

Environmental Research, Technology Demonstration and Conference Project

ECF Project:	ECF 2020-128
Project Title:	Engineering cyanobacteria from Hong Kong waters to produce biofuel – A key technology towards renewable energy and carbon reduction
Principal Investigator:	Dr Zeng Qinglu, Department of Ocean Science, The Hong Kong University of Science and Technology
Total Approved Grant:	\$900,000
Duration:	1/7/2021 to 30/6/2024
Project Status/Remarks:	On-going
Project Scope:	<p>Burning of fossil fuels by our modern society has released a lot of greenhouse gases and drives global warming. To fulfil the Paris Agreement, the Hong Kong Government has set a target of 26%–36% reduction of carbon emission by 2030. An approach with great potential to reduce carbon emission is to develop biofuels using cyanobacteria. Cyanobacteria are known to produce a variety of biofuels, including alkanes that are the major constituents of gasoline, diesel and jet fuels. The marine bacterium <i>Synechococcus</i> is the most abundant primary producer in the 1,700 km² of Hong Kong marine waters; however, its genetic potential for alkane production has not been fully exploited.</p> <p>In the current technology demonstration project, the project team plans to isolate and sequence <i>Synechococcus</i> strains from Hong Kong waters with high alkane yields. A CRISPR-based genetic manipulation tool will then be developed to efficiently and accurately edit the genomes of marine <i>Synechococcus</i>. Eventually, this genetic tool will be used to engineer the <i>Synechococcus</i> strains we isolate from Hong Kong waters to enhance their alkane yields. The proposed biofuel production technology will assist in the identification of routes towards renewable energy production and the reduction of carbon emission in Hong Kong.</p>
Summary of the Findings/Outcomes:	To be available upon completion of the project