SDSN Thailand Public Forum 2026

Thailand Beyond 2030:
Transforming Pathways to Sustainable Development

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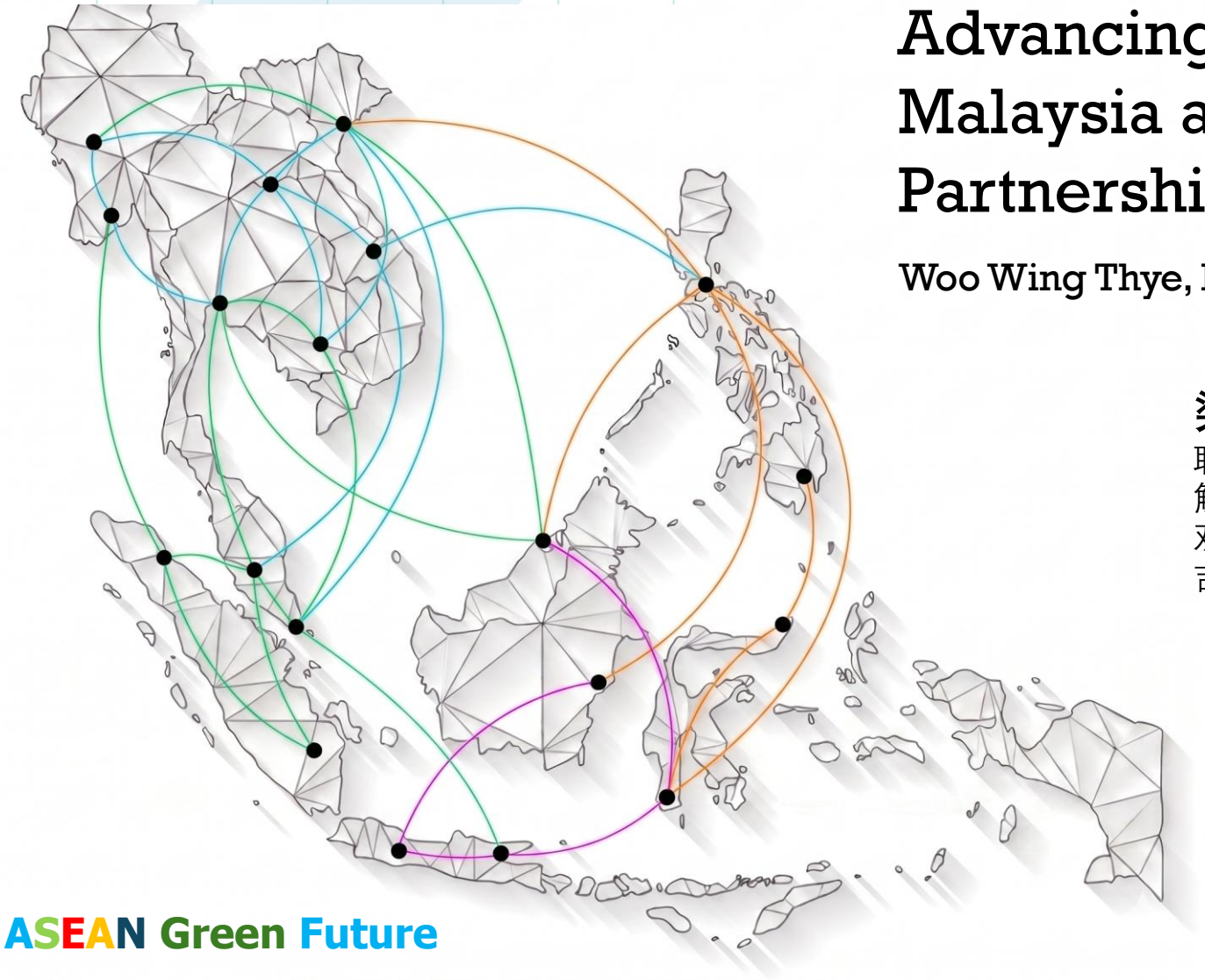

ASEAN Green Future

Advancing a Just Energy Transition in Malaysia and Southeast Asia — Policy, Partnerships and Regional Opportunities

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3 November 2026

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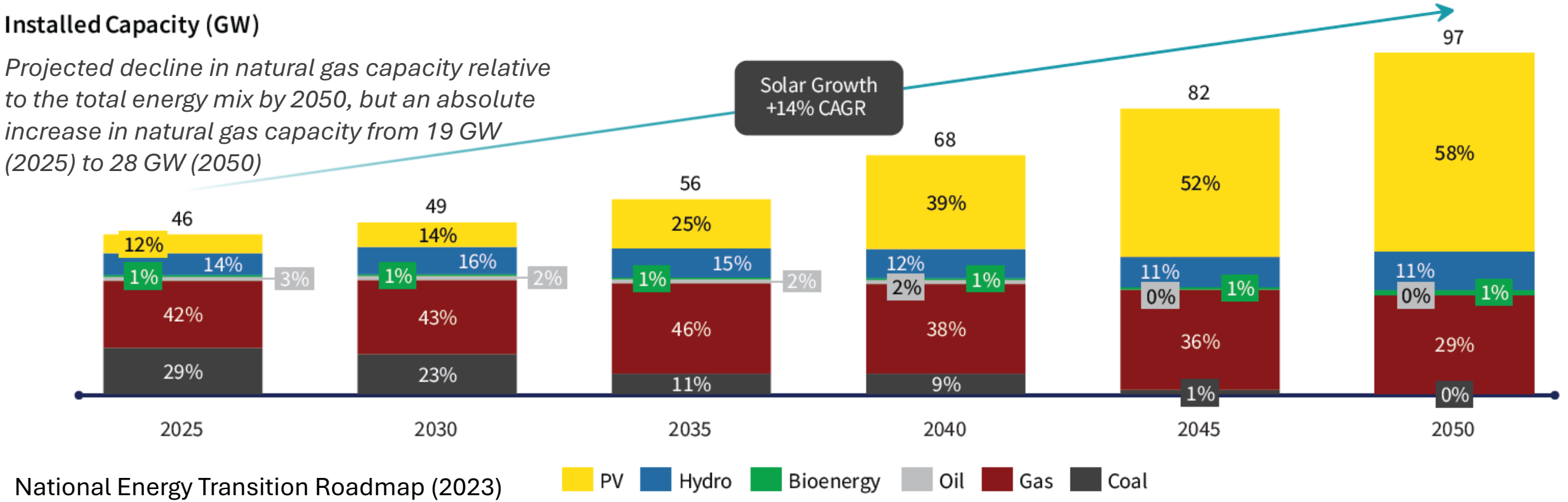
Part 1: Malaysia’s Energy Transition Experience

Quantifying the “False Dam”

- Subsidised Tier 1 gas price: RM35/mmBtu
- Market-linked Tier 2 price: RM46/mmBtu
- RM11 price distortion → an implicit annual subsidy of approximately **RM3.2 billion (USD 805 million)**—a massive fiscal weight holding back market reality.



National Energy Transition Roadmap (2023)

Dualistic Policy Friction

NEW STRAITS TIMES BUSINESS TIMES

Trending : Heard the News? Pakatan Harapan Rafizi Ramli Johor BN Missile Deal Jho Low MACC RON95 subsi

Budget 2026 must sustain fiscal support for natural gas to drive transition and growth

By Bernama October 1, 2025 @ 6:39pm

Malaysia Launches National Carbon Market Policy, Puts Carbon Tax Review On Hold

by Theodora Stankova · April 22, 2026 · 2 minute read

BUSINESS | MALAYSIA 2 min. Read

Malaysia's natural gas industry set for major expansion with new investment roadmap

By Micllavier Pangan | February 16, 2025

Indonesian industry calls for extension of gas subsidy policy

Jakarta Globe - January 9, 2025

Leonard A.L. Cahyoputra, Jakarta – Facing increasing competition from China and India, Indonesian industry leaders are urging the government to extend its natural gas subsidy policy, set to expire on Dec. 31, 2024.

The HGBT program, which was introduced in 2020, offers subsidized gas prices to seven key industrial sectors – including fertilizers, petrochemicals, oleochemicals, steel, ceramics, glass, and rubber gloves – at a rate of $6 per MMBTU. This policy is seen as a crucial measure for maintaining competitiveness in the market.

Part 2: Strengthening Social & Institutional Foundations for a Just Transition

Malaysia’s Trade Exposure to EU CBAM

Table 3. EU Trade Exposure to CBAM-Relevant Categories (2024) (European Commission; Directorate General Trade and Economic Security 2025)

CBAM-Relevant Category	2024 Import Value (million EUR)	Trend (2021–2024)
Iron and steel	€257	High volatility; peaked at €680m in 2022
Non-ferrous metals (incl. aluminium)	€663	Substantial growth from €218m in 2021
Chemicals (potential future CBAM)	€1,884	Resilient; remains a top 5 import category
Total Exposure	**€2,804**	**11% of total industrial imports from Malaysia[6]**

ASEAN Green Future project

Countries	Partner Institutions (Self-funded participation)
Cambodia	Royal University of Phnom Penh Asian Vision Institute
Indonesia	University of Indonesia Institute for Sustainable Earth and Resources United in Diversity PT Bank Mandiri Mandiri Institute
Lao PDR	National University of Laos
Malaysia	SDSN Sunway University
Myanmar	University of Tokyo University of North Carolina WWF Myanmar
Philippines	University of the Philippines
Singapore	National Technological University
Thailand	Thailand Development Research Institute Thammasat University
Vietnam	Vietnam Initiative for Energy Transition University of Economics Ho Chi Minh City SDSN

Technical Platforms

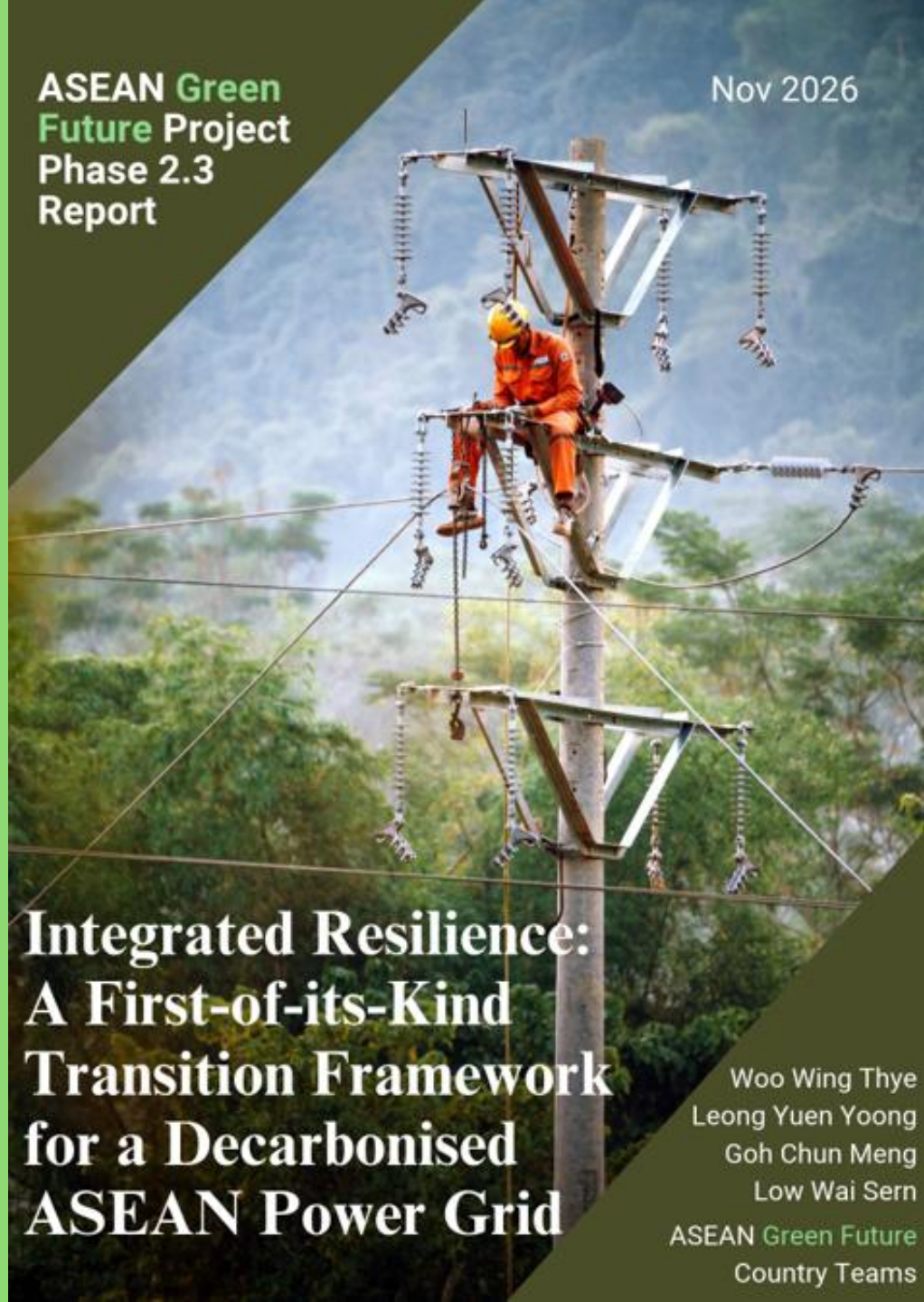
LEAP

nemo



https://www.unsdsn.org/our-work/asean-green-future/

Part 3: Regional Cooperation & Shared Transition Pathways



The APG Modelling Landscape & the Efficiency Dividend

Scenario Design

Scenario	Interconnection	Dispatch Logic	Optimisation Goal
S1	Fixed (2026 transmission capacity)	National isolation	National self-sufficiency
S2	Policy specified (AIMS III +)	Regional cooperation	Policy-guided expansion
S3	Endogenous (optimised)	Regional integration	System-wide technical optimum
S3+	Endogenous (optimised)	Green integration	Near-zero emissions power sector benchmark

Isolation Penalty

S1: With national isolation, countries must maintain massive redundant capacity for local self-sufficiency: **102 GW of coal and 166 GW of natural gas** still operating in 2050.

Scenarios	Total Generation (TWh)	Annual Curtailed Energy Production (TWh)	Energy Curtailment Rate (%)	Peak Curtailed Power (GW)
S1	3,318.77	932.66	28.10 (severe)	291.42
S2	3,572.51	445.30	12.46 (high)	142.67
S3	3,545.85	69.37	1.96 (low)	30.47
S3+	3,615.94	401.27	11.10 (moderate)	60.03

932.81 TWh of discarded clean electricity annually—nearly a trillion kilowatt-hours

Systematic waste of decarbonisation investment

Regional Multiplier Effect: S1 vs. S3 by 2050

Scenarios	Regional Capacity (GW)	Generation (TWh)
S1 (national isolation)	1,452	3,318
S3 (regional technical optimum)	913	3,545

Dividends:

- Regional integration produces MORE energy with 539 GW LESS hardware
- Required storage capacity plummets from 128 GW to 93 GW (27% reduction)

Grid Economics &
the De-escalation of “Prestige” Projects

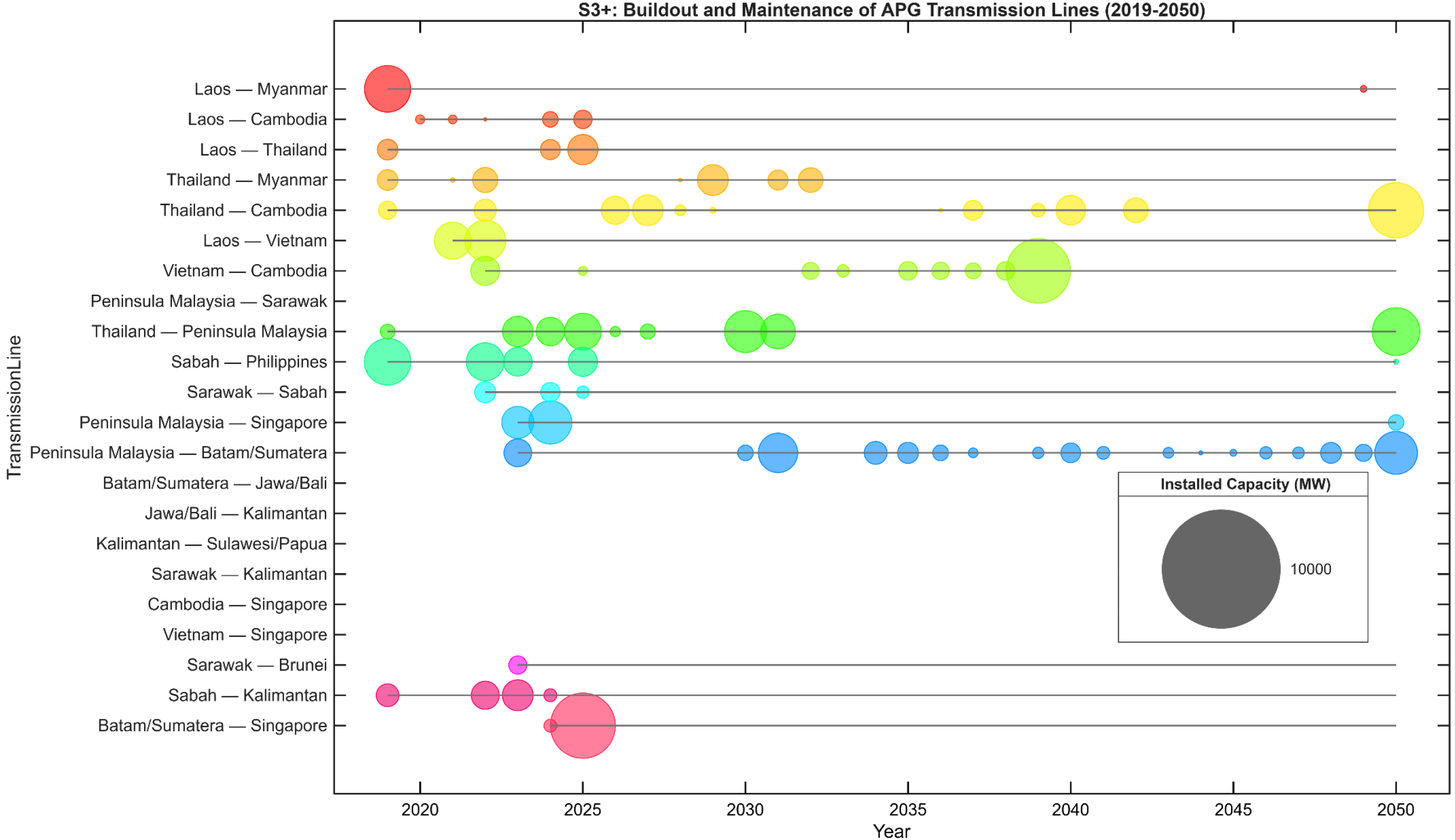
The Subsea Cost Premium

Deep Maritime CAPEX Overhead

Current policy frameworks favor direct subsea HVDC cables crossing the South China Sea to high-demand hubs like Singapore. Our optimization model systematically rejects these routes based on extreme cost realities:

- → **Standard Overland Lines:** Cost-efficient deployment across mainland corridors.
- → **Deep Maritime Corridors:** Impose prohibitive engineering, laying, and maintenance premiums.

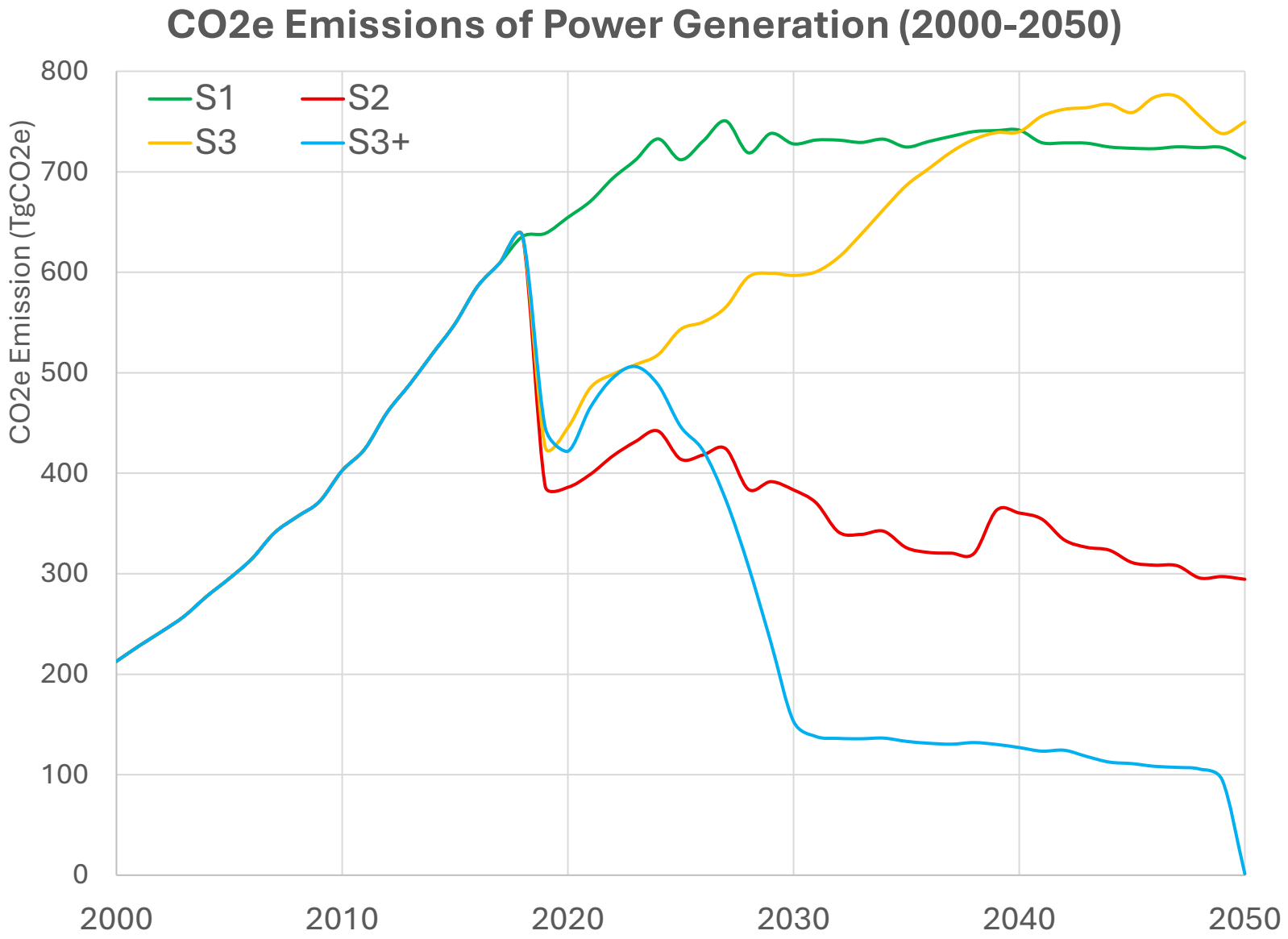



S3+: Buildout and Maintenance of APG Transmission Lines (2019-2050)
TransmissionLine
Laos — Myanmar
Laos — Cambodia
Laos — Thailand
Thailand — Myanmar
Thailand — Cambodia
Laos — Vietnam
Vietnam — Cambodia
Peninsula Malaysia — Sarawak
Thailand — Peninsula Malaysia
Sabah — Philippines
Sarawak — Sabah
Peninsula Malaysia — Singapore
Peninsula Malaysia — Batam/Sumatera
Batam/Sumatera — Jawa/Bali
Jawa/Bali — Kalimantan
Kalimantan — Sulawesi/Papua
Sarawak — Kalimantan
Cambodia — Singapore
Vietnam — Singapore
Sarawak — Brunei
Sabah — Kalimantan
Batam/Sumatera — Singapore
2020
2025
2030
2035
2040
2045
2050
Year
Installed Capacity (MW)
10000

Maintaining rigid political borders and inflexible bilateral supply contracts forces the region into a **“sovereignty trap”** that leaves 50% of the grid's economic and environmental benefits on the table.

Scenario	Curtailment Rate	Grid Characteristics	System Meaning
S1	28.10% (severe)	Limited APG sharing	Massive clean energy waste due to isolation
S2	12.46% (high)	Policy guided APG sharing	Policy roadmap captures half the potential value of integration
S3	1.96% (low)	14 GW APG + natural gas	Pure economic efficiency; gas cushions the grid, so minimal green energy is wasted
S3+	11.10% (moderate)	37 GW APG + hydropower + geothermal + nuclear	The price of near-zero emissions.

Interconnection ≠ Automatic Greening



Macroeconomic Evaluation of Regional Power System Pathways

Scenarios	Total Annual Production Cost of Electricity (2050) (billion USD)	Regional Generation (2050) (TWh)	Unit Production Cost of Electricity (2050) (USD cent/kWh)	Carbon Intensity (2050) (gCO2e/kWh)	Cumulative Investment Cost (2026-2050) (trillion USD)	Cumulative Emissions (2026-2050) (PgCO2e)
S1 (baseline)	5,252.91	3,318.77	158.28	214.99	11.01	18.25
S2 (sub-sea heavy)	1,197.10	3,572.51	33.51	82.42	10.98	8.56
S3 (least cost)	247.09	3,545.85	6.97	211.36	0.99	17.34
S3+ (near zero emissions)	252.50	3,615.94	6.98	0.38	2.18	3.83

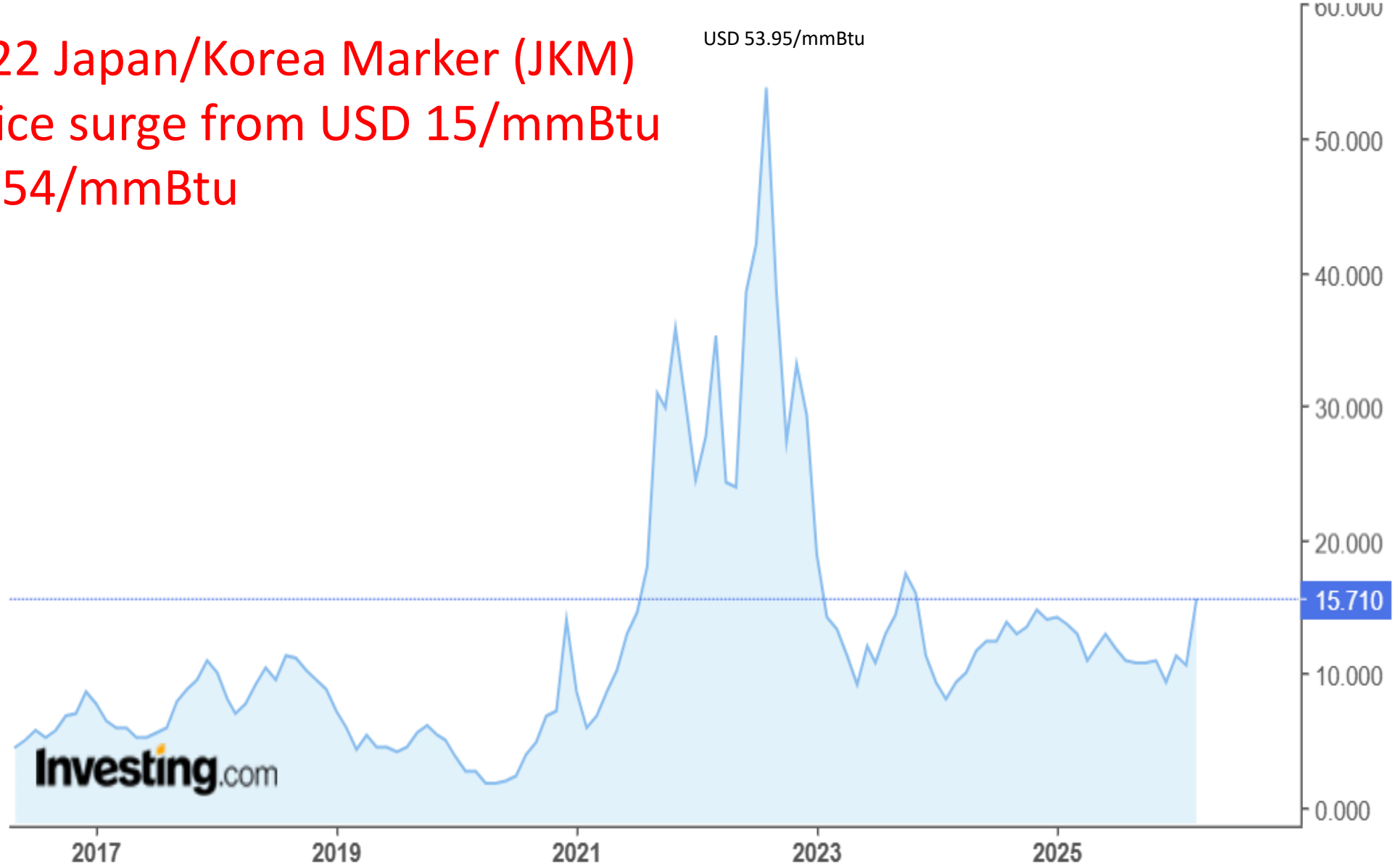
Note: Monetary values are anchored in Real 2019 USD

Deep Dive—The Malaysian “Shock Plus” Stress Test

Methodology of the Localised Shock

Scenario Group	Scenario	Key Parameters & Constraints
Optimised Existing Policy (OEP)	OEP-Reference	**National Energy Transition Roadmap (NETR)** (2023): generation capacity, electric/hydrogen vehicle penetration, and public transport share targets
	OEP-Shock Plus	OEP-Reference + **Compounded Shock** (3x gas price + 50% supply constraint in 2026, 2035, and 2050)
Optimised More Ambitious Policy (OMAP)	OMAP-Pragmatic	**Carbon tax trajectory:** USD 11/tCO2e (2026) to USD 250/tCO2e (2050) No fossil fuel moratorium
	OMAP-Pragmatic Shock Plus	OMAP-Pragmatic + **Compounded Shock** (3x gas price + 50% supply constraint) in 2026, 2035, and 2050
	OMAP-Fast	**Accelerated carbon tax:** USD 50/tCO2e (2026) to USD 250/tCO2e (2050) No fossil fuel moratorium
	OMAP-Fast Shock Plus	OMAP-Fast + **Compounded Shock** (3x gas price + 50% supply constraint) in 2026, 2035, and 2050

The 2022 Japan/Korea Marker (JKM) spot price surge from USD 15/mmBtu to USD 54/mmBtu



Vulnerability vs. Sovereign Immunity

Optimised Existing Policy Scenario (OEP)

- 2050: 93% surge in the unit production cost of electricity and 45 TWh of unserved load (roughly 10% of national demand)

More Ambitious Policy Scenario (OMAP)

- 2050: 0% cost delta and 0 TWh of unserved load

Table 8: Stress Test Analysis – Quantifying the 'Shock Absorption' Capacity and Operational Resilience of the OMAP Architecture against Global Gas Supply Disruption

Scenarios	Total Production Cost of Electricity (Real billion USD)			Generation (TWh)			Unit Production Cost of Electricity, (Real USD cents/kWh)			Cost of Unserved Load (Real billion USD)			Unserved Load (TWh)		
	2026	2035	2050	2026	2035	2050	2026	2035	2050	2026	2035	2050	2026	2035	2050
OEP															
Reference	15.51	21.99	33.92	228.27	308.24	440.8	6.79	7.13	7.70	0	0	0	0	0	0
NGP + SC shocks	21.89	36.32	58.64	228.23	297.44	394.74	9.59	12.21	14.86	0.44	19.61	81	0.24	10.89	**45**
% increase (shock delta)							**41**	**71**	**93**						
OMAP															
Pragmatic	16.02	29.63	37.79	227.69	301.98	430.9	7.04	9.81	8.77	0	0	0	0	0	0
NGP + SC shocks	23.31	38.61	38.4	225.66	249.98	434.94	10.33	15.45	8.83	4.15	90.04	0	2.3	50.02	**0**
% increase (shock delta)							**47**	**57**	**1**						
OMAP															
Fast	18.89	30.68	37.79	227.63	301.29	430.28	8.30	10.18	8.78	0	0	0	0	0	0
NGP + SC shocks	27.18	40.6	38.15	225.74	281.44	433.69	12.04	14.43	8.80	3.88	36.09	0	2.15	20.05	**0**
% increase (shock delta)							**45**	**42**	**0**						

ASEAN GREEN FUTURE

Designing Decarbonisation Pathways for Industrial Competitiveness, Resilience, and Inclusive Growth

Regional Non-Profit Policy Research Initiative

40+	20+	5+	20+
Experts	PhDs	Years	Pubs

Collaborators across

ASEAN CN JP US

VISION

Protect the peace, safety, and wellbeing (平安幸福) of the elders and kin (鄉親父老) of our shared homeland

CORE PURPOSE

- Partnering with ASEAN governments, regional bodies, and industry to design evidence-based decarbonisation strategies that align technological innovation with economic growth and energy security
- Grounding technical decarbonisation in the lived realities, cultural heritage, and self-determination of Southeast Asia's communities

WHAT WE DO

Policy Advice & Transition Frameworks
Evidence-based techno-economic modelling for regional roadmaps

Capacity Building & Leadership
Tailored training programmes for civil servants and regulators across ASEAN

Thought Leadership & Governance
Combining modern systems thinking with ancient wisdom principles for sustainable development

HOW WE WORK

Impact-Driven
Focus on implementable policy solutions and market mechanisms

Research-Grounded
Quantitative modelling, techno-economic analysis & policy research

Globally-Informed & Regionally Rooted
Translating global best practices into actionable ASEAN-specific solutions

Engineering & Economics Integrated
Bridging technological feasibility with real-world financial and regulatory architectures

Climateworks Centre · Sustainable Development Solutions Network · Sunway University · Jeffrey Cheah Foundation

- Malaysia Country Team for RE-CONNECT (EU Horizon 2020)
- Roster member of ETP/UNOPS
- University Partner of JC3

ASEAN GREEN FUTURE

A Trusted Partner in Regional Energy Integration & Sustainability

KEY PILLARS OF IMPACT

Flagship Report
Integrated Resilience: A First-of-its-Kind Transition Framework for a Decarbonised ASEAN Power Grid

National Pathways
Comprehensive Country Reports for ASEAN Member States

Executive Action
AGF Policy Briefs providing actionable briefs for senior decision-makers



CAPACITY BUILDING

Regional Convening
ASEAN Workshop on Sustainable Development

Regional Training
ASEAN Resilient Grid Capacity Building Programme

National Outlooks
Assessing Malaysia's Energy Future executive workshops

Future Systems
ASEAN Integrated Energy and Digital Future

THOUGHT LEADERSHIP

- ASEAN Power Grid Tree of Life
- Da Yu (大禹) Renewable Energy Tree of Life
- Energy Policy Building on Asian Spiritual Resources
- 以「无」御「有」：中国全球能源外交的软实力转型
- From Harm Reduction to Active Stewardship: Resolving Market Asymmetries and Policy Dissonance in the Forest Bioeconomy



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