

CITIZEN SCIENCE PROGRAM INTRODUCING THE EMERGENCY POWER SYSTEM AFTER THE JAPAN EARTHQUAKE OF 2011

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Overview

In this paper, we introduce citizen science program, introducing the emergency power system for water plant after the Japan Earthquake of 2011, with a case of Toyoiwa water plant in Akita city (Fig. 1). Akita city suffered power failure in Japan Earthquake in 2011. The power failure lasted 15 hours, and the operating time of the conventional emergency system, diesel generator, was to leave one hour. Diesel and Gasoline supply also stopped by the earthquake. The Waterworks & Sewerage Bureau of Akita City decided to use the Wind Power with the battery as a new emergency system. Local enterprise agreed with and supported the project. Tohoku Electric Company accepts this project as a result of the earthquake (Fig. 2). We organized citizen science program for the public to understand this emergency power system.

Akita prefecture is known for petroleum exploration and production since 1869. In 1958, it produced more than 350,000 kl/yr, that is around 80% of total production of Japan. Japanese oil companies such as JAPEX (Japan Petroleum Exploration Co.) and INPEX Cooperation are still operating in Akita prefecture.

Akita University's tradition of education and research in resource sciences dates back to March 1910, when the Akita Mining College was established to train engineers in the exploration of underground resources. Over the subsequent 100 years, Akita University has played a leading role in Japan's resource industry, producing many top engineers and researchers in the fields of metals, non-metals, and petroleum resources. The new Faculty of International Resource Sciences was established in 2014 to provide a stronger international platform for research and education. It will function as a national center for resource sciences, fostering global specialists to work at the forefront of this field. The basic education program incorporates general education courses, as well as a suite of special classes that are designed to equip students with a professional working proficiency in the English language. The specialized courses, offered beginning at the second year-level, are all taught in English by world-class professors who are keen on sharing their knowledge and cutting-edge research with students. The curriculum includes many distinctive features to foster high levels of specialization, such as the Resource Sciences Fieldwork Abroad program, in which students gain hands-on experience in the best practices in resource exploration and development outside Japan. Department consists of the science and technology field and the Social Science and Humanities field for solving problems with metal/non-metal resources, petroleum, natural gas, etc. that not only Japan but also the whole world faces.

Methods

We describe the content of program and analyse public reactions. The program targeted: (1) Introduction of Japanese Emergency power supply system for Water Plant using Renewable Energy; (2) Akita city's Toyoiwa Water Plant is the first plant which installed the emergency power system using Wind Power; (3) Why did the Japanese local government decide to install Renewable energy for emergency power?

Results

The Akita University Open Lecture with field visits was held on July, 2019 (Fig. 3). One day program consists of three parts: (1) Lecture, (2) Field Visit, (3) Museum Tour and Discussion. The title of lecture was as Akita City Local Energy System with Sustainable Resource Management. Approximately twenty participants visited Toyoiwa water plant and Wind Power sites in Akita city. During and after field visits, participants had free talk and discussion with lecturers and Akita city civil servants. In Mineral Industry Museum of Akita University, participants enjoyed finding any kinds of ores and minerals needed for building renewable energy system with supports of university students.

Conclusions

In the field visits, participants' main interests were a system of lead acid battery and substation. It was special occasion to citizen to observe numbers of battery and high voltage current substation. They realized the

importance of (1) making a system to build up energy of wind power with batteries, (2) securing mineral resources for renewable energy.

References

MRI (2016) *FY 2015 Report for the Realization of a Low-Carbon Society: Mid and Long-term Renewable Energy Introduction Policy*. (三菱総研(2016) 『平成 27 年度低炭素社会の実現に向けた中長期的再生可能エネルギー導入拡大策検討調査委託業務報告書』)

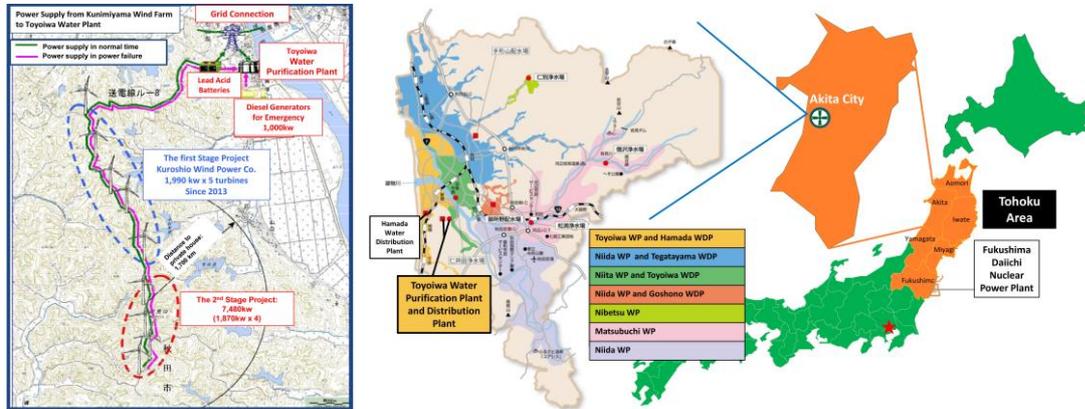


Fig. 1 Study area

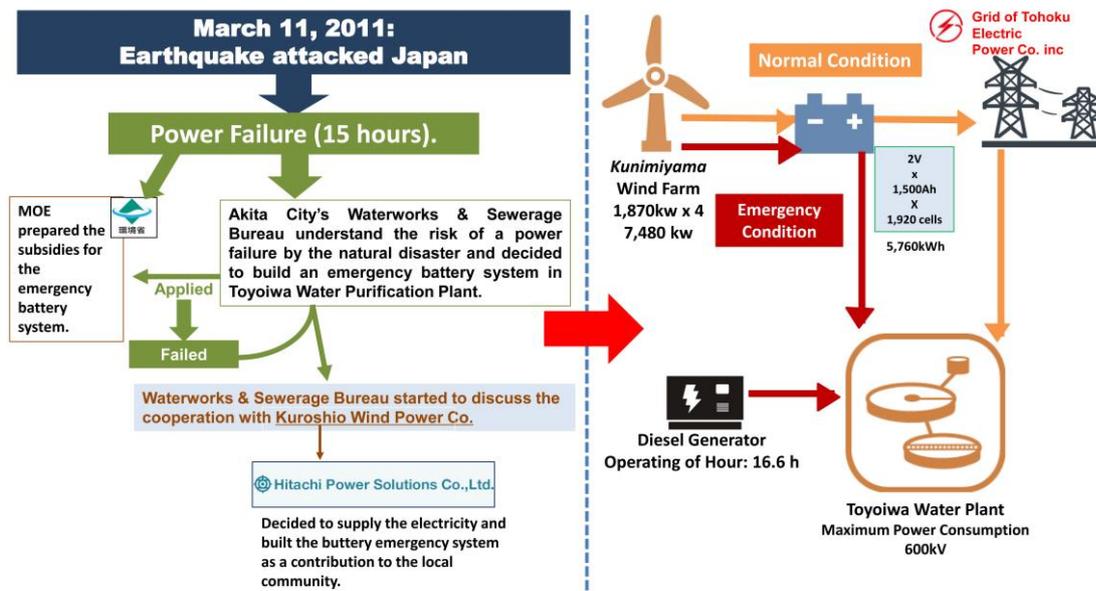


Fig. 2 Emergency power system for water plant before and after the Japan Earthquake of 2011



Fig. 3 The Akita University Open Lecture Field Visit