

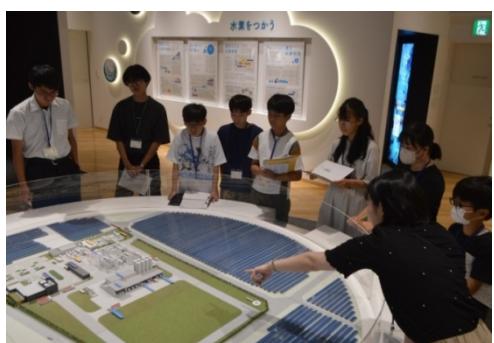
# Future Energy Newspaper

## Hydrogen: A Planet-Friendly Energy Source

### Fukushima Hydrogen Energy Research Field (FH2R)

#### Reacting with oxygen to produce electricity without emitting CO<sub>2</sub>!

The *Fukushima Hydrogen Energy Research Field (FH2R)* in Namie Town serves as a research hub for hydrogen energy. Since hydrogen produces no carbon dioxide when burned, it is seen as one of the key solutions for mitigating global warming. As an environmentally friendly energy source, hydrogen is drawing worldwide attention. However, challenges remain — such as the high cost of production and the limited number of hydrogen fuel cell vehicles in use. FH2R is developing various technologies to address these issues.



Ms. Miyazato (front) explains the overall structure of the facility using a scale model.

Hydrogen is the lightest element — about one-fourteenth the weight of air — and becomes liquid at minus 253°C. When hydrogen reacts chemically with oxygen, it produces electricity and water. With fuel cells powered by hydrogen, electricity can be used even in areas without power lines. Hydrogen can also be transported and stored, making it a promising *energy of the future*, with research underway to develop practical technologies and carry out demonstration tests. Global warming is partly caused by the large amount of carbon dioxide in the atmosphere. Carbon dioxide is emitted when fossil fuels such as coal and oil are burned at thermal power plants. Japan has the fifth-highest CO<sub>2</sub> emissions in the world and a low self-sufficiency rate for fossil fuels. This is why hydrogen has attracted attention. Fuel cell vehicles and buses that use hydrogen instead of gasoline have already been introduced. In other words, hydrogen can be a major tool for preventing further global warming.



Hydrogen gas holders used to store the hydrogen produced at FH2R

### FH2R: A Center for Hydrogen Research

At FH2R, the *New Energy and Industrial Technology Development Organization (NEDO)*, *Toshiba Energy Systems*, *Tohoku Electric Power*, *Iwatani Corporation*, and *Asahi Kasei* work together to produce hydrogen and conduct a wide range of hydrogen-related research. The facility opened in March 2020 as a symbol of revitalization for areas devastated by TEPCO's Fukushima Daiichi Nuclear Power Station accident, aiming to promote hydrogen as a new energy source to replace nuclear power.

The site covers about 22 hectares — roughly the size of five Tokyo Domes — and approximately 68,000 solar panels are installed around the R&D Center. Renewable energy sources such as solar and wind power fluctuate with weather conditions, but at FH2R, hydrogen serves as a *balancing force* for supply and demand in the power grid. Excess electricity is used to produce hydrogen, which is then stored and transported efficiently. The water electrolysis system can produce up to 1,200 Nm<sup>3</sup> of hydrogen per hour. The hydrogen is stored in eight 17.5-meter-high gas holders, each with a 150 m<sup>3</sup> capacity. After impurities are removed, the gas is compressed and delivered by 12 hydrogen trailers and 19 smaller hydrogen gas cylinder packs. Hydrogen produced at FH2R is currently used at Roadside Station Namie, J-Village, Sumitomo Rubber Industries' Shirakawa Plant, and Tokyo Metropolitan City Buses.



Hydrogen gas trailers transport hydrogen produced at FH2R to distant locations.

**Voices from NEDO**  
– Mr. Sugawara and Ms. Miyazato  
“We want to solve environmental problems.”

NEDO, overseen by Japan's Ministry of Economy, Trade and Industry, promotes energy solutions and advances Japan's industrial technology. It organizes, develops and manages projects. Staff members Mr. Totsuki Sugawara and Ms. Mao Miyazato both joined NEDO because of their interest in energy issues.

Mr. Sugawara said, “My motivation comes from being involved in cutting-edge technology and contributing to environmentally friendly initiatives.” Ms. Miyazato added, “Working with companies and universities allows me to interact with people who think differently, which is very stimulating.”



Mr. Sugawara (right) and Ms. Miyazato guide the visitors through the facility.

### Challenges: The Cost of Hydrogen Production

There are still many hurdles to making hydrogen a practical energy source. Production costs remain high, and there are too few fuel cell vehicles. While there are around 27,000 gasoline stations nationwide, there are only about 150 hydrogen stations. To increase hydrogen use, government subsidies for purchasing fuel cell vehicles and measures to lower hydrogen prices are essential.

The hydrogen explosions inside the reactor buildings during TEPCO's Fukushima Daiichi nuclear power station accident gave hydrogen a reputation for being dangerous. However, as with gasoline — also a highly flammable substance now made safe through strict controls — improving hydrogen safety technology is key to gaining public trust.

### Editor's Note

Fukushima's *revitalization* is still underway. Supporting that process through hydrogen production and research is exactly what FH2R is doing. The hydrogen produced at the site is mainly used within the prefecture. I once wondered, “How can hydrogen contribute to revitalization?” One answer may be *power generation*.

If hydrogen-powered power plants are built, they can provide clean electricity in today's era of serious global warming. Such facilities could also create new jobs and help revitalize local communities.

(Team Leader: **Aoi Sekimoto**)

This newspaper was created by:



**Ayumu Senzaki** (Kaisei Elementary, 5th grade)  
**Itaru Tomiya** (Iwaki Ryokurin Junior High, 1st year)  
**Haruhi Hikichi** (Prefectural Asaka Junior High, 1st year)  
**Hodaka Shike** (Futaba Future Junior High, 2nd year)  
**Kota Anzai** (Gakuyo Junior High, 2nd year)  
**Inori Saito** (Gakuyo Junior High, 2nd year)  
**Aoi Sekimoto** (Soma High, 1st year)  
**Hibiki Sato** (Journalism School Alumnus, Fukushima University, 3rd year)