

REvision2023

March 8, 2023

Session3 自然エネルギーがアジアの未来を拓く

「アジア・ゼロエミッション共同体」構想－日本の役割再検討

“Asia Zero Emissions Community” (AZEC)
- The Asian way? Rethinking Japan’s Role



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「アジア・ゼロエミッション共同体構想」

‘The Asian Zero Emissions Community’ (AZEC)



“Since solar power plays a major role in the transition to renewables in Asia, to help stabilize electrical frequency in the region, converting existing thermal power generations into zero-emission power generation is a necessary path. To this end, Japan, through the Asia Energy Transition Initiative, will develop leading projects worth 100 million USD to transform fossil-fuel-fired thermal power into zero-emission thermal power such as ammonia and hydrogen”

Source: COP26 World Leaders Summit Statement by Prime Minister KISHIDA Fumio, 2021.11.2

<アジア・ゼロエミッション共同体の内容>

①ゼロエミッション
技術の開発

②国際共同投資、
共同資金調達

③技術等の標準化

④カーボンのクレジット市場

Develop “Zero Emission Technologies” : Ammonia/Hydrogen/CC(U)S

Co-financing Scheme (Based on Asian Rules)

Standardization of Technology

Develop Carbon Credit/Offset Market

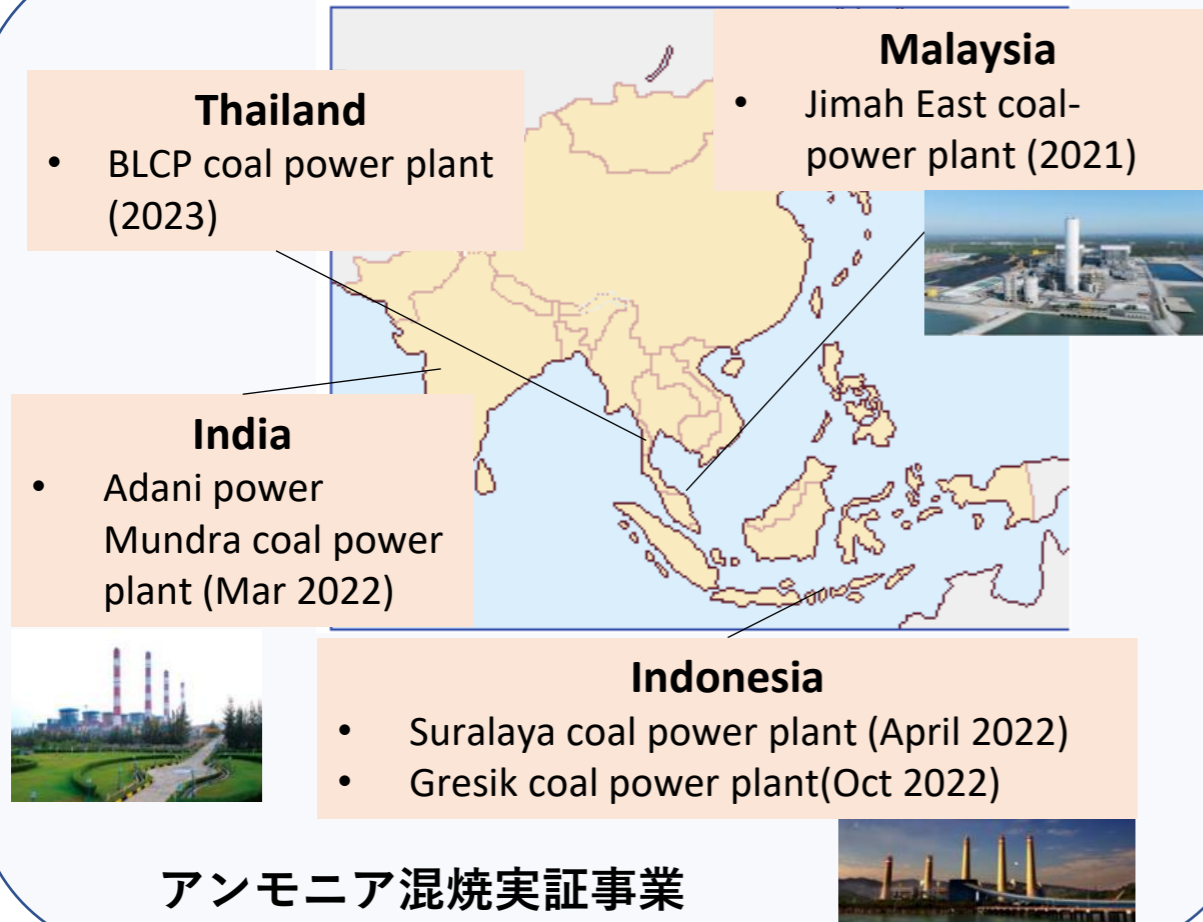
出典：「カーボンニュートラルに向けた国際戦略」資源エネルギー庁 2022年3月1日

Source: “Towards carbon neutrality – An international strategy” Agency of Natural Resources and Energy March 2022

「ゼロエミ火力」実現に向けた検討と投資を加速

Investment started towards the expansion of “Zero Emission Thermal Power”

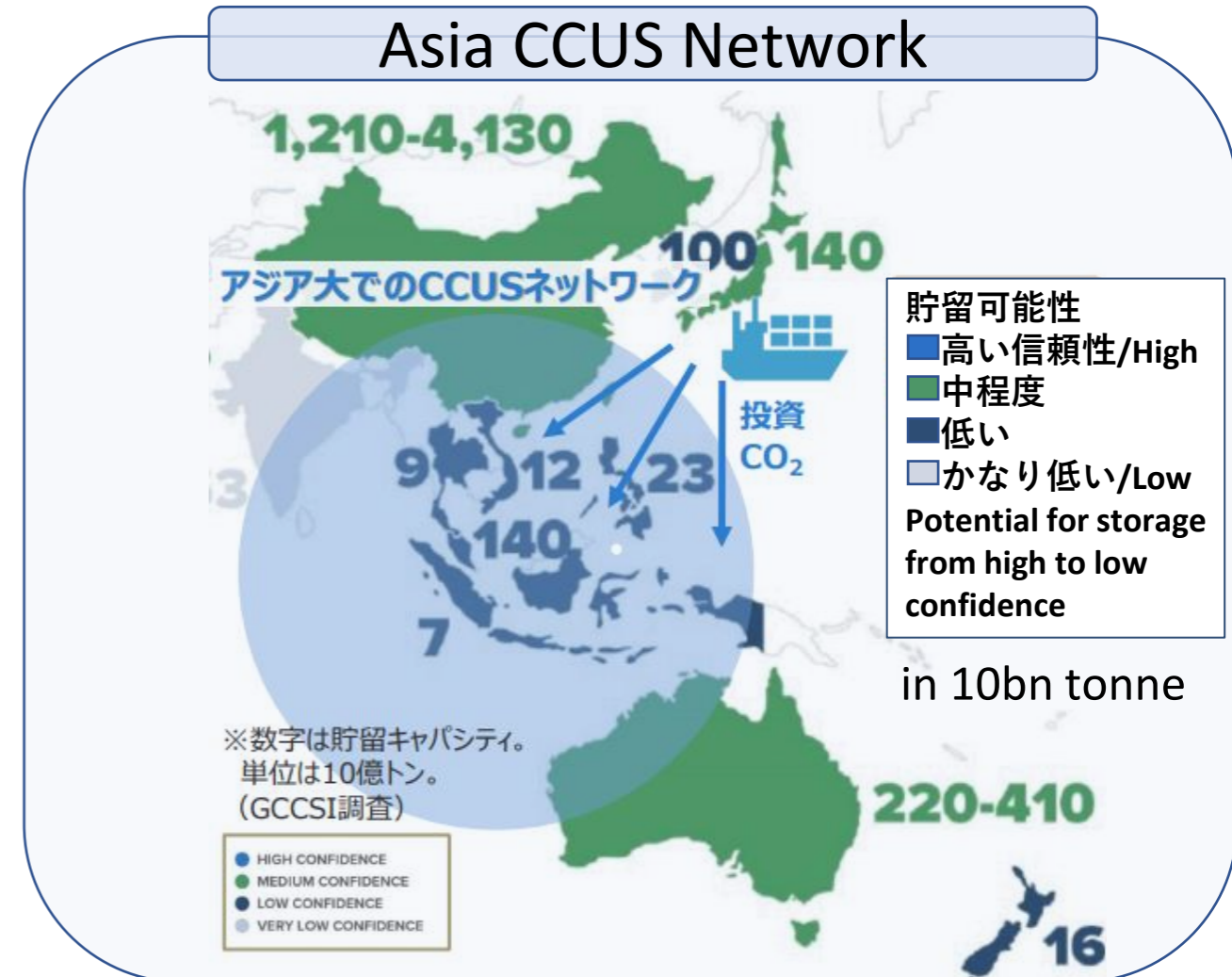
Ammonia Co-firing Feasibility



Source: Created from “Ammonia Strategy and Policy in Japan” presented by Ministry of Economy Trade and Industry Dec 2, 2022 and added information

- 政府の計画：2030年代半ばまで20%混焼普及、2040年代前半まで混焼率拡大
- 2030年20%混焼コスト推計は20円/kWh程度
- Government plan: 20% co-firing by mid-2030s, with increased co-firing rate until early 2040s.
- The cost of 20% co-firing in 2030 is estimated at JPY 20 (15 us cents)/kWh

Asia CCUS Network



Source: “Promotion of overseas CCS” Ministry of Economy Trade and Industry Nov 2, 2022

- 政府はCCS規模は2050年に1.2億～2.4億t/年と想定。政府依頼に基づく試算では海外輸出2.3億～2.8億t/年と推計。
- Gov estimates the scale of CCS in 2050 as 120-240 Mt-CO₂/y. According to the estimates based on gov. requests, 230-280 Mt-CO₂ will be exported.

政府の東南アジアのエネルギー情勢の認識

Government perception of the energy situation in Asia

「電力需要増大分を再エネで賄うといったアプローチは必ずしも現実的ではない」

“The approach of using renewable energy to meet a large part of the increase in electricity demand is not always realistic.”

アジアの実情

- ・再エネ資源が偏在。（※風力は一部を除き乏しく、平地の多くは人口密集地）
- ・島嶼部が多いうえ、大陸も各グリッドのカバレッジが狭い。さらに、グリッド間の連結性も低い。
- ・電力需要の伸びに伴い石炭火力発電量は過去20年間に顕著に上昇。償却中の比較的新しい石炭火力が多い。
- ・パイプラインは限られておりガス供給はLNG中心。
- ・当面、原子力を活用可能な国は限られる。
- ・電力需要は急速に増加中。

⇒ 3Eを満たす単一の電源が存在せず、再エネに加え
こうした事情を反映した多様なアプローチが必須。

- **RE resources are unevenly distributed.** (*Wind power is scarce except in some areas, and much of the flat land is densely populated).
- **The coverage of each grid is limited** on the continent, as well as on many islands. Furthermore, inter-grid connectivity is low.
- Many relatively **new coal-fired power stations's initial investments have not been recouped.**
- **Demand for electricity is increasing rapidly.**

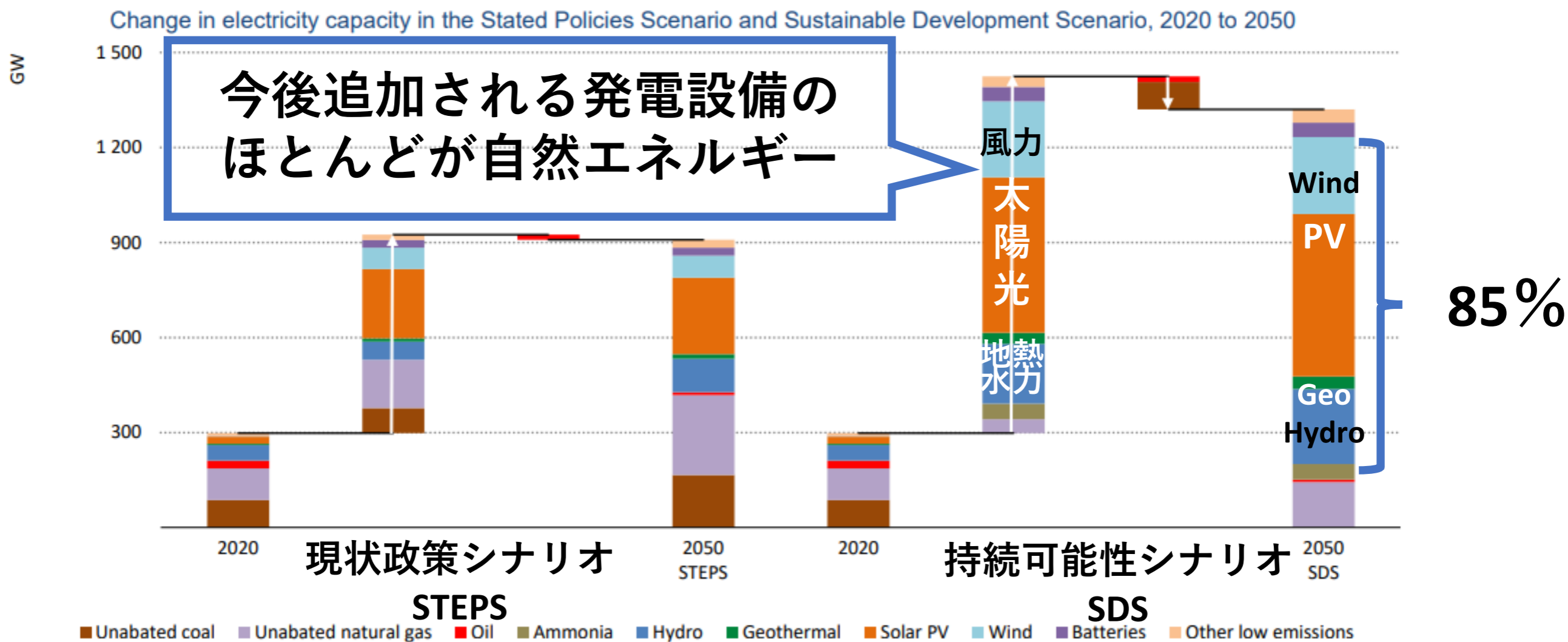
「安定的で質の高い電力供給を確保するため、再エネポテンシャルの低さやグリッドの狭小さを踏まえると、**ゼロエミッション火力、技術が不可欠**」

“Zero-emission thermal power and technologies are essential to ensure a stable, high-quality electricity supply, given the low RE potential and limited grid capacity.”

東南アジアの脱炭素シナリオ (IEA)

Southeast Asia Decarbonization Scenario

Electrical capacity more than triples by 2050, with renewables accounting for the bulk of new capacity in all scenarios, and almost all of the new capacity in the SDS



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Note: "Other low emissions" includes nuclear, CCUS and other forms of renewables.

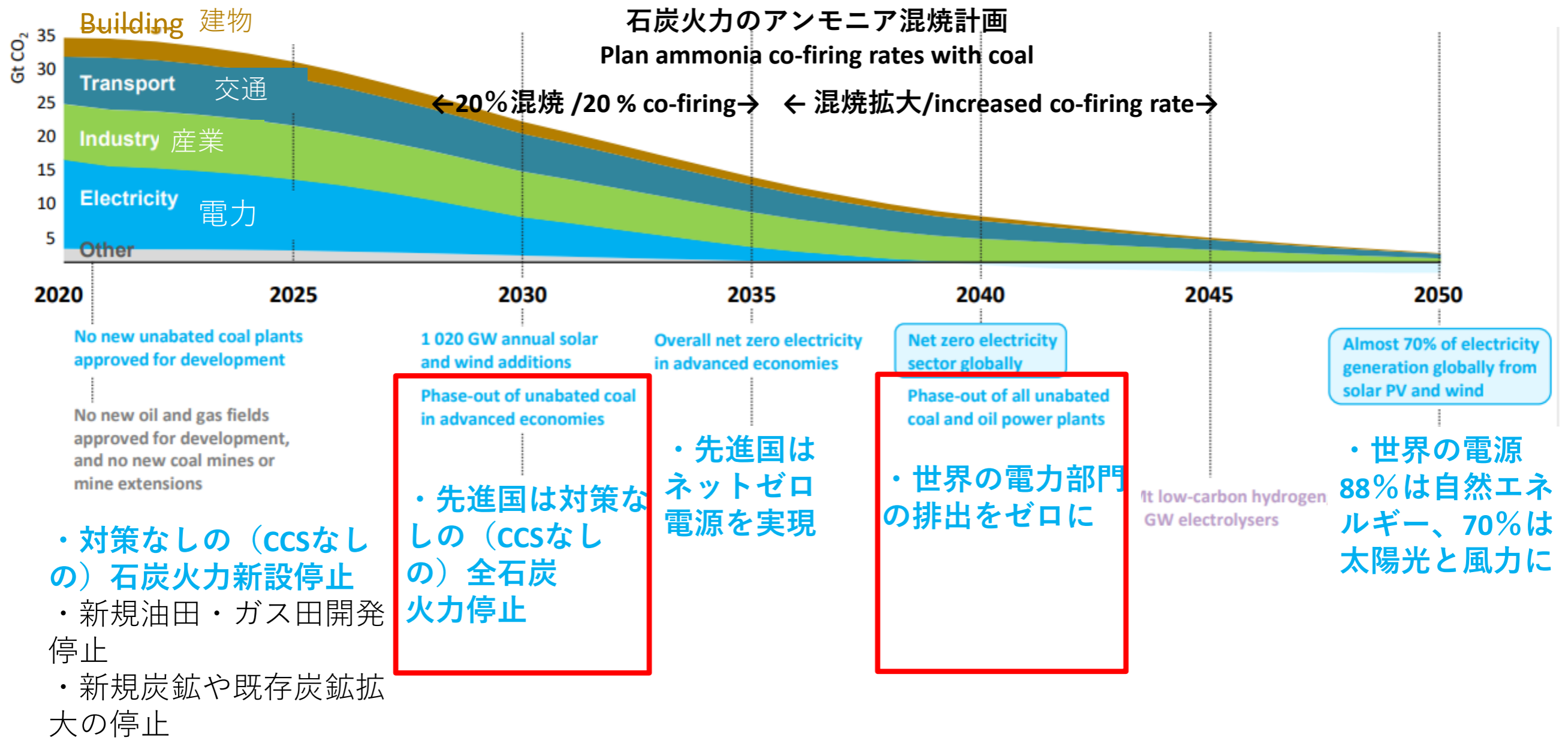
COP26の成果 「1.5°C目標」 シナリオとの整合性

Does ammonia and CCS for the power sector fit with the 1.5°C timeline?

COP26

「1.5°Cまでに気温上昇を抑える努力を決意をもって追求」

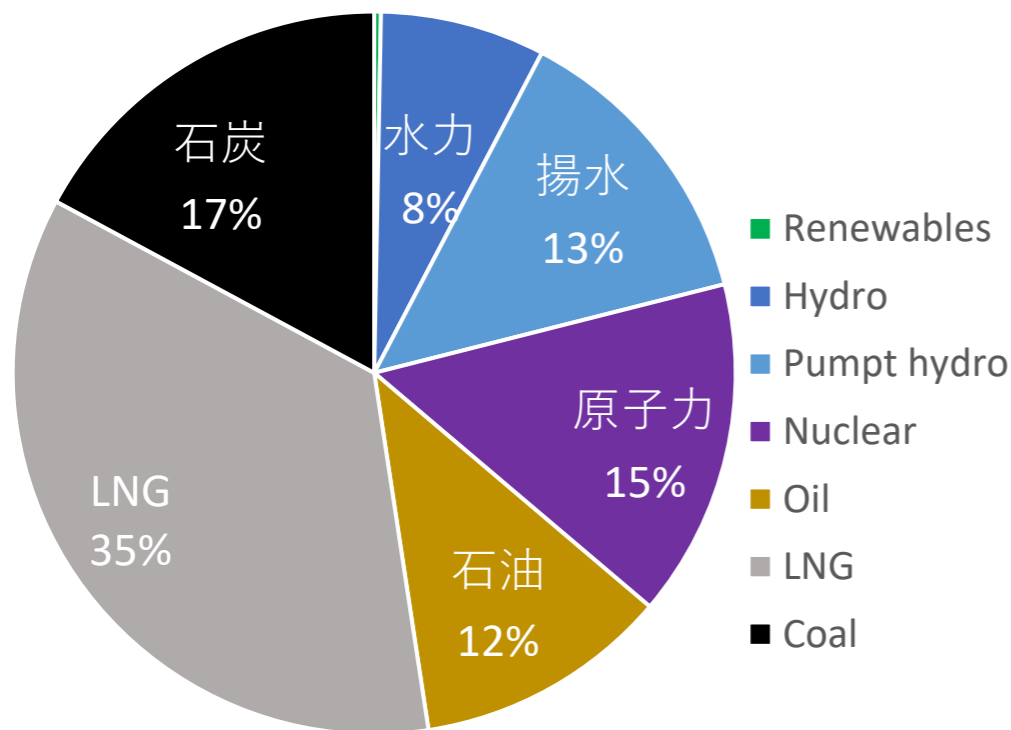
「2050年脱炭素化のため、2030年頃までの排出削減が決定的に重要という認識を共有」



脱炭素でも化石燃料維持：そのままアジアに輸出

Exporting the 'Japan way' of decarbonisation by maintaining fossil fuels

旧一般電気事業者の国内発電設備割合
Incumbents Domestic Installed Capacity
(2021)



Source: METI Total Energy Statistics

次世代石炭火力技術開発状況
Development of next-generation coal-fired generation
by incumbent utilities

	Co-firing			Gasification	
	Ammonia	Biomass	Carbon capture (CCS/CCUS)	Combined Cycle (IGCC)	Gasification with hydrogen
Hokkaido	○		○		
Tohoku	○	●	○	●	
JERA	●	●	○	●	
Hokuriku	○	●	○	○	○
Kansai	○	●	●		
Chugoku	○	●	●	●	●
Shikoku	○	●	○		
Kyushu	○	●	○		
Okinawa	○	●	○		
J-Power	○	●	●	●	●

○ = Research and development (R&D) 研究開発
inc. feasibility investigations

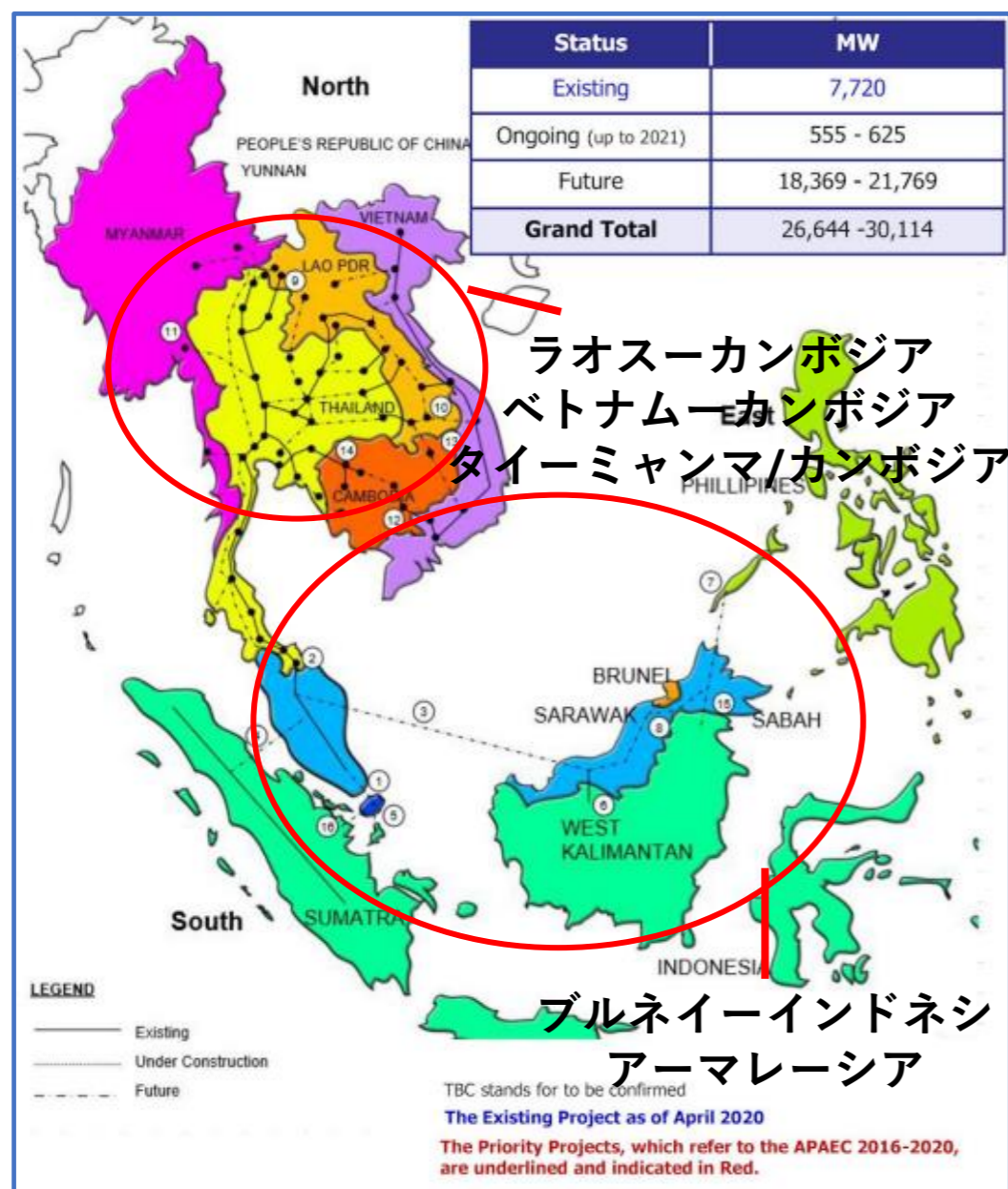
● = Demonstration (field testing) 実証実験

● = Commercialisation (inc. planned) 商用化中

Source: Trencher, Okubo, Mori (2023) unpublished paper

自然エネルギーで安定供給するための国際送電網

The ASEAN power grid



2022年6月：

シンガポールがラオスの自然エネルギーを、タイ、マレーシア経由で購入（PPA）、送電開始

June 2022:

The first 100 MW renewable electricity import by Singapore from the Lao PDR via Thailand and Malaysia marked a milestone in cross-border electricity trade in ASEAN

—— 既存送電網

----- 計画中送電網