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JM and BP license waste-to-fuels technology to Fulcrum BioEnergy

Additional submitted attachment is included below.

JM and BP license waste-to-fuels technology to Fulcrum BioEnergy

September 25, 2018 --We're pleased to announce the signing of the first licensing deal for JM and BP's innovative, award winning Fischer Tropsch technology, to support Fulcrum's production of biojet fuel from municipal waste.

Alongside BP, we've signed an agreement with Fulcrum BioEnergy to license our Fischer Tropsch (FT) technology to support biofuels producer Fulcrum and their drive to convert municipal solid waste into biojet fuel.

The simple to operate and cost advantaged FT technology can operate both at large and small scale to economically convert synthesis gas, generated from sources such as municipal solid waste and other renewable biomass, into long-chain hydrocarbons suitable for the production of diesel and jet fuels. Fulcrum will use the technology in their new Sierra BioFuels Plant located in Storey County, Nevada, approximately 20 miles east of Reno.

The Sierra plant will be the first commercial scale plant in the US to convert municipal solid waste feedstock, or household garbage that would otherwise be landfilled, into a low carbon, renewable transportation fuel. When the plant begins commercial operation, planned for the first quarter of 2020, Sierra is expected to convert approximately 175,000 tonnes of household rubbish into approximately 11 million gallons of fuel each year: equivalent to the fuel needed for more than 180 return flights between London and New York.

Angelo Amorelli, BP's technology vice-president of group research, said: "Through our partnership with Johnson Matthey, we have developed a robust high-quality technology built on great science and great engineering. Our technology can help deliver innovative low carbon fuels that can play an important role in the energy transition. We see this first licence as a stepping stone to other similar opportunities."

Eugene McKenna, Business Development and Innovation Director at JM added: "JM is a leader in science that makes the world cleaner and healthier and in bringing this latest technology to market, we continue to apply our expertise to tackle some of the world's biggest challenges. We are delighted that Fulcrum has selected this technology to support their ambitions in supplying renewable fuels at significant scale. This is an important step in reducing the quantity of oil used to make transportation fuels and we will continue to use our science and engineering skills to facilitate wider adoption of this technology."

JM and BP have been developing FT technology for over 30 years and in 1996 we joined forces to incubate and further develop the technology. Today we have a system that delivers three times the productivity of a conventional multi-tubular fixed bed reactor and halves the capital expenditure when compared to traditional FT reactors. In addition, the technology delivers significant environmental and operational benefits. It also recently received recognition, picking up the Research Project Award and the Oil and Gas Award at the prestigious IChemE Awards in November 2017.

"We have been following BP and Johnson Matthey's progress for several years, including the demonstrated performance and reliability of their innovative design. We are pleased to partner with them and license this improved FT technology for our Sierra BioFuels Plant," said Jim Macias, Fulcrum BioEnergy President and Chief Executive Officer. "The BP/JM technology enhances the value of Fulcrum's process for converting waste to low carbon, drop-in fuels. We look forward to working with BP and JM as we build out our large development programme."

Investment in Fulcrum BioEnergy, Inc., USA
Marubeni Corporation, September 20, 2018

Marubeni Corporation hereby announces that, on September 19th, 2018, Marubeni invested in Fulcrum BioEnergy, Inc., a United States based company that, in conjunction with Japan Airlines Co., Ltd and Japan Overseas Infrastructure Investment Corporation for Transport & Urban Development develops and produces low-carbon jet fuel derived from the country's most abundant resource – municipal solid waste (this process is also knows as, "Waste to Fuel").

Fulcrum has developed and owns a proprietary process that produces low-carbon jet fuel, using municipal solid waste as a feedstock and is developing and constructing several Waste to Fuel projects in United States. Fulcrum is currently constructing its first commercial plant outside of Reno, Nevada, which is on schedule to begin operation in 2020.

In order to achieve carbon neutral growth, and to address any annual increase in total CO2 emissions from international civil aviation (i.e. civil aviation flights that depart in one country and arrive in a different country) above the 2020 levels, the International Civil Aviation Organization has decided to implement a global market-based measure scheme in the form of the Carbon Offsetting and Reduction Scheme for International Aviation. In order to contribute the reduction of CO2 emission from the international aviation sector, Marubeni executed the Master Joint Development Agreement with Fulcrum such that Marubeni and Fulcrum will jointly develop Waste to Fuel projects around the world.

Beginning with this investment in Fulcrum, Marubeni is committed to working towards developing new renewable energy and resource recovery businesses that will enable a Circular Economy.

Extracted November 7, 2018

Joseph Degenfelder

Cc: California Energy Commission