# ASEAN Japan Energy Efficiency Partnership (AJEEP) ECAP34

Kanadevia

Technology for people and planet

## Power to Gas Technology of Kanadevia and Green Energy Projects


**Decarbonization Systems BU**

**Business Development Department**


**13th November 2024**

1. Company Introduction

2. Decarbonization in Southeast Asia

3. Power to Gas Technologies of Kanadevia

4. Our Power to Gas Projects in Southeast Asia

 

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# Change of the Trade Name

**From 1st October 2024, the trade name was changed from Hitachi Zosen to...**

Kanadevia

Technology for people and planet

| **Kanaderu** | + | **Via** |
| --- | --- | --- |
| Harmonized | | way or method (of our stakeholders) |

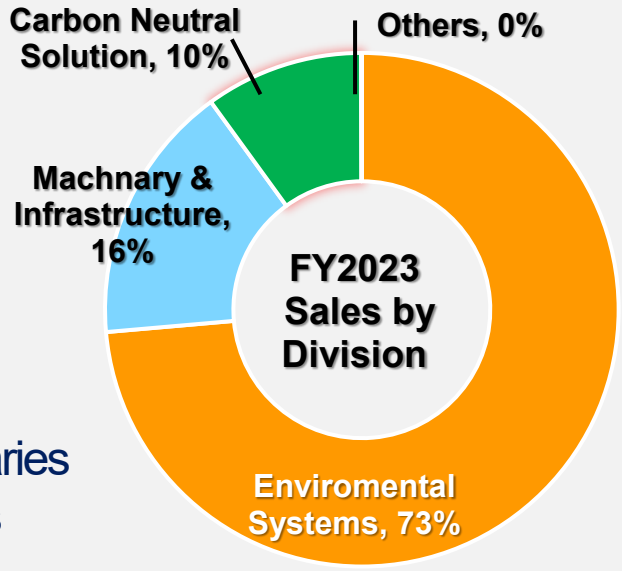
**“To create a world living in balance with nature through the technology expertise”**

# Company Profile of Kanadevia

※As of 31st March 2024／US$=JP¥ 155.00

## Kanadevia Corporation

| | |
|---|---|
| ◆ Date of Founded | 01st April 1881 |
| ◆ Date of Incorporated | 29th May 1934 |
| ◆ President | Mr. Michi Kuwahara, Representative Director and COO |
| ◆ Location of Head Offices | Osaka and Tokyo, Japan |
| ◆ Capital (JP¥ 45,442 million)※ | US$ 293million |
| ◆ Order intake (JP¥ 715,134 million) | ※US$ 4,614 million |
| ◆ Net Sales (JP¥ 555,844 million)※ | US$ 3,586 million |
| ◆ Employees | 12,148 |
| ◆ International Operations | 79 International Subsidiaries<br>4 International Branches |
| ◆ ASEAN Operations | Jakarta, Bangkok, Singapore and Hanoi |



# Business Overview of Kanadevia

## Environmental Systems

- WtE (Waste to Energy) Plants
- Biomass System
- Water Treatment System, etc.

## Machinery & Infrastructure

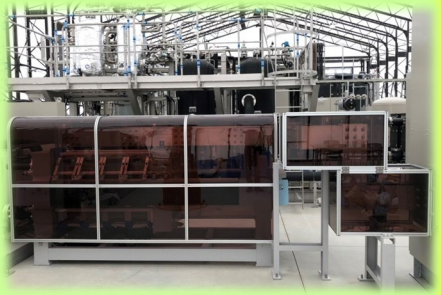
- System Machinery
- Social Infrastructure

## Carbon Neutral Solution

- Water Electrolyzer
- $CO_2$ Recycling
- Process Equipment
- Wind Power Generation
- De-$NO_x$ System for Marine Engine

} **Power to Gas Business**

$CO_2$ Recycling



Water Electrolyzer

Wind Power

Process Equipment

# Participation of Kanadevia in COP29

## ＜Exhibition at the Japan Pavilion＞

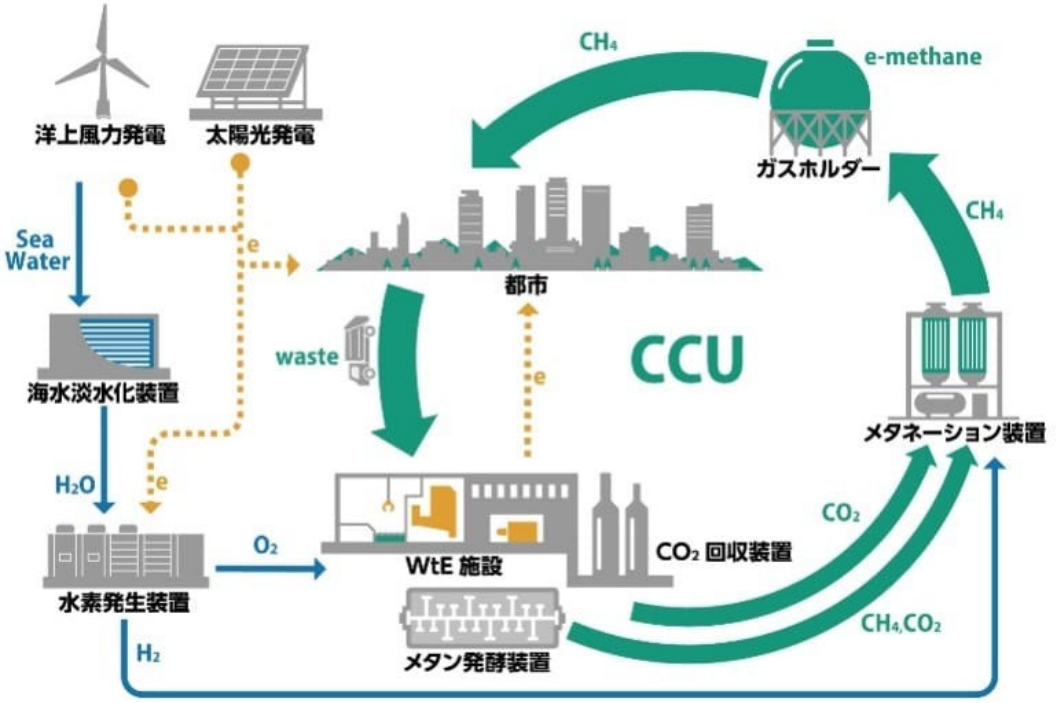
Innovative Waste Management to Achieve Circular Economy & Net-Zero GHG Emissions

## ＜Presentation at JEFMA Seminar on COP29＞

Achieving Circular Economy by Diverse Waste Management Technology & CCUS

by Michi Kuwahara, COO

20th November, 2024 10:30~11:45
(ca. 15 min within this time)




https://www.env.go.jp/earth/cop/cop29/pavilion/exhibition/display/#kanadevia

# Track Records for Southeast Asia

- Kanadevia has track records of Waste to Energy (WtE) plants, water gates and bridge in Southeast Asia.
- In the future, in addition to the conventional businesses, we would like to contribute to decarbonization in Southeast Asia through our Power to Gas technologies.

WtE Plant / NEDO Hanoi, Vietnam IW 75t/d, 1.93MW

WtE Plant / Nongkhai, Thailand RDF(MSW) 370t/d, 8MW

WtE Plant / Rayaong, Thailand RDF(MSW) 300t/d, 9.8MW

Water Gate / Ayutthaya, Thailand

Rama IX Bridge / Bangkok, Thailand

WtE Plant / West Java, Indonesia MSW, more than 2,100t/d

Under Contract Negotiation
Project Scheme: BOT
Operation Period: 20 years

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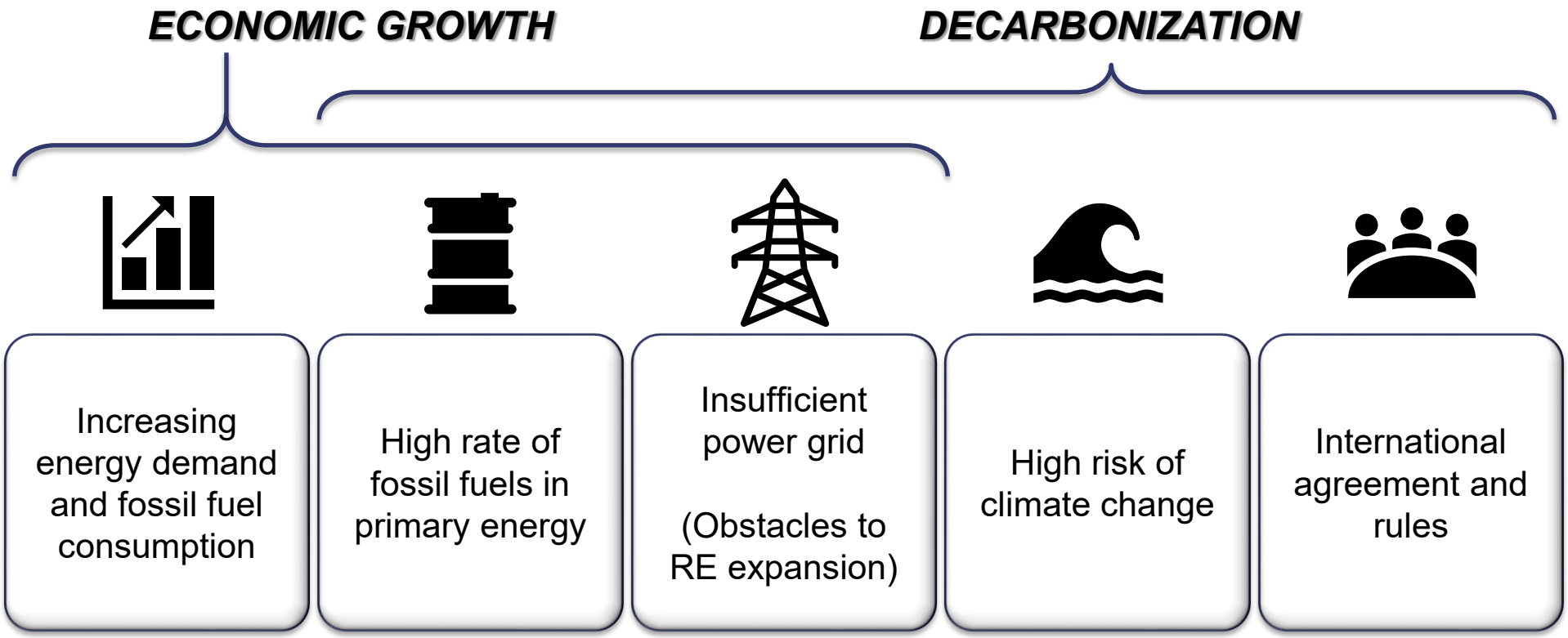
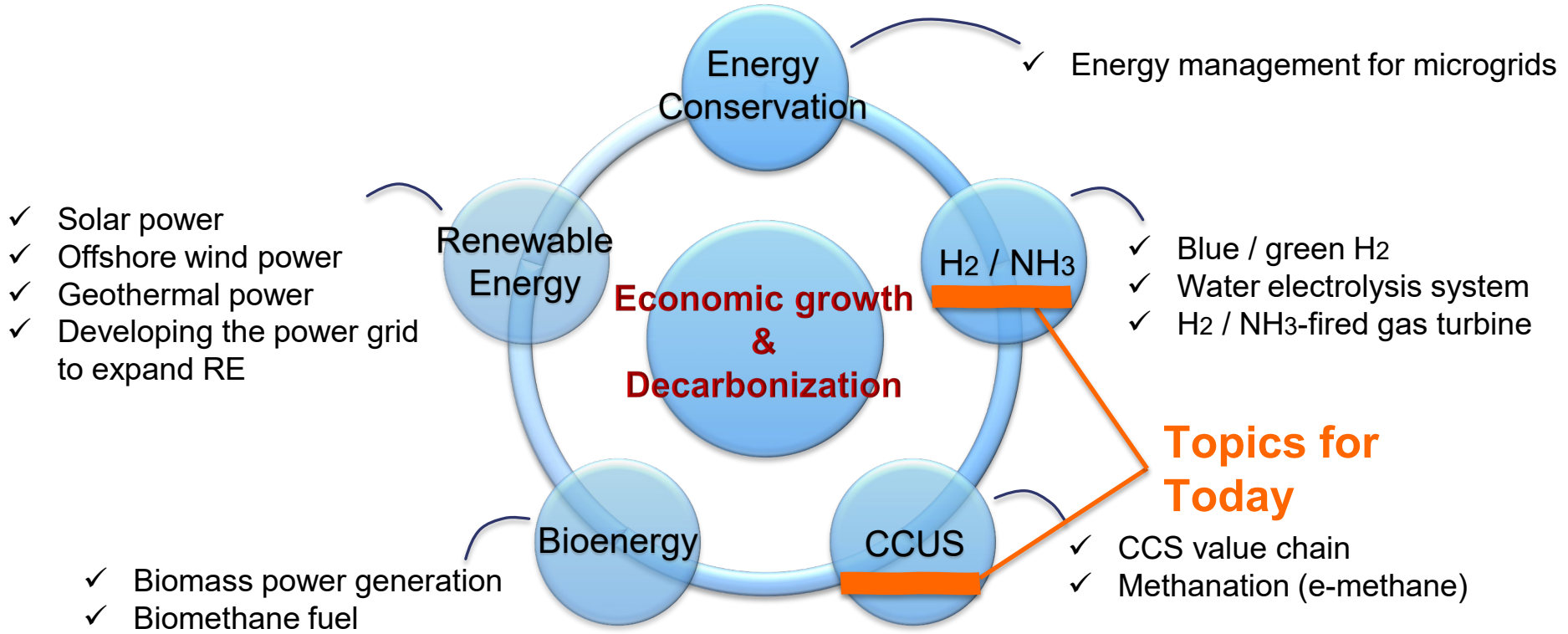
# Challenges and Issues for Southeast Asia

- Along with economic growth, energy demand and fossil fuel consumption are increasing.
- With a high risk of climate change, it is extremely important to develop decarbonization through international cooperation.
- **Southeast Asia is at a critical situation where it must tackle both of economic growth and decarbonization challenges at the same time.**



# Various Decarbonization Tech. that can be Tailored to Each Country

- Each country in Southeast Asia has different socio-economic goals due to their different stages of development, geographical conditions and natural resources.
- Considering this situation, to achieve both economic growth and decarbonization, **it is essential for each country to appropriately select and utilize energy sources and technologies**, *e.g.* [1] energy conservation, [2] renewable energy, [3] hydrogen, ammonia, [4] bioenergy, [5] carbon dioxide capture, utilization and storage (CCUS).



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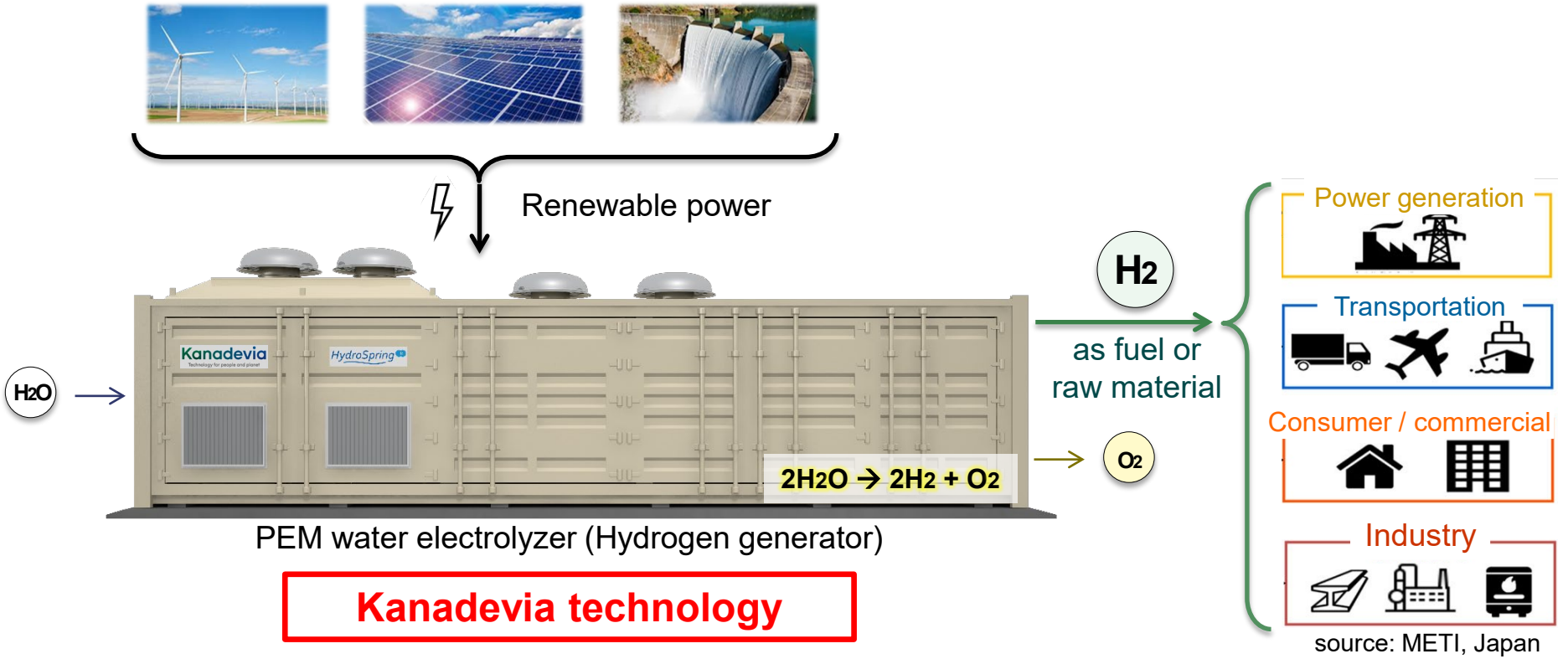
# Green Hydrogen Production Technology of Kanadevia

- **Green $H_2$ refers to $H_2$ generated through water electrolysis using RE.**
- Green $H_2$, as a decarbonized fuel and green raw material, can be an option to achieve decarbonization in Southeast Asia.




PEM water electrolyzer (Hydrogen generator)

**Kanadevia technology**

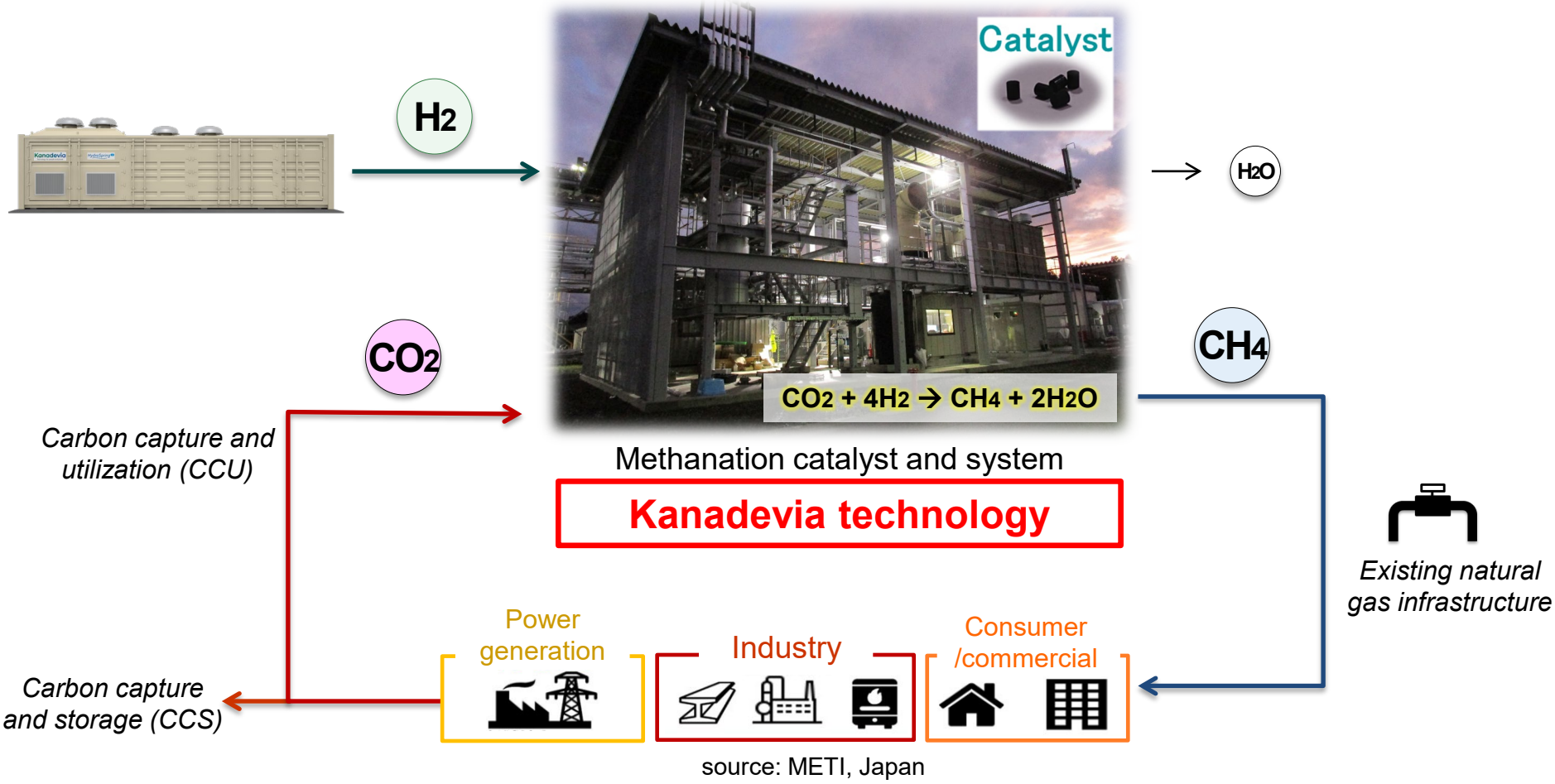
source: METI, Japan

<Major types of electrolysis>

| | |
|---|---|
| Proton Exchange Membrane Water Electrolysis (PEMWE) | High safety and maintenance characteristics. High purity $H_2$ production. High adaptability to fluctuations in renewable power supply. |
| Alkaline Water Electrolysis (AWE) | Relatively low CAPEX. * PEM type is advantageous when using RE. |

# Methanation Technology of Kanadevia

- **Methanation technology is one of the CCU technologies that produces e-methane (synthesized methane) using $H_2$ and $CO_2$ as resource.**
- E-methane can be distributed, stored and used through existing natural gas infrastructure.




source: METI, Japan

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# Promotion of Green Energy Projects in Lao PDR

- Lao PDR has large hydropower generation capacity.
- **Kanadevia has been working on business development related to green energy in Lao PDR.**
- **Effective use of abundant electricity for green $H_2$ production**.

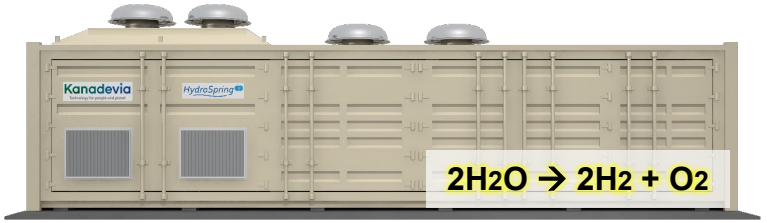
Electricity Data of Lao PDR in 2022

| | |
|---|---|
| Hydropower generation capacity | 9,615 MW (82.5%)*1 |
| Export volume of electricity | 2,358 MUSD (28.8%, Largest)*2 |

*1 :STATISTICAL YEARBOOK ENERGY AND MINES 2022 (Ministry for Energy and Mines, Lao PDR) *2 JETRO

Abundant renewable electricity in Lao PDR

$H_2O$ →




Water Electrolyzer (Hydrogen Generator)

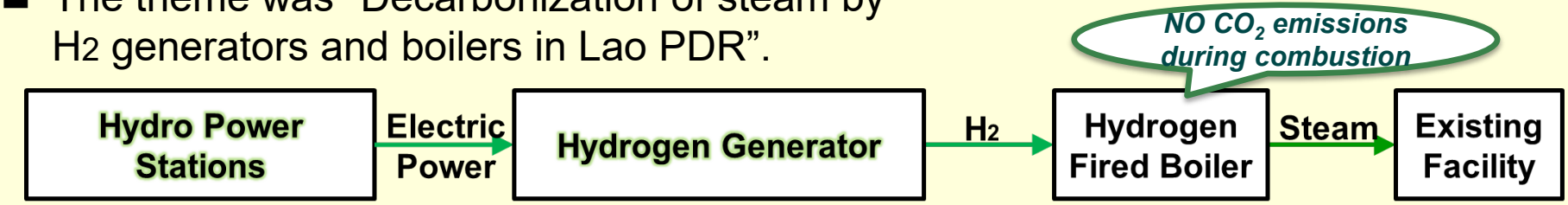
$H_2$ →

- For $H_2$ fired boilers
- Raw material for $NH_3$
- Raw material for $CH_4$

# JCM Project for Lao PDR Utilizing its Abundant Renewable Energy

- **Kanadevia carried out JCM feasibility study with the support of METI, Japan.**
- The theme was “Decarbonization of steam by $H_2$ generators and boilers in Lao PDR”.

JCM THE JOINT CREDITING MECHANISM




**< Main Outcomes >**

- ✓ **Appealing to the gov. of Lao PDR about the benefits of the PJ.**
- ✓ **Analyzing and sharing of challenges* that need to be overcome to realize the PJ.**

**< Benefits of the PJ >**

**Effective use of electricity / Less fossil fuel consumption / Reduction of $CO_2$ emissions**

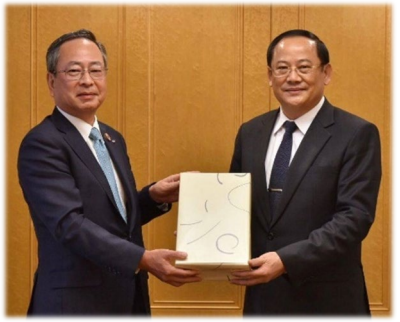


Photo of the Lao government and Kanadevia

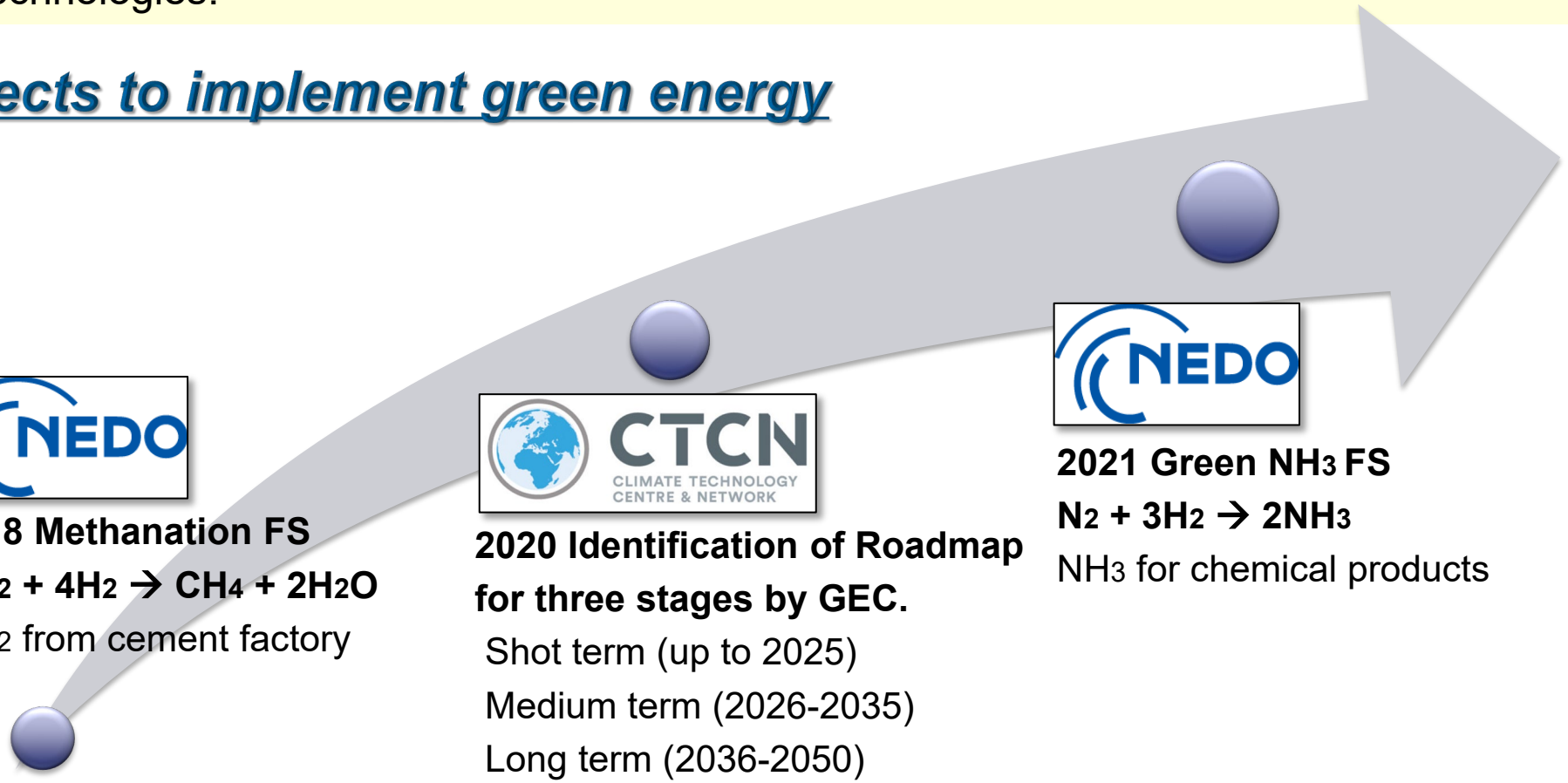
* Challenges need to be overcome

| | |
|---|---|
| Setting incentives for green $H_2$ | ✓ Supplying green electricity to green $H_2$ PJs with the price to make the PJs feasible. (electricity costs account for a large proportion of green $H_2$ production.)<br>✓ Setting an environmental value (*e.g.* carbon pricing, subsidies) is essential. |
| Procurement of green electricity | ✓ The $CO_2$ emission factor of grid power to be re-evaluated taking into consideration that > 80% of elec. in Lao PDR is from hydropower stations.<br>✓ It is necessary to establish a system for distinguishing RE from the other when transmitting elec. via power grid. |

# Other Green Energy Projects

- Kanadevia has carried out other green energy PJs in Lao PDR
  - ✓ Green energy PJs through NEDO* International Demonstration PJs.
  - ✓ Identification of roadmap for carbon neutral through CTCN program by Power to Gas technologies.

## *Projects to implement green energy*



**2018 Methanation FS**

**$CO_2 + 4H_2 \rightarrow CH_4 + 2H_2O$**

$CO_2$ from cement factory

**2020 Identification of Roadmap for three stages by GEC.**

Shot term (up to 2025)

Medium term (2026-2035)

Long term (2036-2050)

**2021 Green $NH_3$ FS**

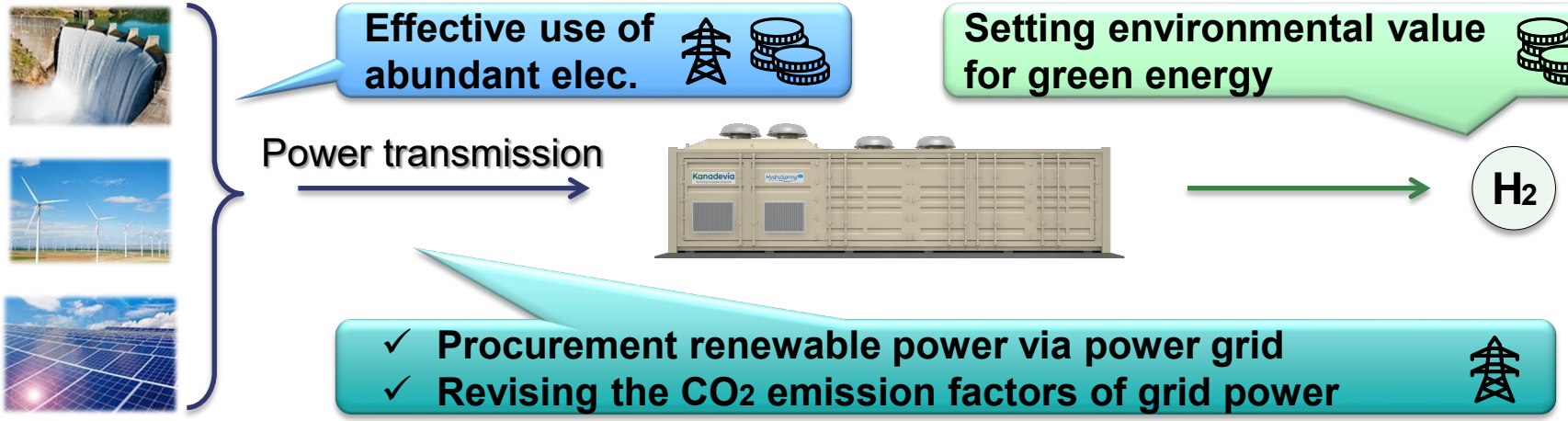
**$N_2 + 3H_2 \rightarrow 2NH_3$**

$NH_3$ for chemical products

*NEDO: New Energy and Industrial Technology Development Organization. NEDO is a Japanese national research and development agency.
*CTCN: Climate Technical Centre & Network. *GEC: Global Environment Centre

# Proposal to Spread Green Energy in Southeast Asia

- **Effective use of green elec. by providing it with feasible prices for green $H_2$ production**
  - ✓ Electricity cost is major part of green $H_2$ production.
  - ✓ Green $H_2$ production facility can be recognized as a tool of energy management system without curtailing output from renewable power stations.
- **Setting an environmental value for green energy**
  - ✓ Green $H_2$, as an alternative energy to fossil fuels, does not emit $CO_2$ when being burned.
  - ✓ It must be effective to establish a carbon pricing system, subsidies and/or incentives to green $H_2$.
- **Procurement of renewable electricity via power grid**
  - ✓ It is necessary to establish a system, such as green energy certificate, for distinguishing RE from the other when transmitting elec. via power grid.
  - ✓ Given the current circumstance toward renewable energy, it is necessary **to revise the $CO_2$ emission factors of grid electricity**.



# Summary

## <*Decarbonization of Southeast Asia*>

- ✓ Southeast Asia is facing a situation where it must **balance economic growth with decarbonization.**
- ✓ It is necessary for each country to select the suitable tech. and energy.

## <*Kanadevia Technologies and PJs in Southeast Asia*>

- ✓ Kanadevia has developed **$H_2$ generation and methanation technologies** for prosperity of Southeast Asia in the fields of $H_2$ / $NH_3$ and CCUS.
- ✓ Kanadevia has carried out feasibility studies for green $H_2$ PJ (JCM PJ), green $NH_3$ and e-methane PJs (NEDO PJs) based on the concept of **well use of hydropower in Lao PDR**.
- ✓ For the project execution in the SEA region, our capability is proven by references on WtE, Water gate, Bridge and other projects.

## <Towards the Spread of Green Energy in Southeast Asia>

- ✓ Supplying green electricity with feasible prices for green energy production.
- ✓ Improving the power grid for renewable electricity supply and establishing a system, such as renewable energy certificate.
- ✓ Revising the $CO_2$ emission factors of the grid power.
- ✓ Setting incentives for green energy.

Kanadevia

Technology for people and planet

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