

「About an Energy use Technology of the Ocean which World Electricity Can Provide.」 Technical and Business Lectures

The challenge is a lot of natural energy secure "Storage/ Transportation/ Reproduction energy/ Use".
The technique of the lecture is a original of Techno Bank company.

"On the sea, and in a single device the electric conversion of plural natural energies is impossible. In addition, on the deep sea equipment mooring and send electricity is impossible. Even if the transmission is converted to electricity, can not be stored. Even if the transport is converted to hydrogen, can not exceed the fuel efficiency per the weight of gasoline use." This problem is solved.

The new technology, providing renewable energy exports.

Since the accident of the nuclear power plant of Japan, world people advocate that time to switch it to renewable energy is now.

We give a lecture for the early spread of "Wave Force Energy" that is the top.

The conditions are as follows :

1. Departmental lecture: Business to public government offices of each country. With the policy to expand renewable energy use, instruction in a technique and the business.
2. Lecture.:
 - The converter of the natural energy. Circulation usage of the magnesium, others.
 - A hydrogenation device. A hydrogen demand Device/DWFC, others.
 - An electrical generator, others.
3. Lecture fee: 100,000 yen. For one time of lecture. (Additional cost burden: Transportation and accommodation costs of speakers from Tokyo.)
4. An application: <mailto:info@j-protium.com>
Since a nuclear plant accident, the inquiries of the lecture increase. Please apply having time margin.

New business by the wave power ship. (Exports of ocean resources.)

Even on the deep sea and among the hurricane, a voyage and production of 24 hours are possible.

The total amount of wave energy, the amount of total power consumption is 300 times more than the world.
The energy density is the strongest, too.

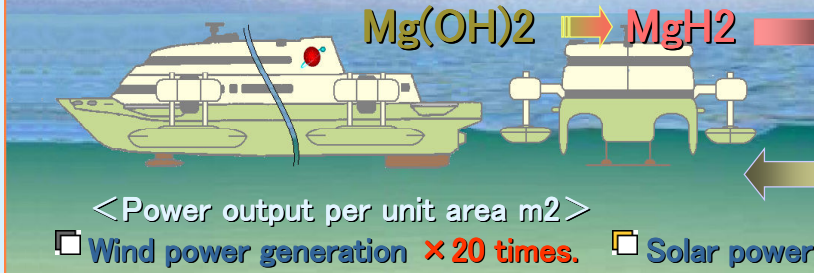
Wave power N-ship, which produces the following resources in sailing. Hydrogen, Nitrogen, Oxygen, Ammonia, Methane-based Fuel, Deep-ocean water, Salt, Chlorine, Sodium, Magnesium, Potassium, Bromine, Lithium. Wave power ship move factories to use, the minimum of time and money, and high efficiency.



Wave Power N-Ship to Energy Trade

"Wave Shock Generation" Wave Power N-Ship
 "With air as materials, the production of the ammonia (NH₃) is possible while going on a voyage"

Smelting during the voyage.



Trading Partner

The <MgH₂>, extracts hydrogen (H₂) first and does clean power generation. On the other hand, the Mg left behind is used for industry as materials of the magnesium alloy. Then, magnesium alloy scrap is used as fuel for power generation. As a result, object is Mg(OH)₂.

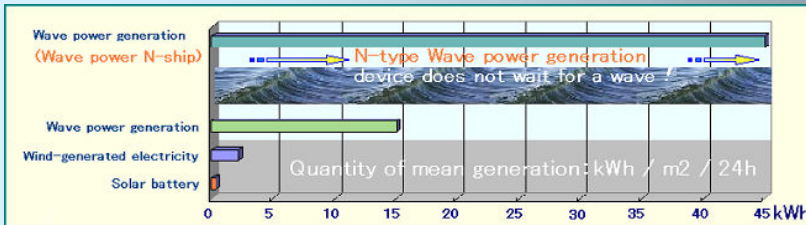
MgH₂

Power Generation

Mg(OH)₂

<Power output per unit area m²>

Wind power generation × 20 times. Solar power generation × 150 times.



Electricity rates
 [2 Yen / kWh]
 is realized

The wave power ship can do the production of the ammonia (NH₃) with air as materials while going on a voyage. The ammonia is the material which is essential for industry. Ammonia production worldwide is now about **150 million tons / year**. This does not include fuel consumption. Production of ammonia, which is produced mainly by natural gas producing countries.

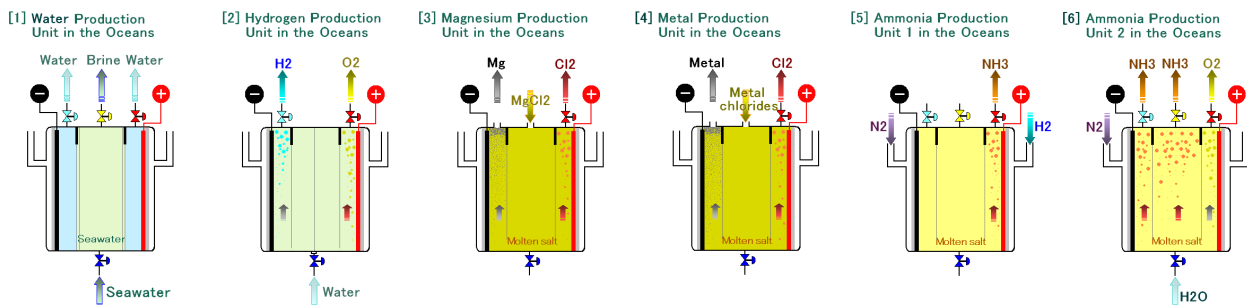
In addition, the content of the hydrogen (H₂) is reviewed as clean fuel by 17.8wt%. Clean the grounds, if the use of hydrogen is only to produce nitrogen and water.

By the way, the content of the hydrogen is alcohol 12.6wt%, natural gas 25wt%.

The carbon dioxide (CO₂) in the air is 0.04% contained. Material to carbon dioxide and hydrogen, the methane-based fuel (C_nH_(2n+2)) can be produced easily.

The following image shows the production.

<Conversion technology for the storage / transportation of the ocean energy> (Multi-purpose device mounted on the wave power N-ship.)

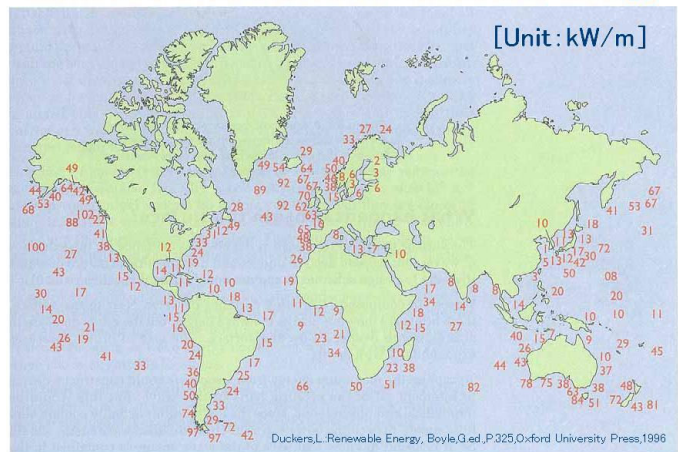


In addition, the use of the submarine cable is possible, too. Can send electricity from the outside of the harbor for 24 hours. In this case, answer the purpose by "Using wave force, ship / raft" to satisfy the electricity demand of the whole world of 15 trillion kWh.

The advantage does not have an obstacle of the shipping and fishing. The profitability of the business becomes the high profit to have transportation, material production, electricity production.

The simple test calculation of the natural energy trade by the wave power ship (8,000t /Full length 120m). The wave power N-ship is equipped with 40 floats and is going on a voyage.
 Each float is floating by seawater weight is 5,000 kg, the width of the upper and lower amplitude 2m, periodicity of the amplitude is 3 seconds, as.

Extensive Distribution of Renewable Energy



< 570 billion kW in untapped wave power : Total power consumption of the world's 1.2 billion kW >

Wave height [m]	1~2	2~3	3~4	4~5	5~6	6~7	7~8
Estimated wave energy [kW/m ²]	10	30	60	100	150	210	280

- (1) Quantity of generation per time by the float.

The work load quotes 1 [kgw] = 9.8 [N]. The electric conversion efficiency for 0.78.

$$5,000\text{kg} \times 9.8\text{N} \times 2\text{m} \times 1.5\text{sec} = 147,000\text{N}$$

$$147,000\text{N} \times 20\text{time} \times 60\text{min} = 176,400,000\text{N}$$

$$176,400,000\text{N} \times 4.2 \div 3,600,000\text{J} = 205.8\text{kWh}$$

$$205.8\text{kWh} \times 40 \times 0.78 = 6,420\text{kWh}$$

- (2) Day for energy production

The ship's propulsion power as consuming 22 percent.

$$5,000\text{kWh} \times 24\text{h} = 120,000\text{kWh}$$

- (3) Annual production of magnesium by wave power. (Amount of energy transportation and storage)

$$120,000\text{kWh} \div 16\text{kWh} \times 365 \text{ days} \div 1,000 = 2,737 \text{ t}$$

- (4) The gross margin **301 million JPY/year**

Magnesium is sold, the price of 260 JPY/kg, a 42.3 percent profit margin.

$$2,737 \text{ t} \times 260,000 \text{ JPY} \doteq 711 \text{ million (sales)}$$

$$711 \text{ billion} \times 0.423 \doteq 301 \text{ million JPY (gross margin)}$$

- (5) Initial cost.

Wave power ship, construction costs of 250,000 JPY / t as.

$$8,000\text{t} \times 250,000 \text{ JPY} = 2 \text{ billion JPY (Initial cost)}$$

- (6) Depreciation and amortization

200 million JPY depreciation budget/years

$$2 \text{ billion JPY} \div 200 \text{ million JPY/ years} \doteq 10 \text{ years (Depreciation period)}$$

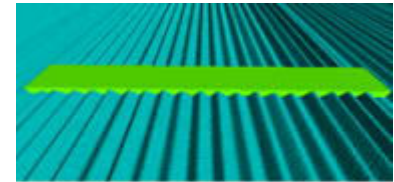
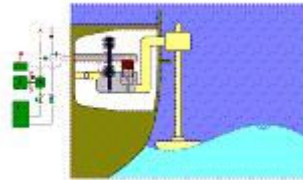


Of Megafloat, a simple estimate of the renewable energy trade

The great wave power, is open year round. In addition, the high energy density per area. Wind (Wind power generation) and wave (Wave power generation) compared to. Wave power is **800-times** higher energy density.

Wave height of 5m, 10-second period, the wave energy is 125kW / m.

Try to compare it to the engine dynamo of the automobile engine (100HP). Between 1 m 2 units will be arranged. For example, the Shinkansen of 700 system (13,200kW) runs when generate electricity a side of 100m.



Megafloat & Wave Motion

Durability of the megafloat is possible more than 100 years, and it is big charm from the viewpoint of business.

So, by the peaceful waves, try a simple estimate of the natural energy trade.

(1) Production of electricity a day.

Wave energy 5kW / m (Wave height of 1m, 10-second period).

To convert electricity from waves. Output of 10,000 kW to the new system.

$$10,000\text{kWh} \times 24\text{h} = 240,000\text{kWh}$$

(2) Annual production of magnesium by wave power. (Amount of energy transportation and storage)

$$240,000\text{kWh} \div 16\text{kWh} \times 365 \text{ days} \div 1,000 = 5,475 \text{ t} *$$

(3) The gross margin **600 million JPY/year**

Magnesium is sold, the price of 260 JPY/kg, a 42.3 percent profit margin.

$$5,475 \text{ t} \times 260,000 \text{ JPY} \doteq 1,4 \text{ billion (sales)}$$

$$1,4 \text{ billion} \times 0.423 \doteq 600 \text{ million JPY (gross margin) } *$$

(*About magnesium production. The height of the wave is 4 times in the case of 2m entirely.)

(4) Initial cost.

Wave-power generation facilities, 300 thousand JPY / kW as.

$$10,000\text{kW} \times 300,000\text{JPY/kW} = 3 \text{ billion JPY (Initial cost)}$$

(5) Depreciation and amortization

400 million JPY depreciation budget/years

$$3 \text{ billion JPY} \div 400 \text{ million JPY/ years} \doteq 8 \text{ years (Depreciation period)}$$

● Ammonia and the expanding global market problems

Ammonia, by natural gas producing countries, now **150 million tons / year** production has. Hydrogen is the raw material, obtained by decomposition of natural gas. Transportation will be transported by tanker dedicated refrigeration equipment. The main market is the breakdown of ammonia, 80% fertilizer, plastics, textiles and 20% are. In particular, as a nitrogenous ingredient in fertilizer, because there is no alternative, is important.



For renewable energy use, ammonia is active. (Currently, ammonia is not consumed



as fuel.) The ammonia takes an important role as means of the storage / transportation of the hydrogen. The practical use of the system of solid oxide form fuel cell "SOFC" which made ammonia direct fuel has already unfolded.

«Use technology of Hydrogen-Agent "Mg(NH₃)₆Cl₂", "H₃NBH₃"»

Hydrogen-Agent "Mg(NH₃)₆Cl₂" is metal ammine complexes. Can using hydrogen of 9.1wt% by the weight ratio. In addition, a large quantity of ammonia has difficulty in transportation and long-term preservation. The storage means using Bitter-salt realizes this by packing with the life material easily.

Ammonia poison prevention technology is the next generation of energy points.

Hydrogen-Agent "H₃NBH₃" is ammonia-borane complexes. Can using hydrogen of 13wt % by the weight ratio.

Mg(NH₃)₆Cl₂ and H₃NBH₃ is, MgH₂ was developed in 2005 alongside.

(Techno Bank company. <http://www.techno-bank.co.jp/>)



Hydrogen-Agent is the era of fossil fuel depletion, and the savior of the car.

U.S. Department of Energy (DOE) target of hydrogen storage capacity, 6.5wt%. Hydrogen-Agent, we solve this problem. Hydrogen cars, Hydrogen-Agent is equipped with about 47kg-66kg to 600km run.

Ammonia (NH₃) is reacted with to produce Hydrogen-Agent, and then filled into the cassette. Using hydrogen, waste heat and heat the cassette. The cassettes will be recycled.

Keywords Featuring a low-cost, safe, clean, and recycle. This is realized by an offer of low-cost ammonia. The production of the ammonia is cheap electricity by the wave power and nitrogen included in the air.

Going forward, toward the era of food shortages, to expand markets and increase the amount of ammonia in agricultural production.

The problem of the drying up of the natural gas surfaces sometime soon.

The ammonia production using an ocean energy is advantageous in that it can solve agriculture and a problem of the energy.

Can supply enough power consumed by the world's total. Ammonia production of the age, **15,000,000,000 tons / year** is expected.



● Stationary control of artificial floating island.

Mega-float (Marine Farm)

Exclusive economic zone is the distance from the coast about 370km. In the territorial waters (22km), beach and wave heights of more than 2 times. To a floating wave power generation is a mega-float in this area. Compared to the amount of electricity to power 10 times at the beach is easy.

The industrial, domestic demand for energy is sufficient to self-sufficiency. The extra power, the body structure to produce new material. The marine production (Food / Rare metals), and fishing can be safe.

Durability of the mega-float is possible more than 100 years, and it is big charm from the viewpoint of business.

Environment issues to solve. (CO2 reduction / Clean recycled resources).



● The concept of the process.

