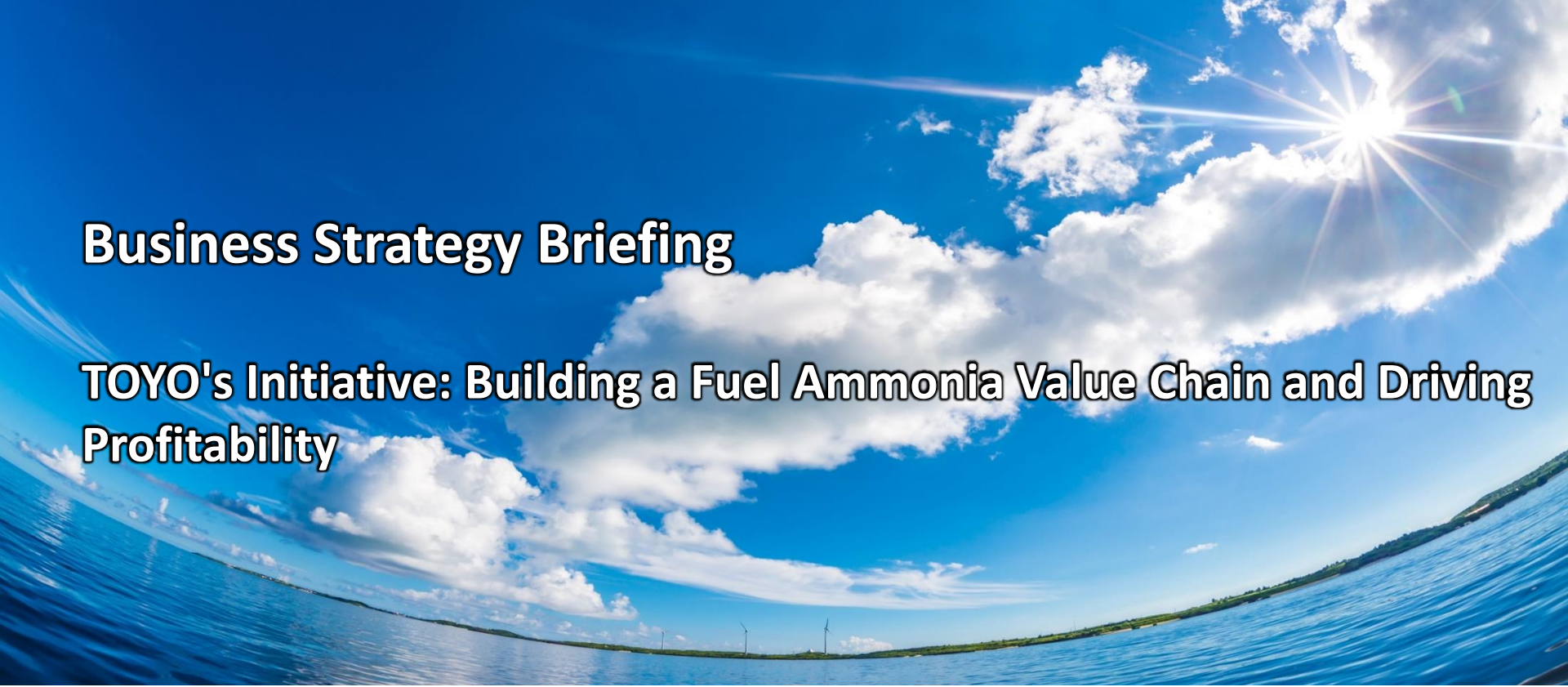


Business Strategy Briefing

TOYO's Initiative: Building a Fuel Ammonia Value Chain and Driving Profitability

December 10, 2024

Toyo Engineering Corporation

Deputy General Manager, Value Chain Business Investment Department,
Carbon Neutral Business Division, Business Development & Marketing Unit

Toshiyuki Koga

1. **Ammonia Demand Outlook**

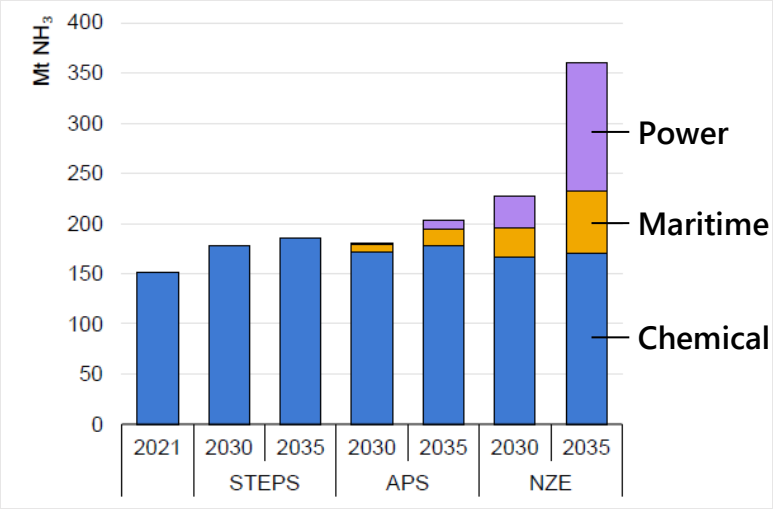
2. TOYO's Strengths in Ammonia

3. Value Chain Development Initiative:

   Hybrid Green Ammonia Project “GAIA” in Indonesia

Ammonia (NH_3) Demand Outlook by Application

Ammonia Demand Outlook by Application (Global)



Key Figures for NZE Scenario in 2035:

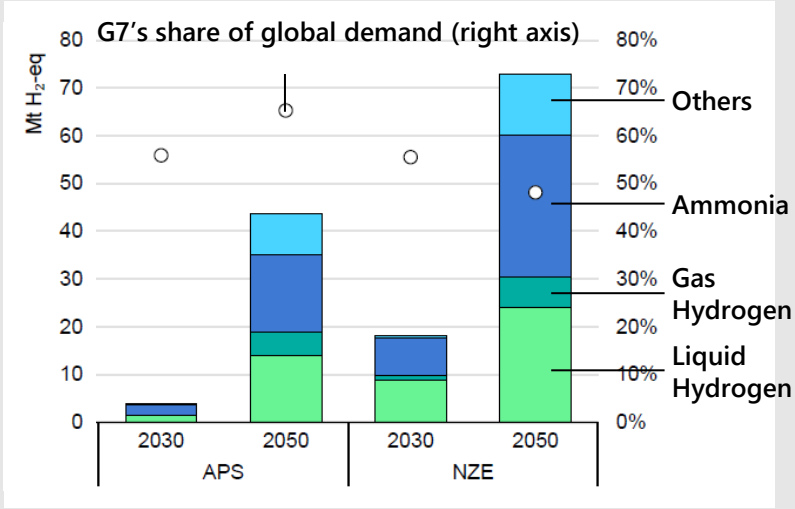
- Power Generation :125Mt-NH_3
- Maritime Fuel : 70Mt-NH_3

} Total 195Mt[1)]-NH_3

1) Mt＝Million tons

Assuming EPC costs are 150 billion JPY/Mt, the total EPC market is: 150Bn JPY/Mt × 195Mt ＝29 trillion JPY

Hydrogen Demand Outlook by Carrier (G7 Countries)



Estimated NH_3 Demand as H_2 Carrier for NZE Scenario:

- 2030: ~10 Mt-H_2-eq = ~56 Mt-NH_3[2)]
- 2050: ~30 Mt-H_2-eq = ~169 169Mt-NH_3[2)]

If converted to plant EPC value, the EPC market for G7 countries alone will be 8Tn JPY in 2030, 25Tn JPY in 2050

Source：IEA, "Towards hydrogen definitions based on their emissions intensity"【Link】 2) 5.63 t-NH_3/t-H_2 (Mole base. Yield should also be considered.)

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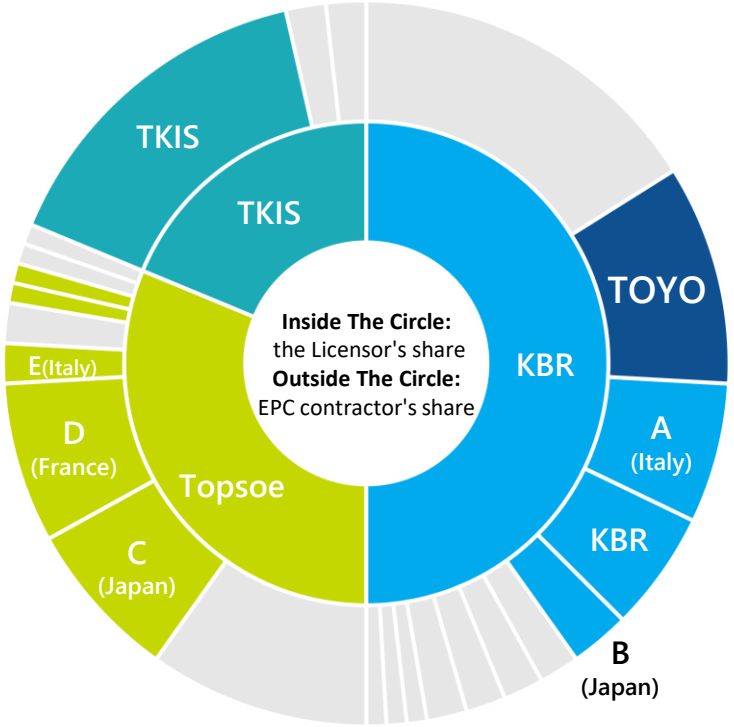
TOYO's Strengths I : Ammonia EPC Global Market Share (Number of Projects, After 2001)

TOYO Will Be the EPC Market Leader, Even in the NH_3/H_2 Era

Gray indicates Chinese, Korean, or local companies (local etc.).
It is estimated that each of these companies undertakes 1-2 small projects.



Source：Created by TOYO based on data from various organizations

Market Characteristics

- Due to the complexity of handling high-temperature and high-pressure systems, a limited number of engineering companies in Japan and Europe hold significant market shares.
  - → Japan: **TOYO**, MHI, KHI
  - → Europe: TKIS (Germany), Tecnimont (Italy), Technip (France), Saipem (Italy) *US: KBR has withdrawn from EPC activities.
- Although advancements in low-temperature, low-pressure technologies are progressing, high-temperature, high-pressure systems continue to dominate as the mainstream choice for large-scale and liquefied fuel transport applications.
- In the case of ammonia for power generation, electric utilities place a particularly strong emphasis on manufacturing reliability and stability. Consequently, Japanese and European engineering companies with extensive track records are attracting significant number of inquiries.
- As plants become larger and more complex in the future, a virtuous cycle is expected to emerge, where "extensive experience" leads to "new orders", which further enhances "extensive experience".

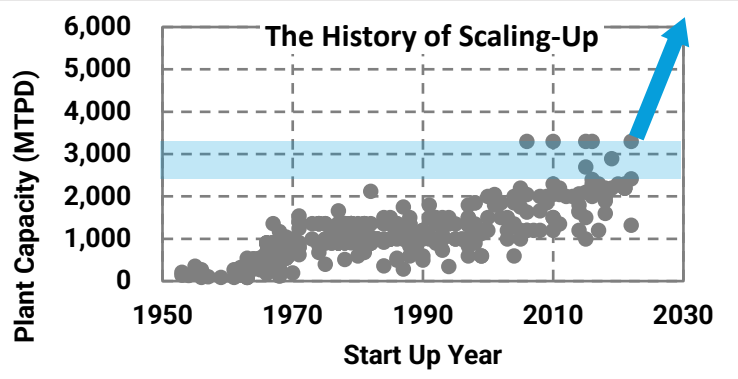
Similar to LNG, this market has the potential to be dominated by Japanese engineering companies.

TOYO's Strengths II: Cost Reduction in Ammonia Production Plants

TOYO leverages its extensive EPC experience and expertise to achieve significant cost reductions

Plant Scaling-Up

- The current mainstream capacity stands at approximately 3,000 MT[1)]/day, with future plants anticipated to scale up to 6,000 MT/day or even 10,000 MT/day.
- Based on historical rules of thumb, the expected CAPEX[2)] reduction effect can be approximated as expansion rate × 0.6 power.



Cost Reduction Measures Beyond Scaling-Up

- Building plants with the same production capacity in parallel reduces overall CAPEX
  - → Reducing Design Man-Hours by Leveraging Repeatability
  - → Consolidating orders results in lower costs for equipment and materials
  - → Cost reduction through shared utility facilities
  - → Flexibility for future expansion
- Selecting sites with low construction and tax costs, with existing OSBL (Outside Battery Limit) facilities, including CO_2 pipelines.
- Utilizing a flexible vendor list that balances QCD (Quality, Cost, and Delivery) and prioritizing vendors with cost competitiveness.
- Modularization should only be employed when construction site risks are high, as it generally does not contribute to cost reductions.

Source：TOYO 1) Metric Ton (MT) 2) Capital Expenditure

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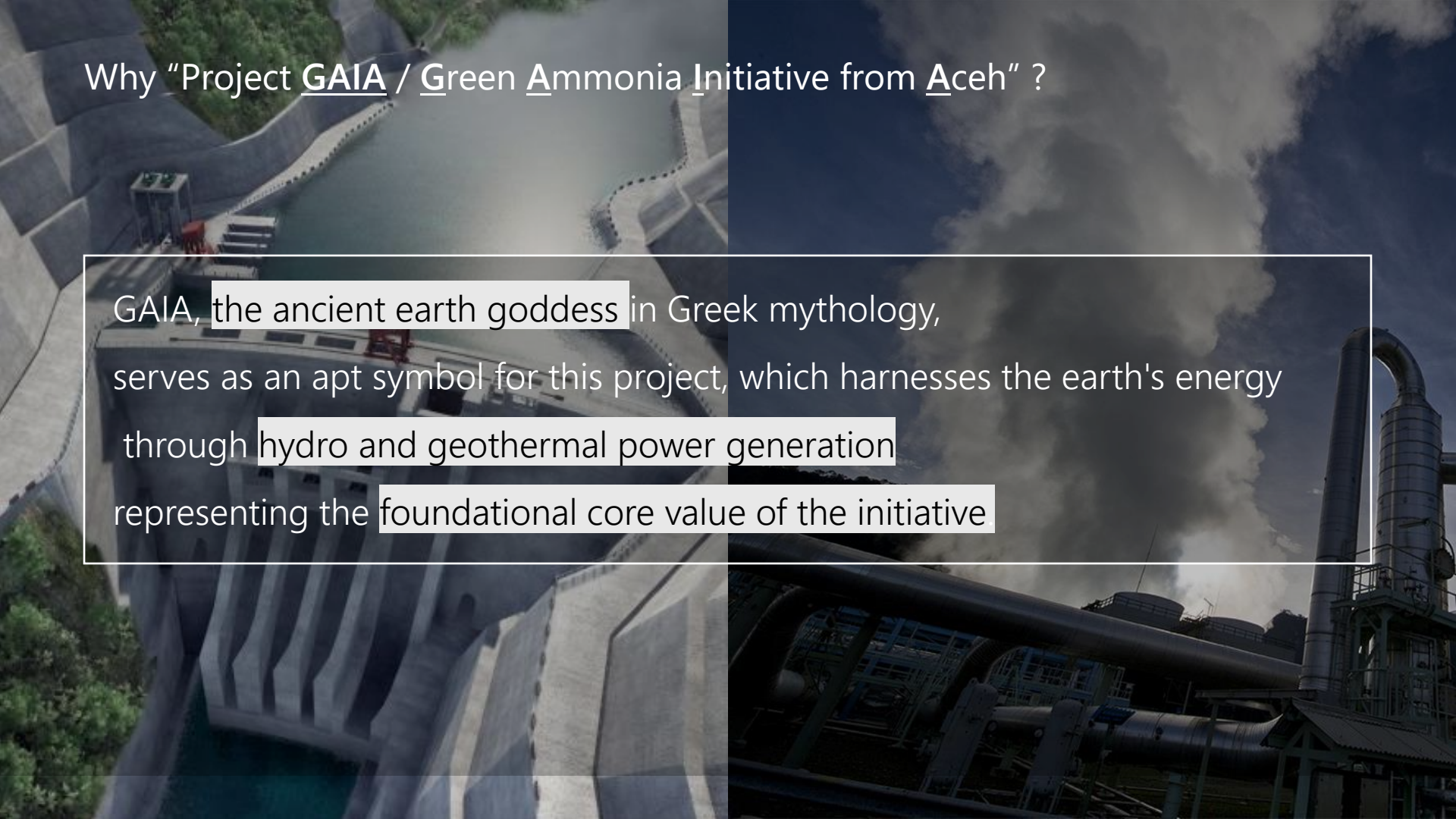

Why “Project **GAIA** / **G**reen **A**mmonia **I**nitiative from **A**ceh” ?

GAIA, the ancient earth goddess in Greek mythology,
serves as an apt symbol for this project, which harnesses the earth's energy
through hydro and geothermal power generation
representing the foundational core value of the initiative.

Project Value

- **World's First and Indonesia's First**
  Hybrid Green NH_3 Production & Maritime Bunkering Value Chain

- **Promotion of New Energy Export**
  Leveraging existing ammonia plants under PUPUK INDONESIA (PI) to develop green ammonia production for export

- **Domestic and Global Business Expansion (Future)**
  Collaborating with PI's internal facilities to develop further business opportunities
  Exporting this business model to other countries with existing ammonia plants

Support from the Indonesian & Japanese governments accelerates the GAIA project

In addition to executing the GAIA project through EPC, TOYO aims to generate stable and recurring business profits from its operations.


RENEWABLE Energy
(FEEDSTOCK)
PLN
EXISTING Ammonia Plant +
Electrolyzer (PRODUCTION)
PUPUK INDONESIA HOLDING COMPANY
TOYO ENGINEERING
GREEN AMMONIA BUNKERING VALUE CHAIN
NEW Ammonia Bunkering
(MARKET CREATION)
ITOCHU


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Unique Points of the Project

Enhancing the value of existing plants by leveraging TOYO's specialized expertise

PUPUK INDONESIA HOLDING COMPANY

Over 50 Years of Ammonia Operation Know-how and Expertise

More than 60% of PI's Existing Ammonia Plant EPC Track Record

TOYO ENGINEERING

QUICK

Utilize PI's existing facilities

→ Add electrolyzers to NH_3 plants

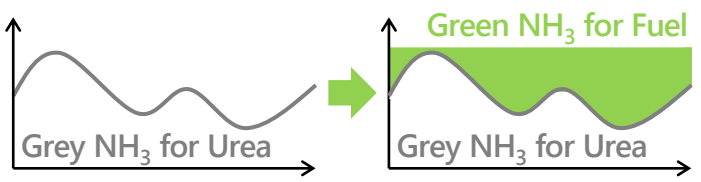
→ Source RE electricity from the grid

ECONOMIC

Minimize CAPEX and OPEX

→ Utilize unused NH_3 capacities

→ Level out NH_3 annual production



Estimated Schedule

Focus on the success of GAIA first, and then, expand the business

Aug. 2024	~ Mar. 2024	1H FY2024	FY2027	FY2028 ~
FEED* has started 【ongoing】	JVC Establishment 【Target】	Final Investment Decision (FID) 【Target】	Commercial Operation Date 【Target】	Expansion to PI's other plants 【Target】

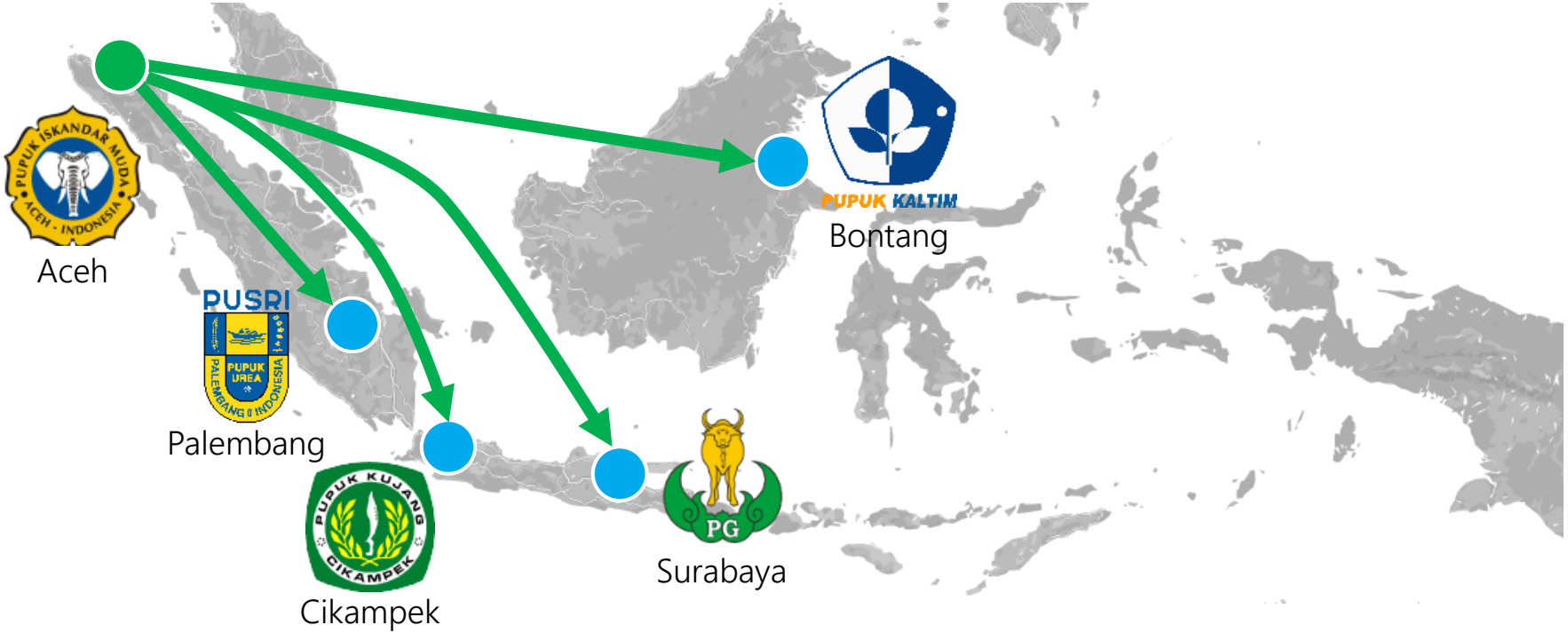
Public announcement of the signing of Joint Development Agreement at AZEC in August 2024

Public announcement of the signing of Shareholders' Agreement at COP29 in November 2024

*Front-End Engineering Design

Future Expansion Opportunity

Expand the success of PJ GAIA to other existing NH_3 plants



Toyo Engineering Corporation

URL https://www.toyo-eng.com/jp/en/

For further information, please contact:

Yoshifumi SHIRAISHI

General Manager

Corporate Communications Department

TEL +81-50-1735-7304

E-mail ir@toyo-eng.com