

March 27, 2020

IHI Corporation

JERA Co., Inc.

Marubeni Corporation

**Feasibility Study under NEDO Program**  
**on Ammonia Co-firing in Thermal Power Generation Facility**

IHI Corporation, JERA Co., Inc., Marubeni Corporation (all companies hereinafter, the “3 companies”) , in cooperation with Woodside Energy Ltd., have contracted with New Energy and Industrial Technology Development Organization (hereinafter, “NEDO”) to participate in a feasibility study on the co-firing of ammonia in commercial thermal power plants which is an additional study scope under “Advanced Research on Technology for Ammonia Co-firing Thermal Power Generation”.

The purpose of the project is to evaluate possible applications for the co-firing of ammonia in thermal power plants by conducting studies and evaluations on the economics for required facilities including ammonia production and transportation.

Ammonia can efficiently transport and store hydrogen at low cost and in addition to its role as an energy carrier, it can be directly used as fuel in thermal power generation. As ammonia does not emit carbon dioxide at the time of combustion, it is expected to greatly benefit the reduction of greenhouse gas emissions.

The study will conduct a technical study necessary for a trial for direct usage of ammonia as a fuel source for existing thermal power plants. In addition, it will evaluate the economics of equipment cost, operational cost, and cost for the production and transportation of ammonia, as well as evaluate other possible applications.

The 3 companies aim to contribute to the further reduction of carbon dioxide emission through the promotion and social implementation of hydrogen energy including ammonia.

## Overview of Feasibility Study

### 1. Project Title

Under NEDO's "Next Generation Thermal Power Generation Technology Development Project / Next Generation Thermal Power Generation Technology Promotion Project / Advanced Research on Technology for Ammonia Co-firing Thermal Power Generation / Research and Development on Multi-Burner Ammonia Co-firing Technology for Pulverized Coal Boiler" project, feasibility study targeting commercial thermal power plants which is an additional scope.

### 2. Project Overview

In order to use ammonia, which does not emit carbon dioxide when combusted, as a fuel in power generation, the project will conduct technological studies necessary for demonstration on commercial thermal power plants. Additionally, the project will identify challenges and study the economics of ammonia production and transportation to evaluate potential applications for ammonia co-firing.

### 3. Parties and Roles

- IHI Corporation (Headquarters: Koto-ku, Tokyo, President and CEO: Tsugio Mitsuoka)  
Evaluation of thermal efficiency of ammonia co-firing using numerical analysis. Study on ammonia storage and supply facilities, as well as ammonia co-firing burner related facilities, for demonstration on commercial thermal power plants.
- JERA Co., Inc. (Headquarters: Chuo-ku, Tokyo, President: Satoshi Onoda)  
To identify and solve challenges related to the application of ammonia co-firing in commercial thermal power plants, conduct studies on specifications for ammonia storage, vaporizer, etc., and economic evaluation for ammonia cost, capital investment, etc.
- Marubeni Corporation (Headquarters: Chuo-ku, Tokyo, President and CEO: Masumi Kakinoki)  
Study and identify challenges related to ways to reduce carbon dioxide footprint of ammonia and improvement of transportation efficiency including utilization of larger-sized vessels to reduce transportation cost.
- Woodside Energy Ltd. (Headquarters: Perth WA, Australia, CEO and Managing Director: Peter J Coleman)  
Study and identify challenges related to realizing large-scale ammonia production plants and ways to reduce ammonia production cost, etc.

4. Term of Project

March 23, 2020 to February 28, 2021

5. Flow of Ammonia Production to Power Generation

