

This is not an ADB material. The views expressed in this document are the views of the author/s and/or their organizations and do not necessarily reflect the views or policies of the Asian Development Bank, or its Board of Governors, or the governments they represent. ADB does not guarantee the accuracy and/or completeness of the material's contents, and accepts no responsibility for any direct or indirect consequence of their use or reliance, whether wholly or partially. Please feel free to contact the authors directly should you have queries.

ALCHEMIST MATERIAL INC.

WASTE INTO GREEN HYDROGEN
BY DE-CENTRALIZED EQUIPMENT



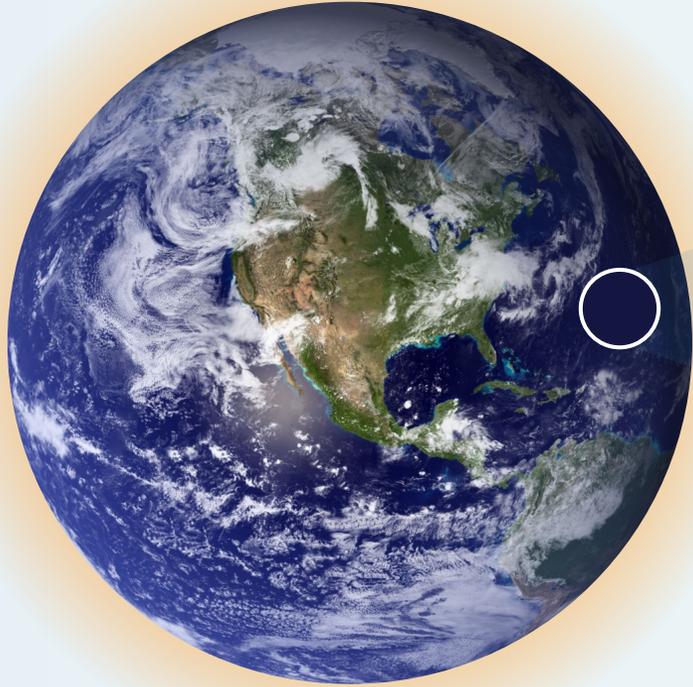
We support the Sustainable Development Goals



Image by generative AI



PROBLEMS ON THE EARTH



Climate change by Greenhouse Gas



Waste issues including ocean plastic

CUSTOMER'S PAIN



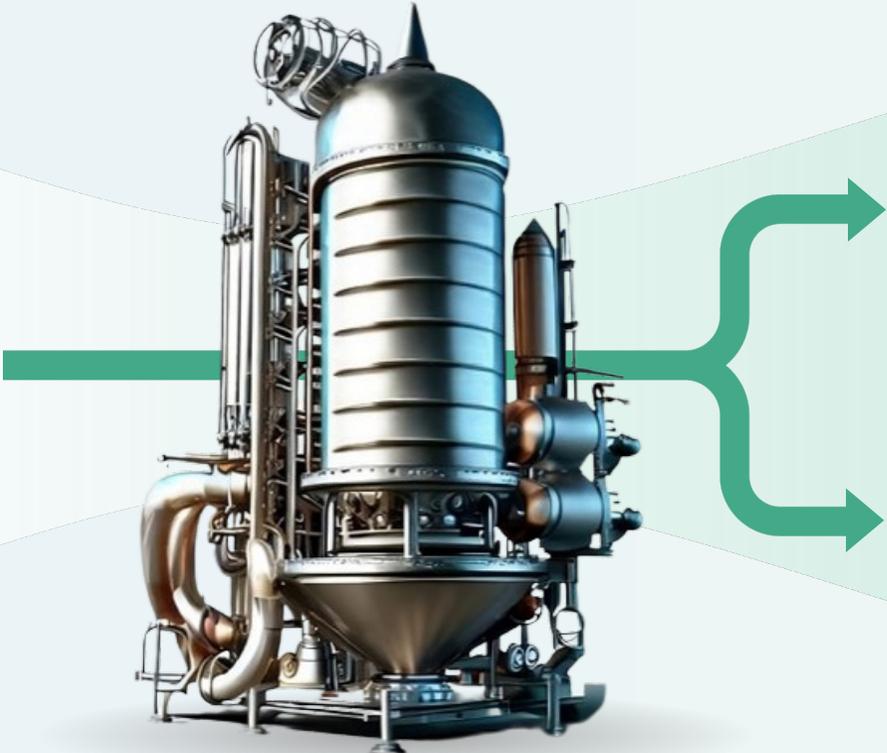
Expensive Waste
Management
Cost

Expensive
Green Energy



SOLUTION

Convert waste into **Green Hydrogen** and **GHG credits** by De-centralized equipment

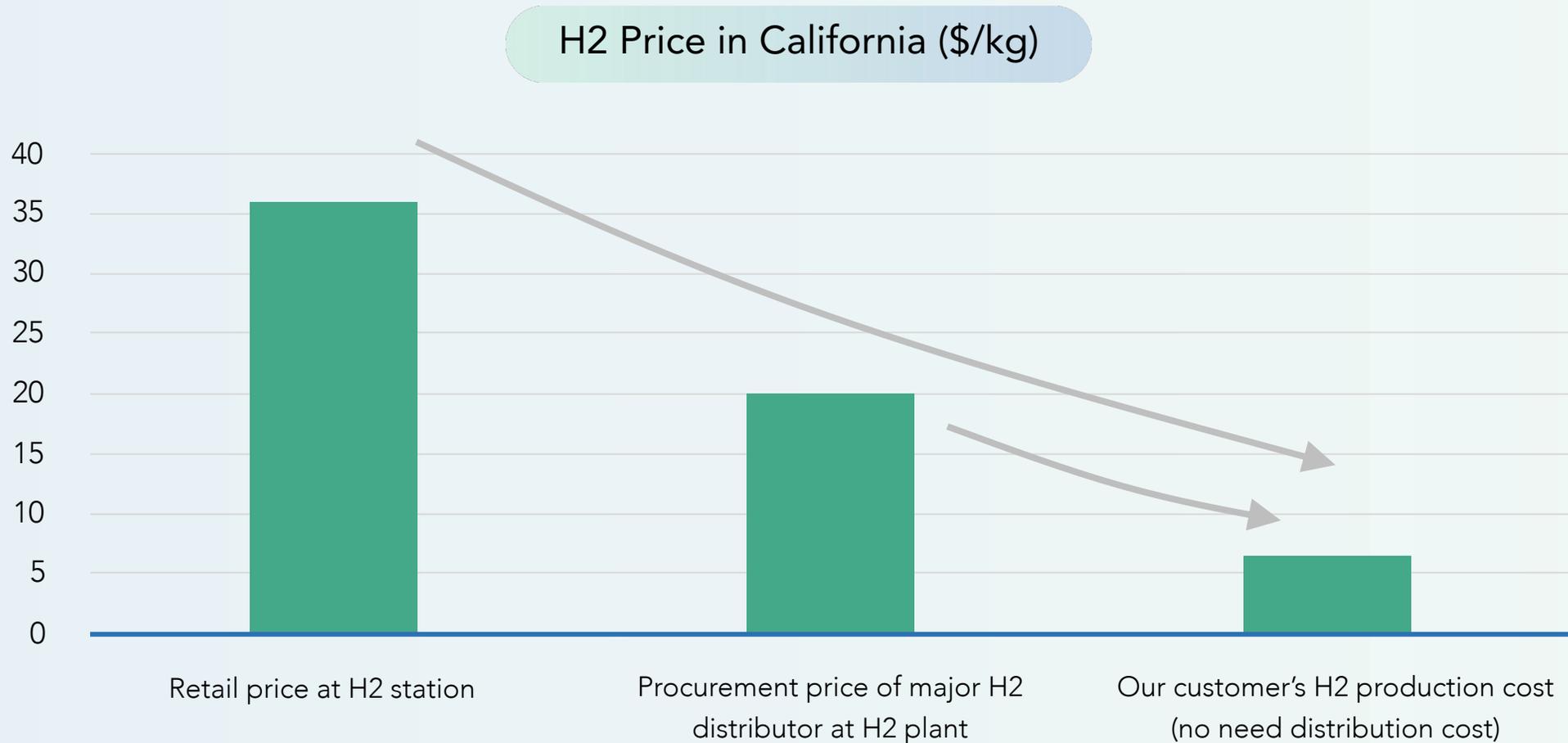


GHG Credits

Greenhouse Gas Credits

H₂ PRICE

Our customers can obtain H₂ with 1/3 of the current cost.

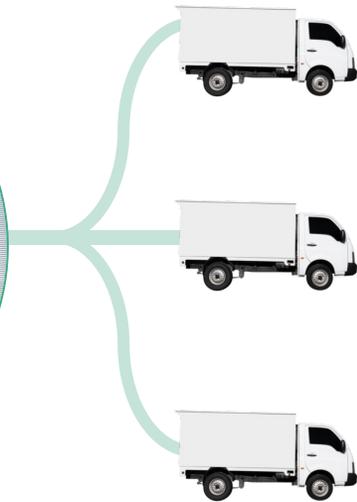


NEW IDEA

Cut distribution cost and energy by de-Centralized H2 production

Current System

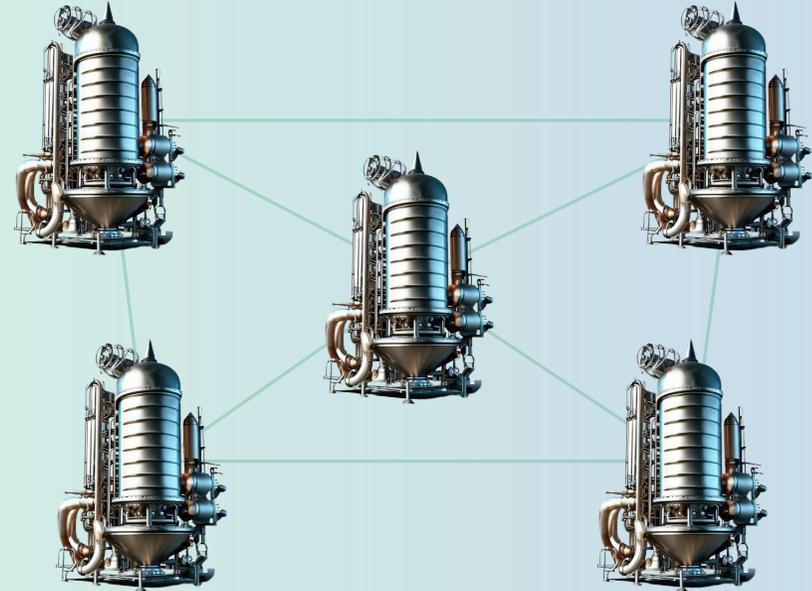
H2 production cost < Distribution cost



Centralized Big Plant

Our System

No distribution cost



De-Centralized System

BUSINESS MODEL

Equipment sales followed by recurring services

**Equipment
Sales**



**Spare parts sales
and field service**



**Issuing Proof of
Recycling**

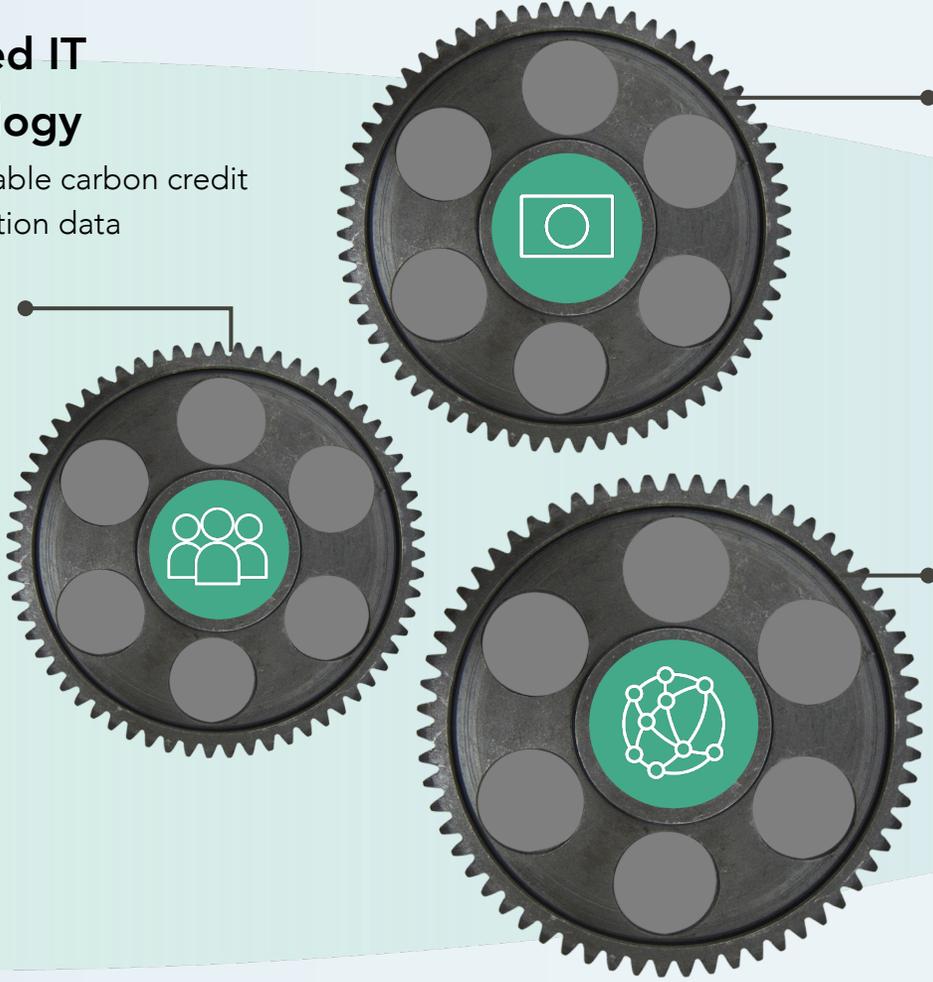
**Generation & Trading of
Greenhouse gas credits
& Waste credit**



TECHNOLOGY

Patented IT technology

Generate trustable carbon credit by real gasification data



Japanese matured engineering

Invented 20 years ago by a Japanese major company

Cutting edge equipment technologies in Silicon Valley

The unique chamber design brings,

1. Low heat loss
2. High response control
3. Uniform reaction within chambers
4. High durability
5. Low cost materials
6. Easy maintenance



FOUNDERS



Tatsunori Suzuki

CEO

He is a serial entrepreneur in climate tech industry. He initiated Fuel Cell research project at Intel corporation. The project spun out then he served as a CEO at Zeptor Corporation which ran energy solution business for ten years in Silicon valley. He originally belonged to the Automobile industry in Japan and designed a Formula-1 racing engine management system.



Kazumasa Saito

COO

He was engaged in the environment and energy business at NEC. He led the development of Energy management systems for overseas markets. He also served as a chairman of an IT company.



Ted Ishikawa

CTO

He was an Applied Fellow at Applied Material and led the development of Semiconductor equipment. Then he became a technologist at Apple to develop new technologies.



James Robert White

Director of development

Serial entrepreneur with successful track record of commercializing gas related equipment. He used to work at Ballard Power System for Hydrogen Fuel Cell development. Ph.D Mechanical engineering at MIT.

ADVISORY BOARDS

Dan Maydan

Ex-President of Applied Material

Dr. Maydan was a president of Applied Material which is a largest Semiconductor equipment producer in the world. In 1998, Dr. Maydan was elected to the National Academy of Engineering.

Yoshio Nishi

Honorary Professor at Stanford

Dr. Nishi was a director at Stanford Nanofabrication Facility at Stanford University. He led engineering at Toshiba, Hewlett Packard and TI.

Steven Leiw

Lawyer

Steven was previously a corporate lawyer at eBay working in the intellectual property rights, disputed resolution and public policy sectors.

Kelly Kay

Ex-president of Toyota research institute

She was a VP of business operation at Lyft then served as a president of Toyota Research Institutes which dictates future of Toyota Motor.



TARGET CUSTOMERS

Local city in Asia

South Asian countries do not have incinerator and just dump waste.



Need profitable waste treatment business to eliminate ocean plastics!

E-commerce warehouse

Warehouses operate thousands of Hydrogen forklifts and need Hydrogen.



Need affordable Hydrogen by getting rid of their own waste!

Hydrogen station

Hydrogen delivery cost to the stations is too expensive.



Need affordable Green Hydrogen!

Factory

Factories need to pay to get rid of industrial waste.

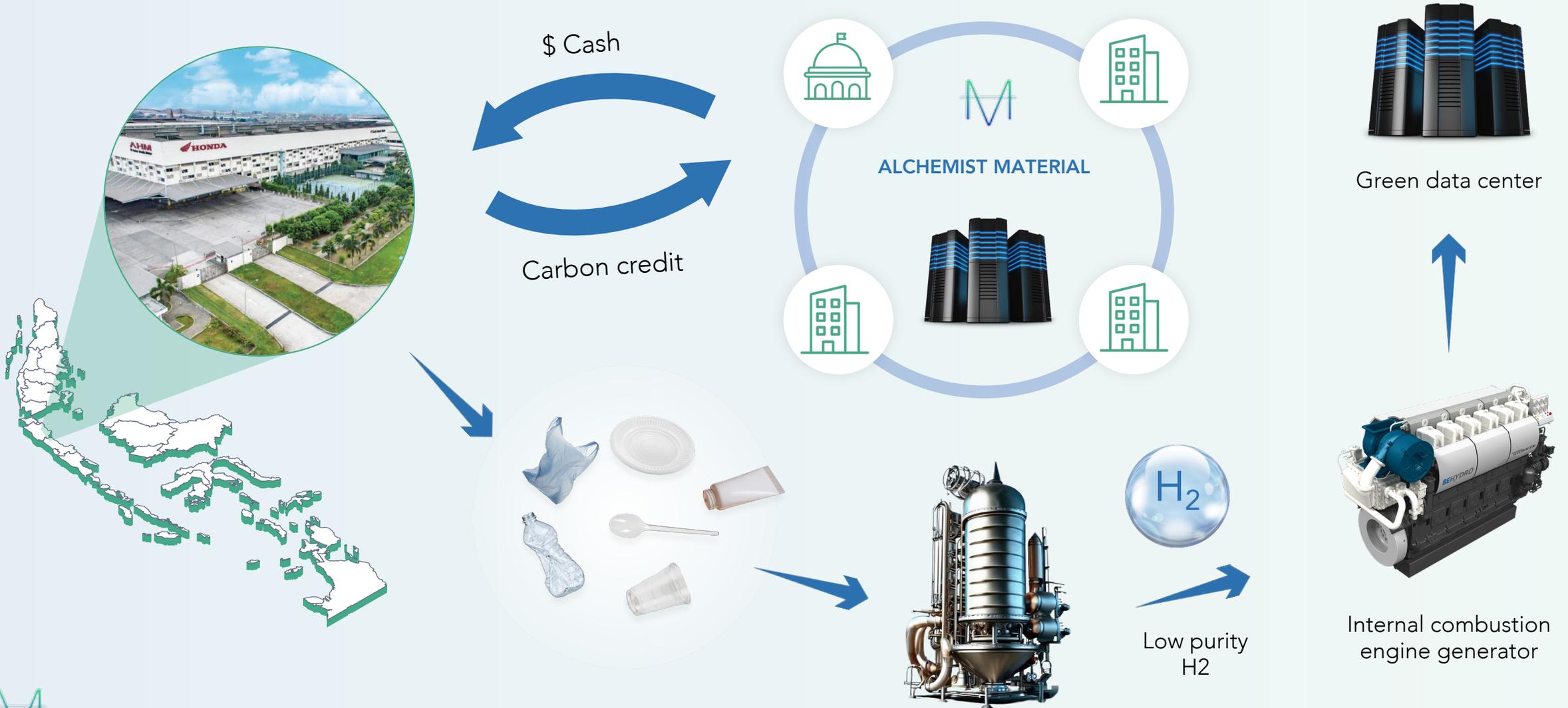


Make money instead of paying



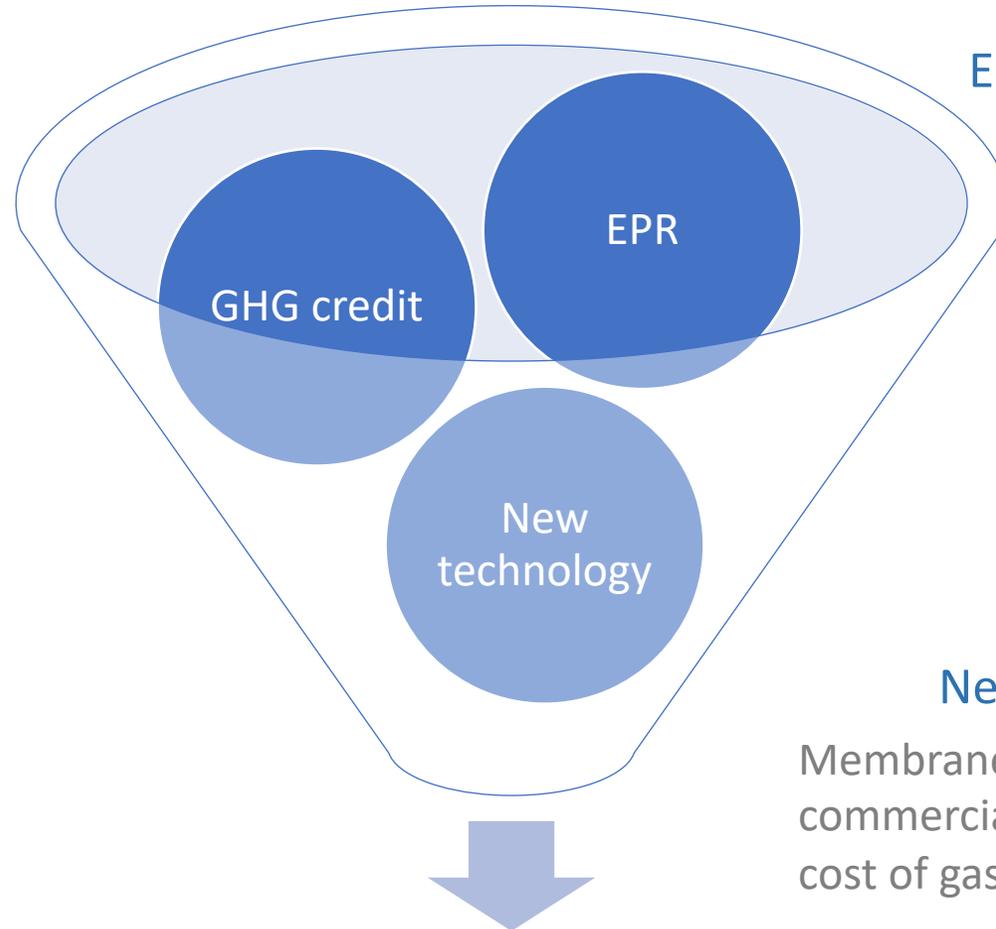
PILOT PROJECT IN INDONESIA

Convert waste into energy for green data center at industrial park



Backups

Why now?



GHG (Greenhouse Gas) credit

Indonesia is making GHG credit as official for trading with foreign countries.

EPR (Extended Producer Responsibility)

Several countries setting the new regulation which forces product producers to be responsible for recycling products.

EPR*

<https://spectrumnews1.com/ca/la-west/environment/2021/02/01/eight-states-join-ca-to-make-manufacturers-responsible-for-plastic-waste>

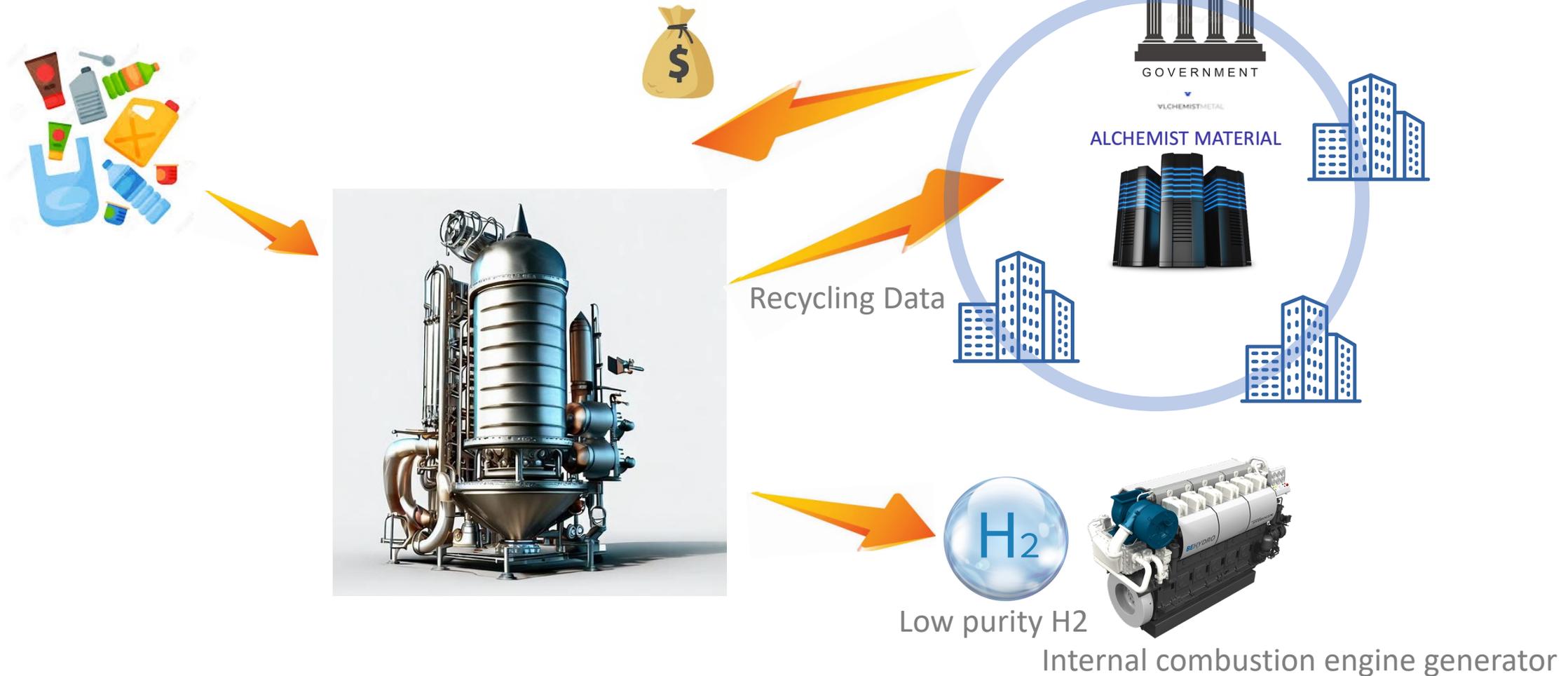
New technology (Membrane)

Membrane gas separation system has been commercialized recently. It would reduce cost of gas separation significantly.

Waste into H2 business becomes
Profitable upcycle Business

Expected Customer (Local city in Indonesia)

Local cities can produce not only electricity for Micro-grid but Greenhouse gas credit for earning cash for profitable waste management business.



Value proposition of customers

Our customers can make money from waste!

	Indonesia Industrial park	Local city Indonesia	Amazon,Walmart,Nike	H2 station US	Okinawa japan
Equipment (\$)*	3,700,000	3,700,000	4,600,000	4,600,000	4,600,000
Spair parts (\$/y)	100,000	100,000	150,000	150,000	150,000
Field service (\$/y)	20,000	20,000	500,000	500,000	200,000
Utility (\$/y)	520,163	520,163	375,704	375,704	317,299
Labor (\$/y)	42,000	42,000	840,000	840,000	360,000
Annual Operation cost (\$/y)	1,144,663	1,144,663	2,440,704	2,440,704	1,602,299
Tipping fee (\$/y)	716	716	108,225	108,225	2,560,770
H2 sales (\$/y)**	0	0	6,320,000	11,380,000	1,830,000
Electricity sales (\$/y)	750,000	1,130,000	0	0	0
CO2 sales (\$/y)***	1,100,000	0	0	0	1,090,000
Greenhouse gas credit	TBD	TBD	TBD	TBD	TBD
Waste credit	TBD	TBD	TBD	TBD	TBD
Annual sales w/o credits (\$/y)	1,850,716	1,130,716	6,428,225	11,488,225	5,480,770
Net income before tax (\$/y)	706,053	-13,947	3,987,521	9,047,521	3,878,471

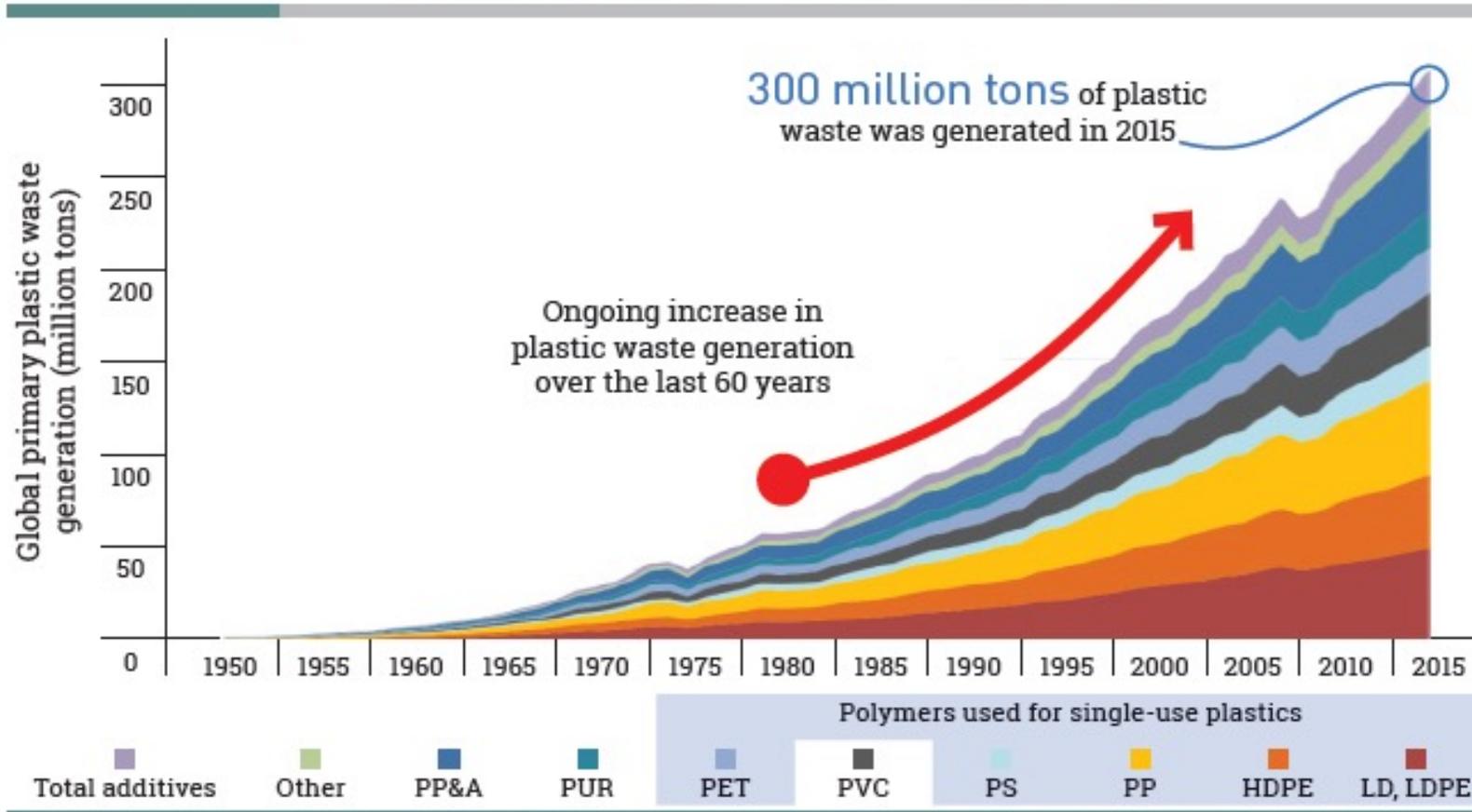
*8yesrs depreatiation including power generator in Indonesia

** H2 price at Amazon is \$20/kg, H2 price at H2 station is \$36, H2 price in Okinawa is \$8/kg

*** CO2 has high demand in industrial park and Okinawa. Our US customers give away CO2 to oil industry for oil enhanced recovery then expect big CO2 credit

Plastic waste generation

Figure 1.4. Global primary plastics waste generation, 1950 - 2015¹⁶



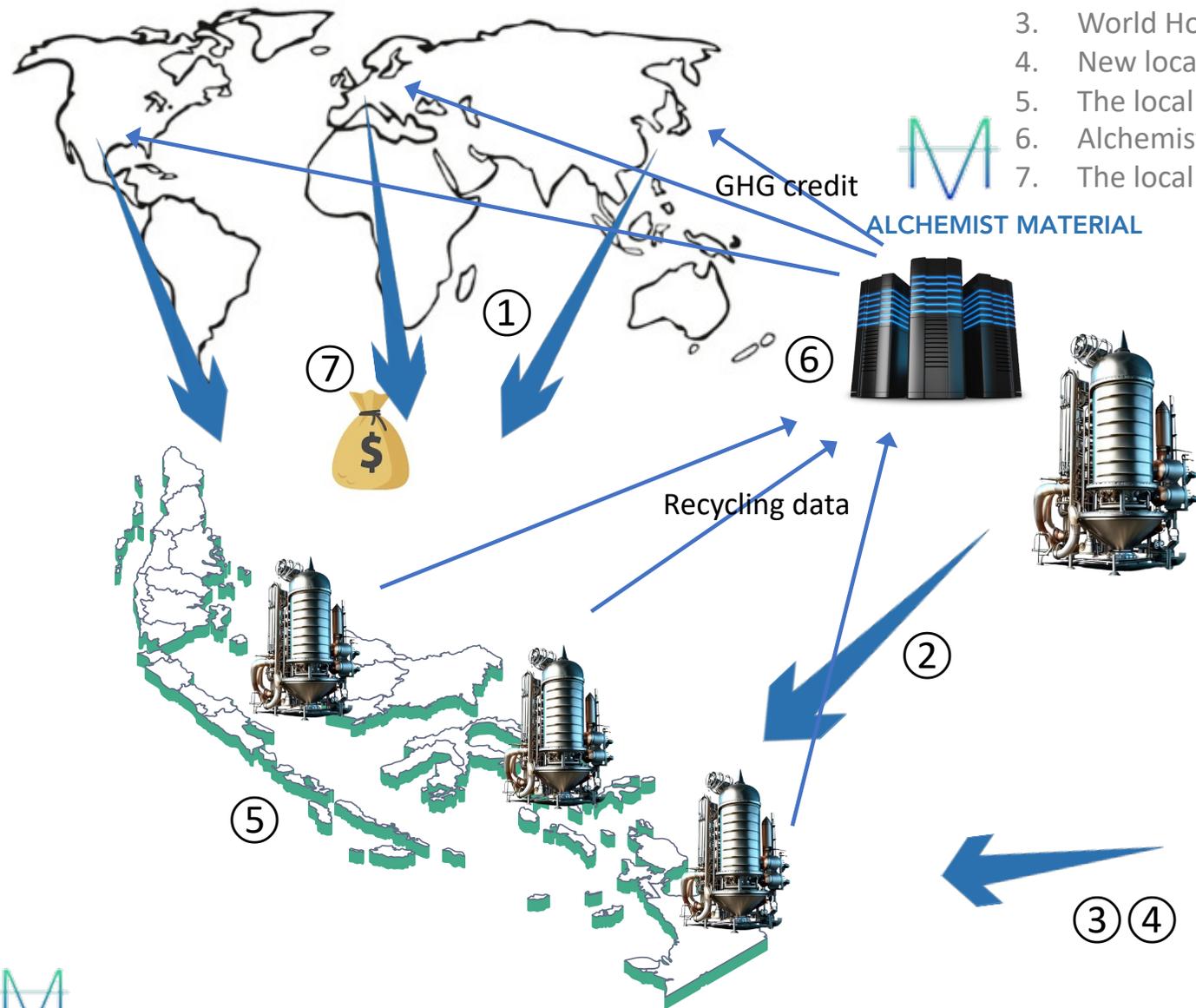
Source: Adapted from Geyer, Jambeck, and Law, 2017

by : United Nation SINGLE-USE PLASTICS A Roadmap for Sustainability

Business proposal

Procedure

1. Investors give debt finance to local cities in Indonesia
2. Alchemist Material sells the equipment to the local cities
3. World Horenso educates and trains students at industrial high school in Indonesia
4. New local graduate workers will work on field service
5. The local cities convert waste into local green energy and GHG credit
6. Alchemist Material trades the GHG credit for the customers
7. The local cities receive cash from foreign entities and pay back the debt.



Objectives

- ✓ Reduce ocean plastic
- ✓ Reduce GHG includes CO2 and Methane
- ✓ Reduce smog pollution from burning agricultural waste
- ✓ Jobs for young people
- ✓ One step forward for H2 society

