse emissions by eliminating such emission that would have otherwise been generated in conventional drilling and pumping for new oil resources, or emissions generated from conventional pyrolysis processes. The successful outcome of the project will enable not only the utilization of waste plastics for production of drop-in fuels, but also the reduction of financial and environmental costs and burdens associated with recycling, landfill, ocean clean-up efforts, and greenhouse gas emissions associated with conventional waste plastic disposal methods and drilling and pumping for new oil resources. The high level objectives of this pilot project are: 1. to prove out the technology in field; 2. to confirm commerciality; and, 3. to use the resulting data and outcome to develop a plan for commerical offerings.

The initial pilot PTO system will focus on processing low density polyethylene (LDPE) liners used by Whitewater in their business operations. These types of liners are difficult to recycle, and were either disposed of in landfills, or until recently, shipped to China. Whitewater and Resynergi seek to develop an economically viable and environmentally conscious program to dispose of the liners. Lab testing and economic assessment of Resynergi's RF thermolysis technology and system design indicates Resynergi's PTO system can be deployed for the purpose of positive economics and commercial scalability. Scale-up phases beyond an initial 1-year pilot project would include processing greater levels of the LDPE liners from others, as well as processing other typels of agricultural waste pastics. Commencing with the application of the

technology at pilot scale, it is anticiapted that the technology will reduce existing operating costs based upon the demands for diesel, as well as mitigte the costs and enviromental impact associated with disposal. At scaled-up levels, the economic potential and environmentnal benefits will increase more substantially. Delivery of a pilot commercial PTO system to Whitewater's Grande Prairie facility is scheduled for November, 2018, with start up to commence upon receipt. As per the attached project Gantt chart, over the course of the project, the mechanical, technical and environmental performance of the pilot PTO system will be evaluated, and the resulting fuel products will be tested against ASTM and Canadian Clean Fuel Standards (CFS) to ensure quality standards.

GHG EMISSION REDUCTION SUMMARY: