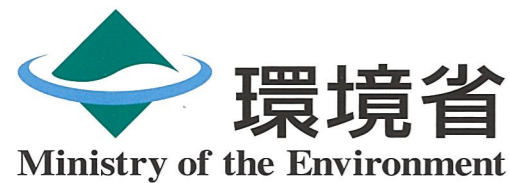


Demonstration equipment Major specifications

Wind turbine generator system (owned by Muroran City)	Rated output : 1,000kW
Water electrolyzer system	Hydrogen production capacity : 1Nm ³ /hour
Vehicle-mounted metal hydride tank	Rated hydrogen absorb capacity : 45Nm ³
Fixed metal hydride tank	Rated hydrogen absorb capacity : 45Nm ³
Pure hydrogen fuel cell	Rated output : 700W
Hydrogen transport vehicle	2t (container attachable/removable type)



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Ministry of the Environment Demonstrating a regional,
low-carbon hydrogen supply chain

Project to demonstrate a low-pressure
hydrogen delivery system to promote
hydrogen use in buildings
and city infrastructure



Low-pressure Hydrogen Delivery System Demonstration Project

This demonstration project is being promoted as part of the Low-Carbon Hydrogen Supply Chain Demonstration Project of the Ministry of the Environment.

Low-pressure handling of hydrogen throughout all phases from production through storage, transport, and use help to achieve a safe and secure hydrogen-based society, Storing the hydrogen at low pressure also enable unmanned operation of the hydrogen production systems, which help to reduce the price of hydrogen.

Low-temperature waste heat from buildings is used as heat supply to release hydrogen from the metal hydride (MH) tank. This helps to conserve energy.

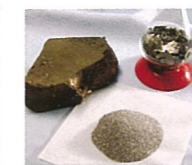
What is a hydrogen absorbing alloy?

A hydrogen absorbing alloy absorbs hydrogen when it is pressurized or cooled under hydrogen and releases hydrogen when pressure is reduced or a hydride is heated. A hydrogen absorbing alloy absorbs a large amount of hydrogen (1,000 times the alloy volume or more) without high pressure nor high temperature. For this demonstration project, the AB5-type alloys are used because they show small pressure difference between absorption and desorption and can be easily used for practical applications.

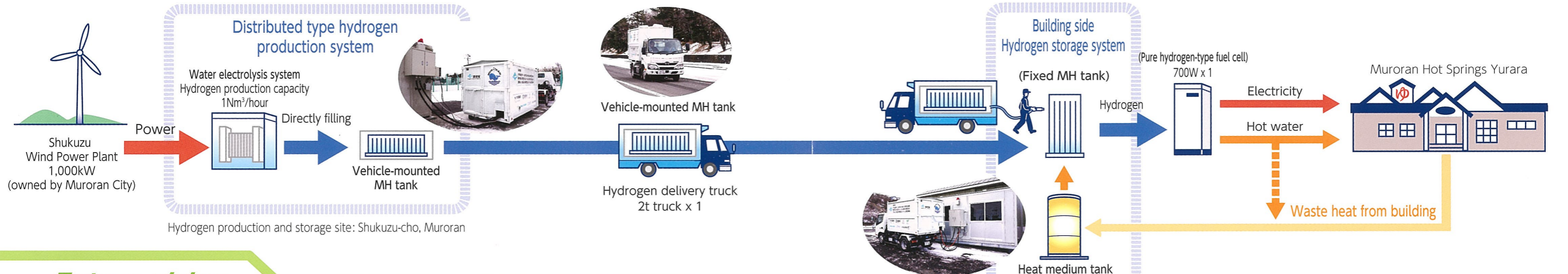
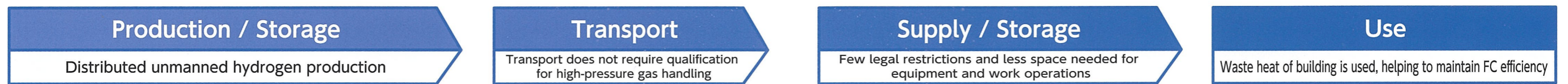
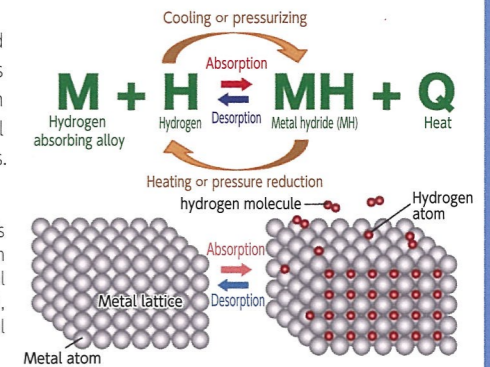
■ Comparison of various types of hydrogen absorbing alloys(MH)

Alloy type	AB5	AB2	AB	BCC
Typical alloys	LaNi5	ZrMn2	TiFe	Ti-V-Cr
Durability	○	○	△	△
Tunability of working pressure	○	○	×	△
Compactness of MH container	○	△	△	○
Confirmation of safety	○	△	△	△

■ Appearance of hydrogen absorbing alloys.

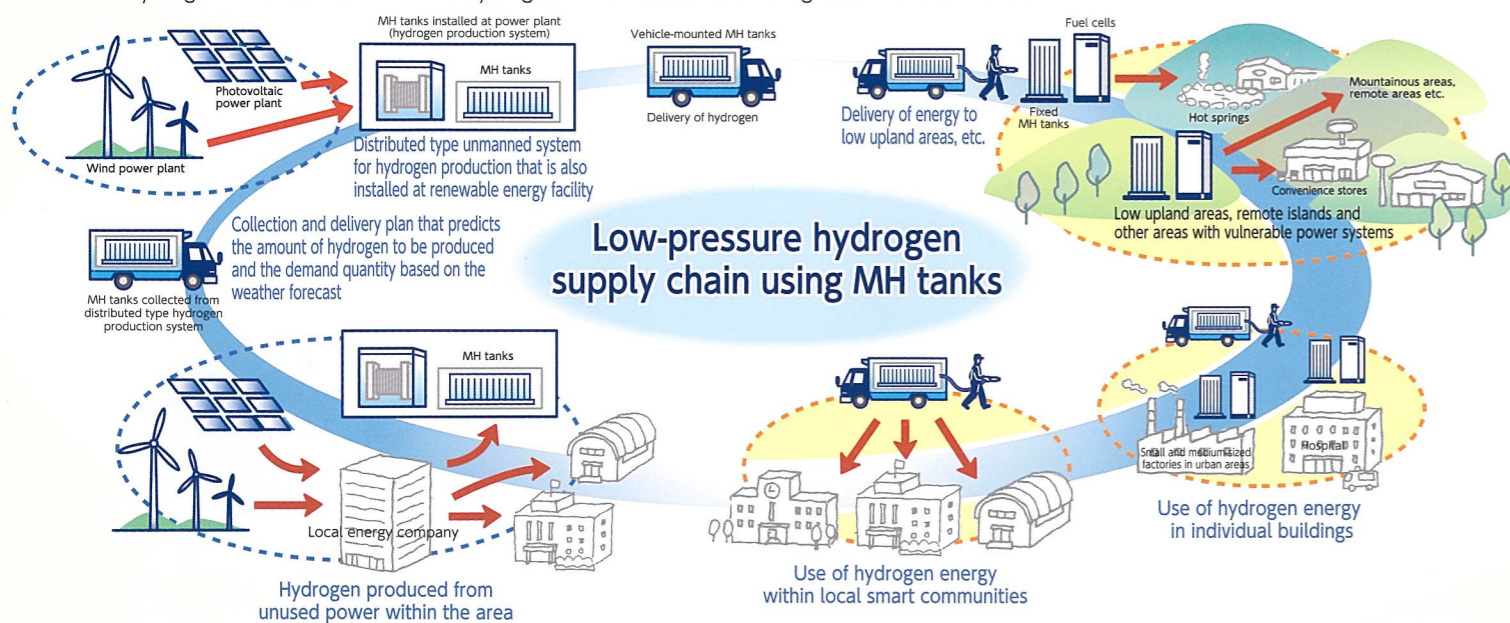


The hydrogen atom bonds with the metal atoms in the metal lattice (the metal atoms by the metal atoms), so the alloy is called a metal hydride (MH).

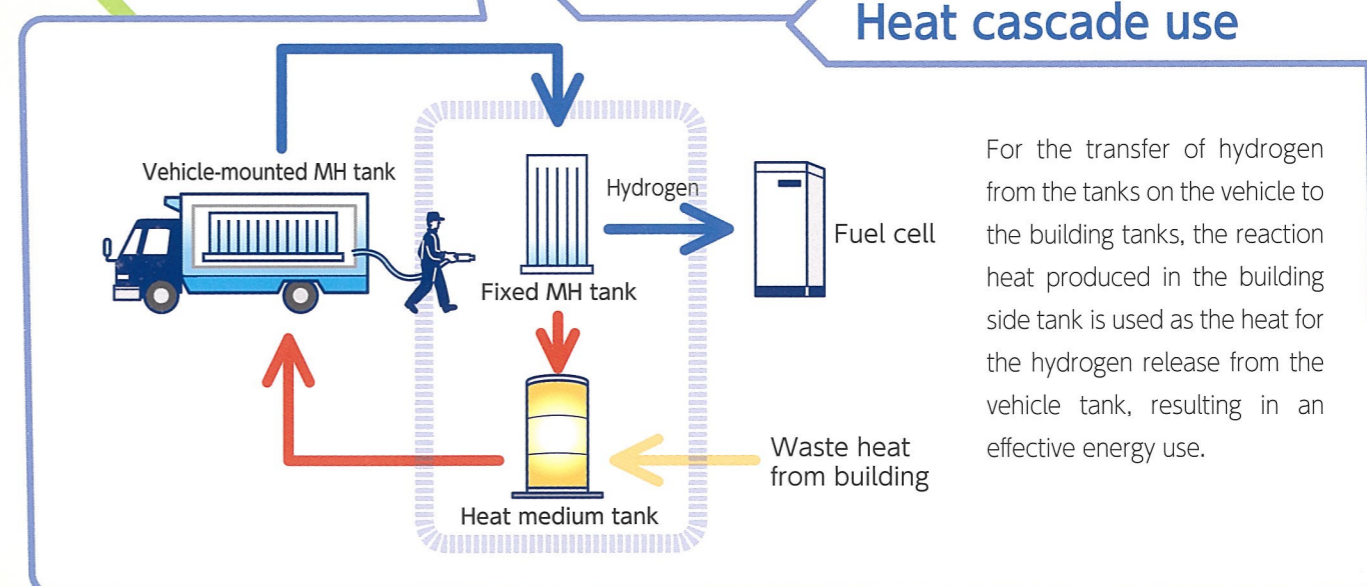


Future vision

In the future, a fully unmanned and distributed type system for hydrogen production will be placed in a photovoltaic power generation, wind power generation or other renewable energy facilities. At regular intervals, hydrogen delivery trucks will collect the MH tanks in which hydrogen is stored and deliver the hydrogen to the locations where it is needed.



Heat cascade use



For the transfer of hydrogen from the tanks on the vehicle to the building tanks, the reaction heat produced in the building side tank is used as the heat for the hydrogen release from the vehicle tank, resulting in an effective energy use.