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**News Release**

**TOYO Participates in Construction of Demonstration Facility to Produce Biojet Fuel from Woody Biomass**  
**Combining High-performance Entrained-Flow Type Gasification and FT Synthesis Technology**

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Toyo Engineering Corporation

Toyo Engineering Corporation (TOYO, President and CEO Haruo Nagamatsu), as a member of consortium of Mitsubishi Hitachi Power Systems, Ltd. (MHPS), Chubu Electric Power Co., Inc. (CEPCO), and Japan Aerospace Exploration Agency (JAXA) and TOYO, jointly launches demonstration of synthetic “neat” biojet fuel<sup>\*1</sup> production from woody biomass. Construction of the demonstration facility that integrates high-performance entrained-flow type gasification technology<sup>\*2</sup> and FT synthesis technology<sup>\*3</sup> has been commenced at the power station of CEPCO in Nagoya, Japan. The consortium plans to start trial operation of the facility in FY 2019 and conduct verification operation in FY 2020 including combustion and jet engine testing fueled by the produced biojet at JAXA.

The project envisages the reduction of CO<sub>2</sub> emissions attributable to jet fuel usage under the entrustment of "Biojet Fuel Production Technology Development Project" of New Energy and Industrial Technology Development Organization (NEDO). To demonstrate neat biojet fuel production, proprietary technologies and expertise of consortium members are applied; namely atmospheric oxygen/steam-blown entrained-flow type gasification technology by MHPS, engineering of FT synthesis technology and synthetic oil upgrading technology by TOYO, facility operation and fuel procurement know-how by CEPCO, and evaluation capability of jet fuel combustion characteristics by JAXA.

The demonstration facility will have 0.7 ton/day of woody biomass processing and about 20 liter/day of neat biojet fuel production capacity, and various tests and studies will be conducted through the verification operation of the facility. Based on the results of verification and tests, the consortium will also optimize future commercial scale system to develop biojet fuel production technology with high on-stream rate, high efficiency, and low capital cost.

TOYO has more than 100 project experiences in constructing natural gas utilization facilities such as ammonia, methanol, DME, and hydrogen plants. In addition, TOYO has been working on construction of liquid processing units and technology development in GTL (Gas to Liquid: production of liquid fuel from natural gas), a new utilization form of natural gas. TOYO will utilize the technological expertise cultivated in those projects for the production of renewable fuels by BTL (Biomass to Liquid: producing liquid fuels from biomass). The FT synthesis system adopted for this project is compact, highly efficient, and suitable for small to medium scale plants like BTL, and the reactor is easily scaled up for commercial scale systems.

Furthermore, in order to study the process to apply produced neat biojet fuel for practical use in aviation industry, TOYO is participating in “neat biojet fuel practical application working group (tentative name)” under the support of NEDO and will examine its commercial application more practically.



TOYO will contribute to establishing biojet fuel production technology through close collaboration with the consortium parties and mitigating global impact on environment by reducing CO<sub>2</sub> emissions attributable to jet fuel usage in aviation sector.

- \*1) Biomass derived from pure unblended jet fuel based on 100% biomass quality standards\*<sup>4</sup>
- \*2) The gasification technology realizes uniform and highly efficient gasification owing to following features; oxygen is blown at high velocity into the bottom of the special cylindrical gasifier, and among solid biomass, larger particles are circulated in suspension to be pyrolytically gasified in the lower part of gasifier where upward gas flow velocity is high, and smaller particles are gasified in the upper part of gasifier where gas flow velocity is low.
- \*3) FT (Fischer-Tropsch) synthesis is a method of synthesizing liquid hydrocarbons from carbon monoxide and hydrogen using catalytic reactions.
- \*4) It must comply with the standard for neat biojet fuel (ASTM D7566) that can be mixed with conventional jet fuel.

### **Project Summary**

- Entruster: New Energy and Industrial Technology Development Organization (NEDO)
- Entrusted Parties: Consortium of Toyo Engineering Corporation (TOYO), Mitsubishi Hitachi Power Systems, Ltd. (MHPS), Chubu Electric Power Co., Inc. (CEPCO), and Japan Aerospace Exploration Agency (JAXA)
- Site: Sin-Nagoya Power Station of CEPCO, Aichi Prefecture, Japan
- Facilities: Integrated demonstration facility that produces synthesized neat biojet fuel from woody biomass; biomass processing capacity: 0.7 ton/day, biojet fuel production capacity: about 20 liter/day
- Scope of TOYO: Engineering, procurement, construction, commissioning, trial and verification operation of FT synthesis and synthetic oil upgrading facility, verification of quality of produced biojet fuel, confirmation of ASTM standard compliance, optimization study for commercial scale systems, etc.
- Trial Operation: FY2019 (scheduled)

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