Coastal Livelihood and Environmental Action Network
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ELEMENTARY DISCUSSION ON

JAPAN'S **FALSE** SOLUTIONS

IN PROPOSED IEPMP OF BANGLADESH

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Hasan Mehedi
Chief Executive
Coastal Livelihood and Environmental Action Network (CLEAN)

DISCLAIMER

I am an energy campaigner, not expert.

I have never seen a hydrogen producing machine except in the laboratory and exhibitions where Mitsubishi and Tokyo Gas was showing their technologies to convince buyers.

All information are collected from secondary sources and experts I met.

Please be prepared to hear ‘Fossil Gas’ instead of ‘Natural Gas’ from me.

IEPMP

On 14 March 2021, Japan International Cooperation Agency (JICA) signed an agreement with the Energy and Mineral Resource Division (EMRD) to formulate the Integrated Energy and Power Master Plan (IEPMP) with an aim of zero/low carbon economic development.

JICA appointed the Institute of Energy Economics Japan (IEEJ) as the consultant to formulate the IEPMP.

47 experts have developed the IEPMP. All of them are Japanese and there is no involvement of Bangladeshi experts.

IEEJ submitted 1st draft of IEPMP in June 2022

We have come to know that the

7TH DRAFT

of IEPMP has been submitted to the Government.

But only 4th draft was distributed among a limited civil society representatives.

They did not consult with even the Parliamentary Standing Committee and the Planning Ministry.

DEMAND PROJECTION

In 3rd draft, JICA (& IEEJ) projected the demand as 85,852 MW in 2050. In 4th draft, it lowered the projection to 70,512 MW. In 5th draft, the projection raised a little to 71,234 MW.

Interestingly, the power supply plan for 2050 is 1,11,138 MW which means idle capacity will reach 39,904 MW.

ENERGY MIX IN THE IEPMP

Sources	2029-2030		2040-2041		2049-2050	
Coal	8,260	(21.2%)	10,868	(14.6%)	11,468	(10%)
Fossil Gas (Incl. LNG)	15,836	(40.7%)	30,784	(41.5%)	29,250	(27%)
Petroleum	5,448	(14%)	2,426	(3.3%)	6,700	(6%)
Nuclear	2,060	(5.3%)	4,460	(6%)	4,460	(4%)
Ammonia	—-	—-	1,244	(1.7%)	5,044	(5%)
Hydrogen	—-	—-	4,800	(6.5%)	11,200	(10%)
Hydro	230	(0.6%)	830	(1.1%)	1,139	(1%)
Renewables	3,905	(10%)	11,185	(15.1%)	26,230	(23%)
Import	3,156	(8.1%)	7,656	(10.3%)	15,656	(14%)
Total	**38,895**		**74,253**		**1,11,138**	

We took the data from 'In Between Scenario' of proposed IEPMP (5th draft, 6 May 2023).

The PP2041 Scenario is even worse in some cases.

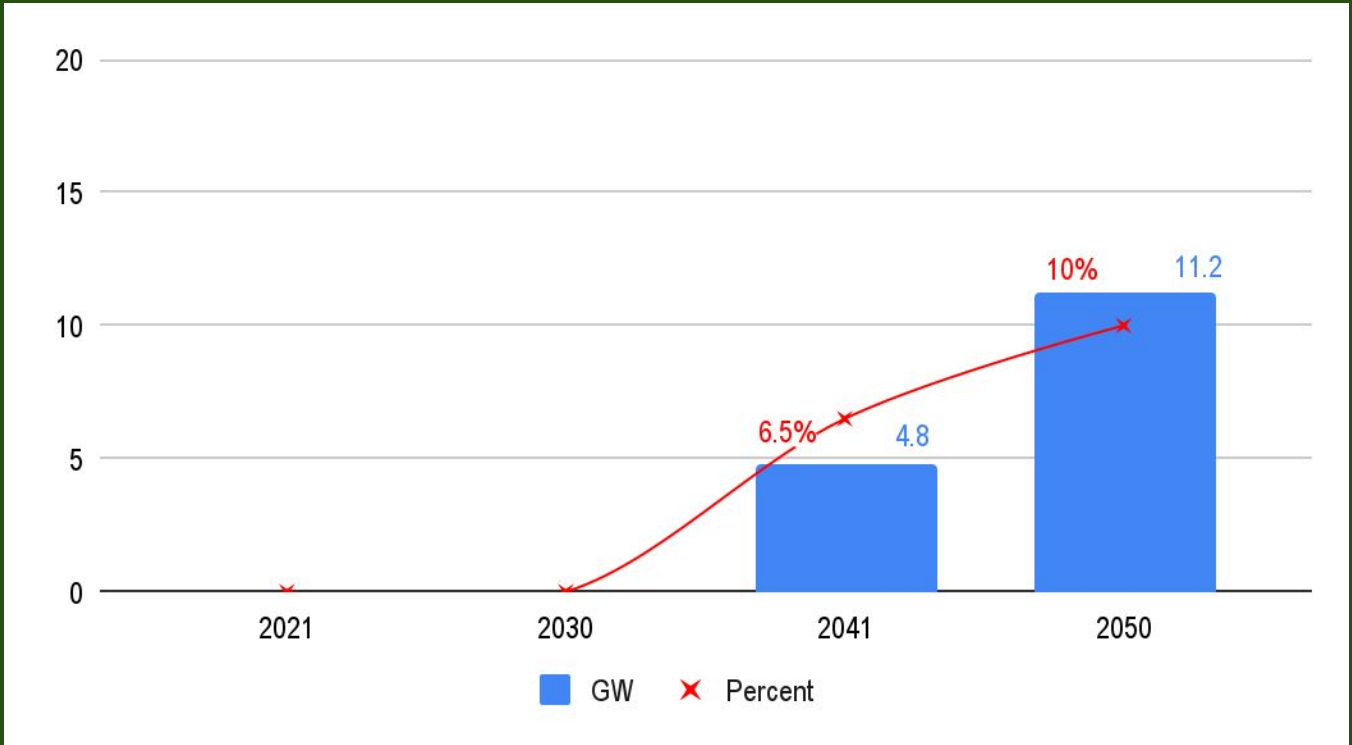
In that scenario, JICA proposed to install 1,37,800 MW in which 62,010 MW (45%) fossil gas and 22,048 MW (16%) Hydrogen based electricity

It also proposed 6,890 MW (5%) Nuclear, 2,756 MW (2%) Coal and 15,158 MW (11%) Imported and only 26,182 MW (19%) from Renewables.

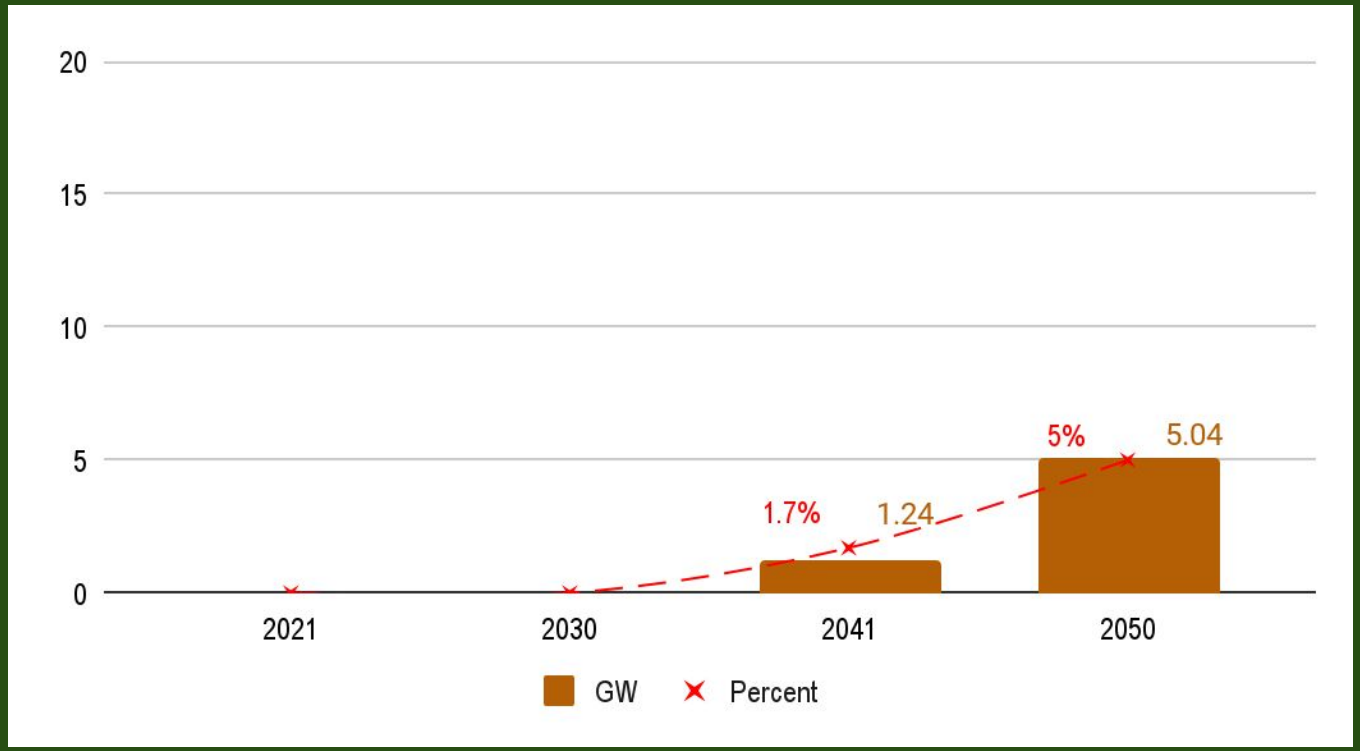
IEPMP PROJECTION: HYDROGEN

JICA proposed to start Hydrogen combustion in 20% gas power plants by 2037 and achieving 4,800 MW (6.5% of total capacity) Hydrogen fired electricity within next 4 years.

Interestingly, it proposed to install 6,400 MW of Hydrogen power plants within next 9 years to reach 11,200 MW (10%) from only Hydrogen by 2050.



IEPMP PROJECTION: AMMONIA

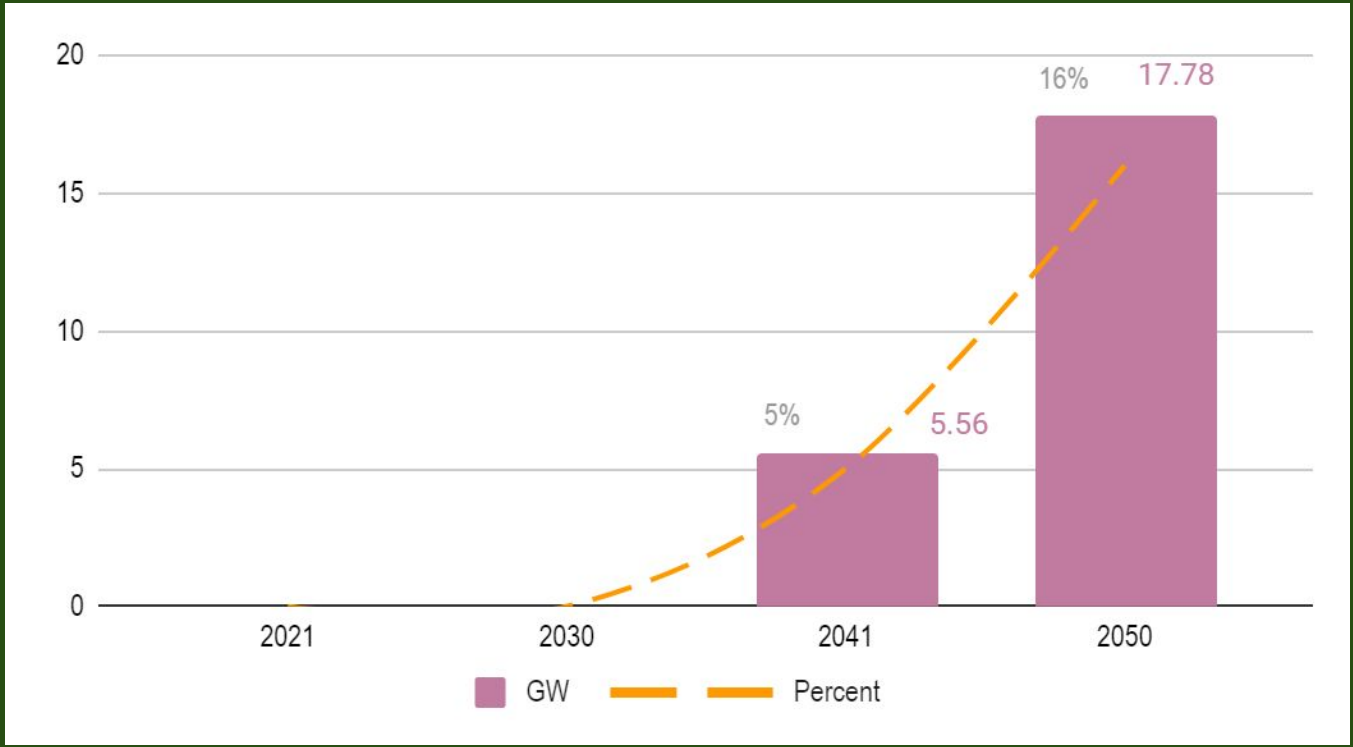


JICA proposed to introduce Ammonia firing in 20% power plants by 2035, earlier than Hydrogen.

It projected to achieve 1,244 MW Ammonia fired power plants by 2041 and 5,044 MW by 2050.

IEPMP PROJECTION: CCS

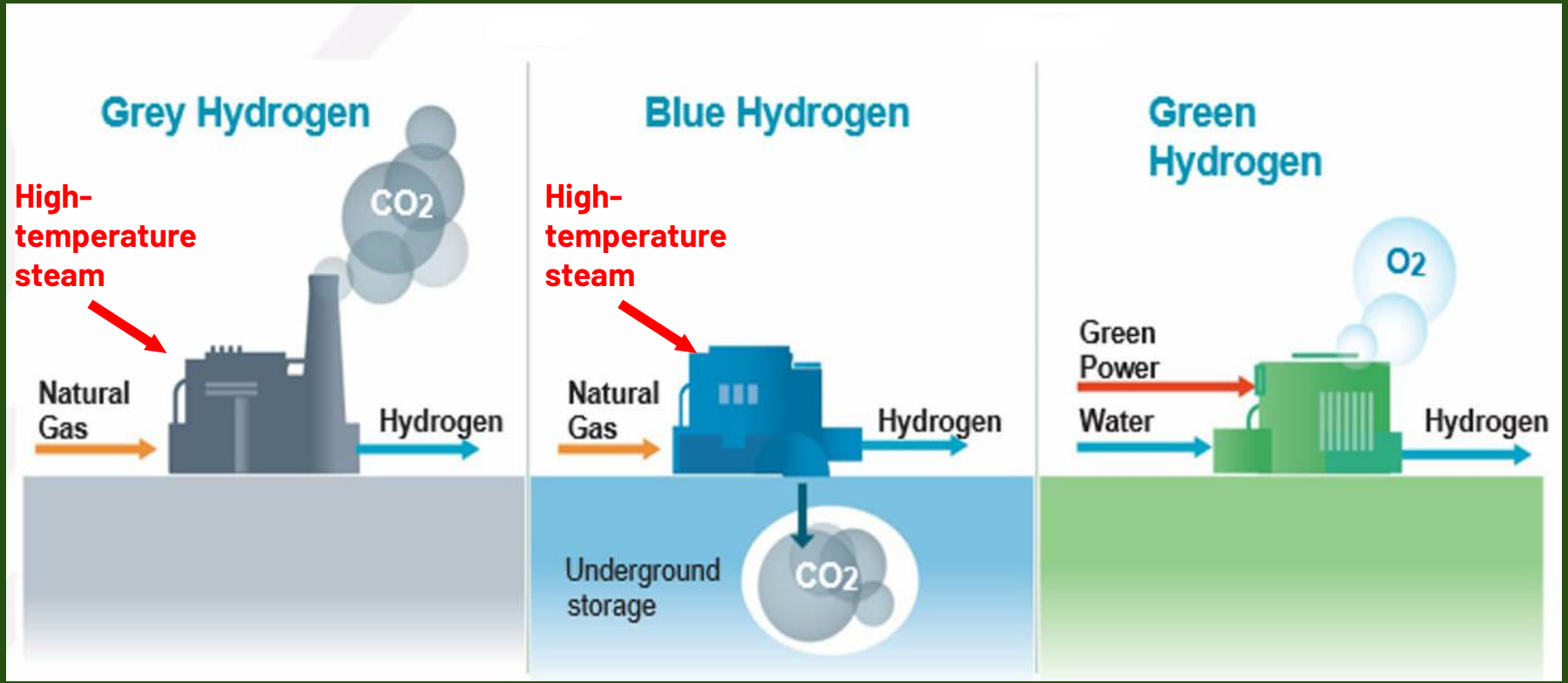
In 4th draft, JICA (& IEEJ) proposed to add CCS in coal and gas-based power plants by 2035. In 5th draft, it is delayed to 2040 and targeted to generate 77 million units of electricity by 2050.



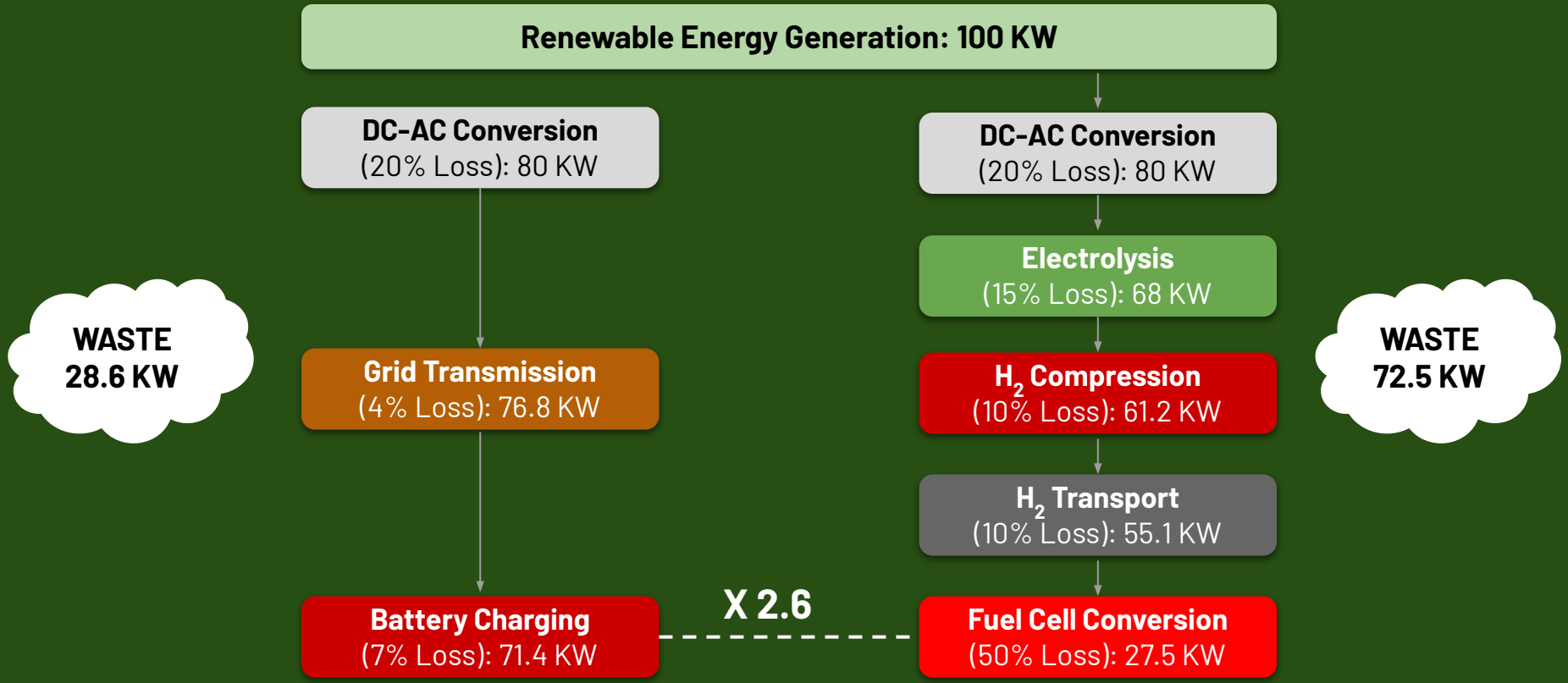
WHAT IS LIQUID HYDROGEN

Green Hydrogen	Uses RE-based electricity to electrolyse freshwater. Electrolysers use an electrochemical reaction to split water into its components of hydrogen and oxygen. The cost is around USD 3.8-6.0 per kg which is super expensive now. As a Result, Green Hydrogen contributes **only 4% of total hydrogen** now.
Grey Hydrogen	High-temperature steam (700°C–1,000°C) is used to produce hydrogen from a methane source, such as fossil gas. Emits 9-10 kg GHGs per kg in the atmosphere. Current production cost is USD 3.2 per kg, 7 times higher than domestic gas. Grey hydrogen accounts for **roughly 76% of the hydrogen** produced in the world today.
Black Hydrogen	Produces in the same process of Grey Hydrogen, but uses coal as the raw material. It emits around 20 kg of GHGs to produce 1 kg of Black/Brown Hydrogen. Currently Black Hydrogen **contributes 19% of the total hydrogen** market.
Blue Hydrogen	Produces in the same process of Grey and Black Hydrogen, but uses Carbon Capture and Storage (CCS) technology to store GHGs in deep underground. Total cost is USD 5 per kg, 8 times higher than domestic fossil gas.

MAJOR HYDROGEN FUELS



Renewables Vs. Green Hydrogen



RISKS OF HYDROGEN

Production process emits **9-20 kg of GHGs** to produce 1 kg Grey Hydrogen. Reduces 50% only if it is blue hydrogen

Calorific value of Hydrogen is one-third of fossil gas. (10.8:31.7 MJ/m^3). Three times more pipeline, storage system required.

Five times more **flammable** than fossil gas. High risk of **leakage** because three times more pressure on the pipelines.

Low Efficiency. Only 27.5% of calorific value would be converted to electricity. 72.5% of energy will be wasted.

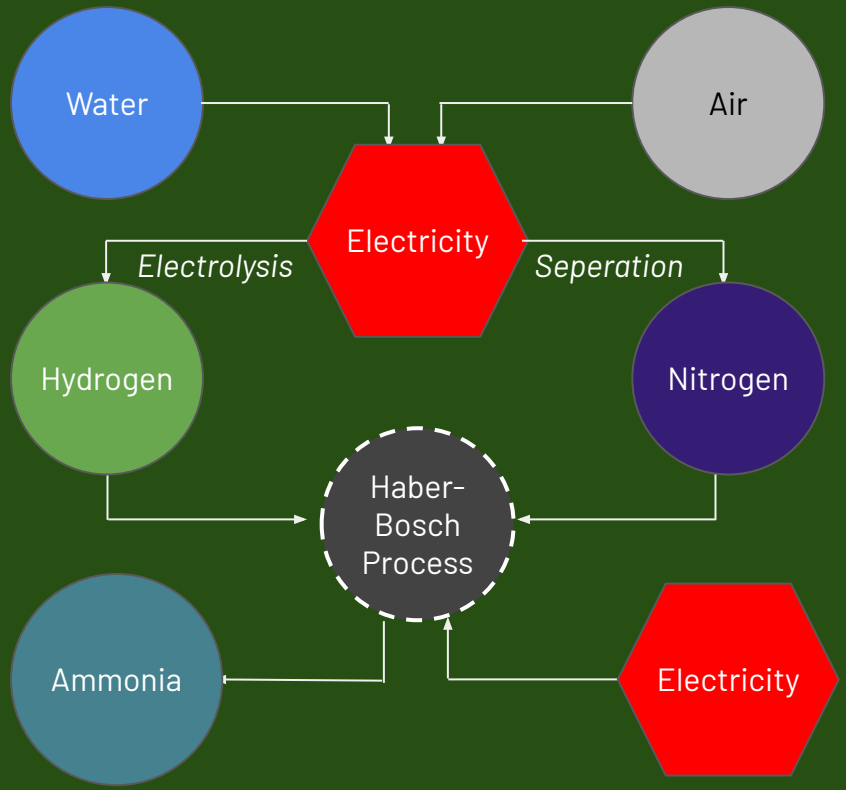
Bangladesh will be completely **dependent on Imported Hydrogen** from exporting countries, i.e., Japan

WHAT IS AMMONIA

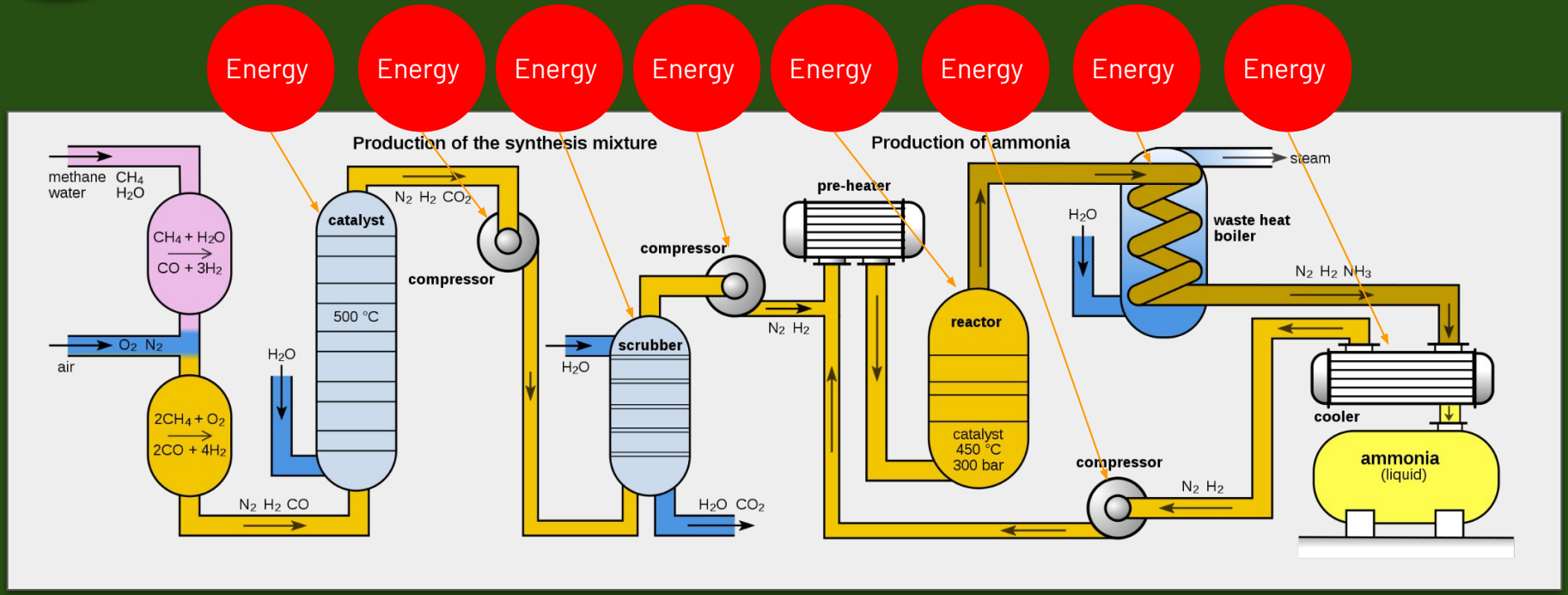
- Ammonia is a colorless highly irritating gas with a sharp suffocating odor.
- It dissolves easily in water to form ammonium hydroxide solution which can cause irritation and burns.
- Ammonia gas is easily compressed and forms a clear, colorless liquid under pressure.
- It is usually shipped as a compressed liquid in steel cylinders.
- Ammonia is not highly flammable, but containers of ammonia may explode when exposed to high heat.
- About 80% of the ammonia produced in industry is used in agriculture as fertilizer.
- Ammonia is also used as a refrigerant gas, to purify water supplies, and in the manufacture of plastics, explosives, fabrics, pesticides, dyes and other chemicals.

AMMONIA PRODUCTION

- Here, electricity required at least twice to produce green ammonia from air. If it is renewable energy, it is a huge loss of the energy.
- In addition to that, the Hydrogen and nitrogen molecules have to go through compression, heating, cooling, scrubbing and artificial reactor process to produce ammonia.
- The whole process not only increase the cost of ammonia as a fuel, but also emit serious level of greenhouse gases.
- Currently, 95% of ammonia is produced from fossil gas and emitting more than that of using fossil gas directly.



HABER- BOSCH PROCESS



RISKS OF AMMONIA

Studies in Indonesia, Malaysia, Philippines and Thailand shows that Ammonia firing **could emit 69% more GHG** than unabated fossil gas

Worse for the environment than burning **unabated coal** because of its upstream emissions and energy losses at production stage.

Target of **Zero emission can not be achieved** even by using so called 'Green Ammonia' produced from Renewables

Only 20% mix of Ammonia **would double the fuel cost of power**, even if we use cheapest Grey Ammonia. 50% use would increase 5 times.

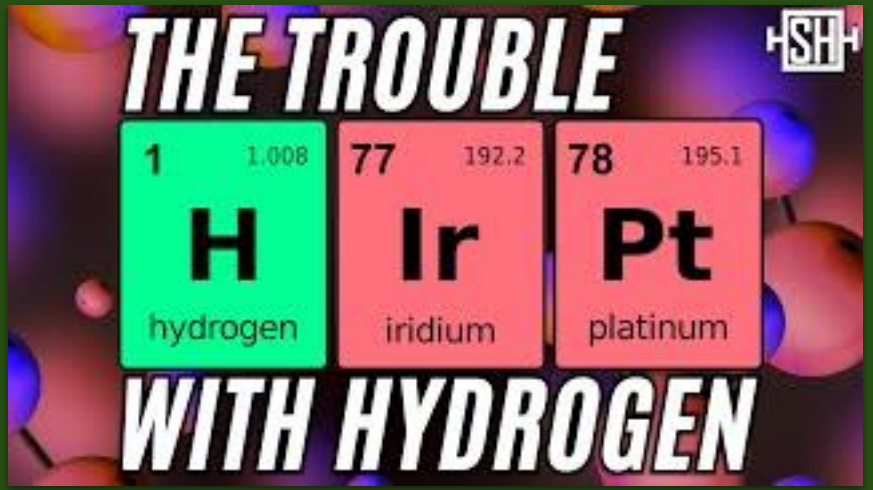
Burning Ammonia for power generation is a **wasteful use** because other use of it doesn't emit GHGs

CCS Technology

- **Carbon Capture:** Carbon Dioxide is captured at pre-combustion, post combustion or oxy-fuel combustion process
- **Transport:** After capture, CO2 must be transported to suitable storage sites. Pumping it through pipelines, carrying in tubes or tankers are three different options.
- **Storage:** Pumped to the underground storage: (a) Deep Ocean (b) Deep Geological Storage or (c) Mineral Storage.
- There are maximum **13 examples** of using CCS in power projects and none of those are in Canada, Germany, USA or UK.

- Deep ocean storage will increase ocean acidification which is already climate threat to the earth.
- There no guarantee of longevity of the storage. A sudden eruption can make a disaster in the project area.
- Ammonia production firing process emits more than the fossil fuel itself.
- Cost of ammonia will increase the electricity price 25%-50% which will pass on to the consumers shoulder.

THE TRUTH ABOUT HYDROGEN



Switch to green hydrogen will lead to 'significantly higher energy prices in 2050 than today': analyst

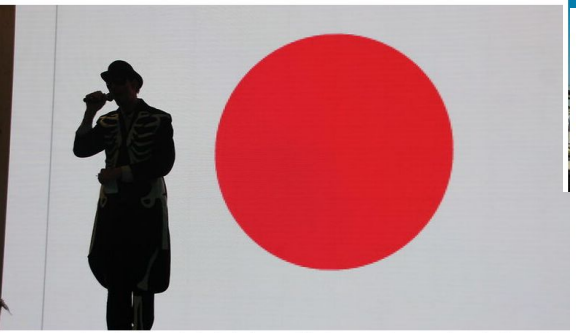
Renewable H2 will still cost buyers more than $3/kg by mid-century, when including storage, compression and distribution, writes CRU

28 March 2023 7:21 GMT *UPDATED 28 March 2023 7:21 GMT*

Japan's 'green transformation' would derail the energy transition in Asia

Published on 02/03/2023, 11:48am

Japan plans to prolong fossil fuels across Southeast Asia, by promoting carbon capture, gas and the co-firing of ammonia at coal power plants.



Japanese stopped exporting dirty coal technologies last year following pressure from campaigners, but its new Green transformation strategy relies on the continued use of fossil fuel-based technologies (Photo credit: John Englart)

By Dwi Sawung and Gerry Arances

Bloomberg

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US and Other G7 Members Oppose Japan's Push For Fossil Fuel Investment

- Disagreement within group over use of coal plant technology
- Energy, climate and environment ministers meet next month

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By Shoko Oda, Jennifer A Dlouhy, and Alberto Nardelli
March 17, 2023 at 5:47 PM EDT
Updated on March 18, 2023 at 6:58 AM EDT

How Japan's big plans for a 'hydrogen society' fell flat

By Etienne Balmer - April 14, 2023 @ 12:35pm

Japan again recognized for poor record on fossil fuels

THE ASAHI SHIMBUN
November 11, 2022 at 17:51 JST

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G7 host Japan under fire for being an obstacle to climate action and leadership

Japan is under fire as it heads into the G7 Summit. Activists are organizing actions in Japan, across Asia, and around the world, to pressure Japan to stop utilizing its G7 presidency to drive the expansion of gas and other fossil fuel-based technologies. As the G7 leaders meet in Hiroshima on May 19-21, Japan must stop derailing the energy transition for the G7, in Asia, and globally; and shift its support from fossil fuels to renewable energy.

At the G7 Climate, Energy and Environment Ministerial held in Sapporo on April 15-16, the Japanese government set out to promote its "Green Transformation (GX)" strategy which includes fossil fuels and fossil fuel-based technologies. However, opposition from the UK, France, and Canada kept the G7 from backing Japan's unpro

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Climate change: Is 'blue hydrogen' Japan's answer to coal?

6 December 2021

Climate change

CONCLUSION

- Japan prepared the projection and fuel mix shamelessly in favour of **Japanese private companies**, not Bangladesh.
- Hydrogen processes are **extremely inefficient**, ammonia is worse than hydrogen
- Liquifying hydrogen **consumes 30% of energy**, ammonia even more.
- There is **no proven example** of emission reduction by CCS technology
- Huge **consumer subsidies** needed for CCS hydrogen and ammonia
- Building sufficient green hydrogen and ammonia production is **not feasible** before 2050
- Blue hydrogen will increase **gas imports**, create high emissions and damage energy security
- Blending hydrogen and ammonia into the existing grid makes **no economic sense**
- Electricity **from any source is more efficient, cheaper and less emitting** than hydrogen based on that fuel
- Ammonia is **highly toxic and dangerous** to transport
- Hydrogen must only be used where there are no other alternatives for only f**ertilizer, glass, plastic** and maybe steel industry.
- Confusion and uncertainty created by hydrogen lobby will **delay the decarbonization**

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+88 02 477 701 458
clean.khulna@gmail.com
https://cleanbd.org

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