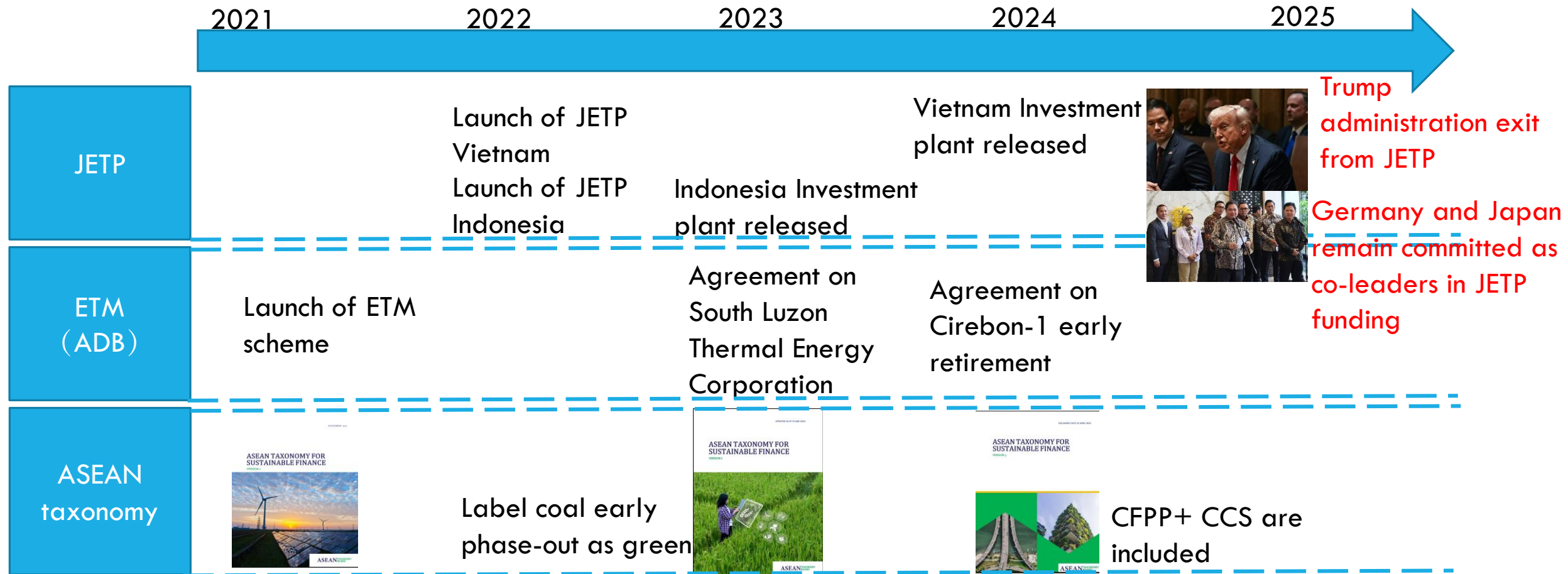


A PLANT LEVEL PHASE-OUT/DOWN STRATEGY OF COAL-FIRED POWER PLANTS(CFPP) IN ASEAN COUNTRIES

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MILESTONE OF COAL-FIRED POWER PLANTS (CFPP) PHASE-OUT/DOWN IN ASEAN



EXPLORE THE STRATEGY OF COAL-FIRED POWER PLANT PHASE-OUT/DOWN STRATEGY

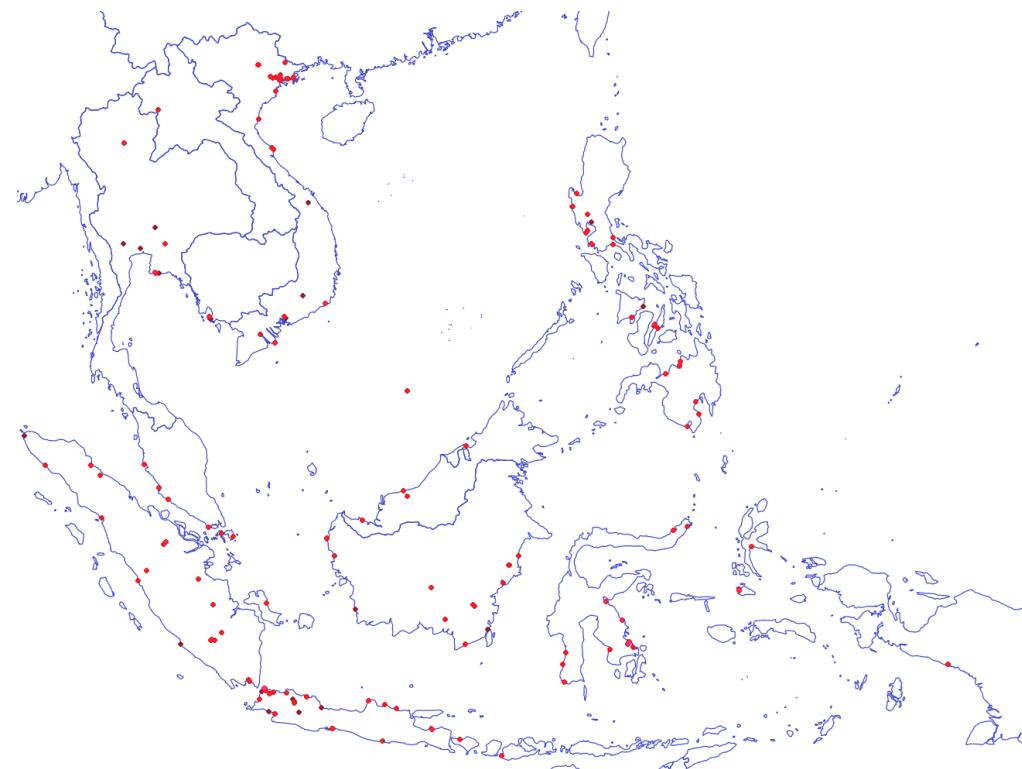
- Reduce the emission from coal use in electricity sector require both freezing the existing pipeline unabated-CFPP construction as well as early phase out/down the operating CFPP
- The plant-level strategy should combine the insights of IAMs as well as socio-political reality in each country

Status of CFPP in ASEAN countries

Status Country	Freeze the construction pipeline				Phase out / down(This work)
	Announced	Constructing	Permitted	Pre-permitted	Operating
Brunei	0	0	0	0	4
Cambodia	0	5	2	0	7
Indonesia	6	56	6	44	221
Laos	7	0	2	0	3
Malaysia	0	0	0	0	25
Myanmar	-	-	-	-	Missing data
Philippines	0	4	4	6	56
Thailand	0	0	0	1	20
Vietnam	5	11	8	32	70
SUM	18	76	22	83	406

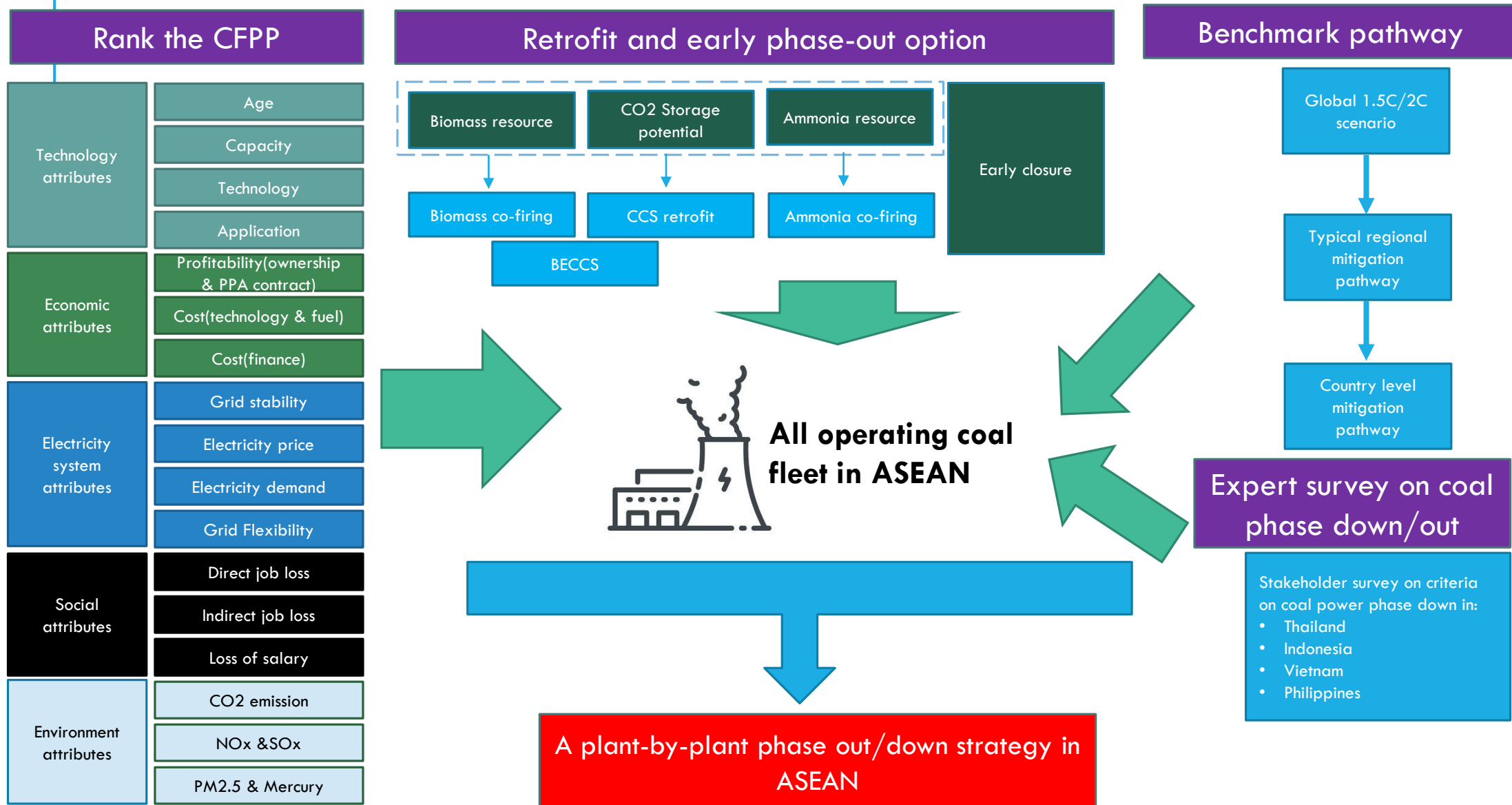
Source: Compiled with Global Coal Plant Tracker

Distribution of operating coal power plants



Source: Author

COMBINE THE INSIGHTS OF IAM MODELING WITH RANK THE CFPP CAN CONTRIBUTE THE PLANT-BY-PLANT PHASE OUT/DOWN STRATEGY



BENCHMARK PATHWAYS-REGIONAL LEVEL AND COUNTRY LEVEL

- In this work, we use regional mitigation pathway and country-level pathway as benchmark for CPO/CPD

Trade off between ambitious and feasibility

More credible to global climate target



More feasible for policy making

Typical regional mitigation pathway

AIM model results for country level

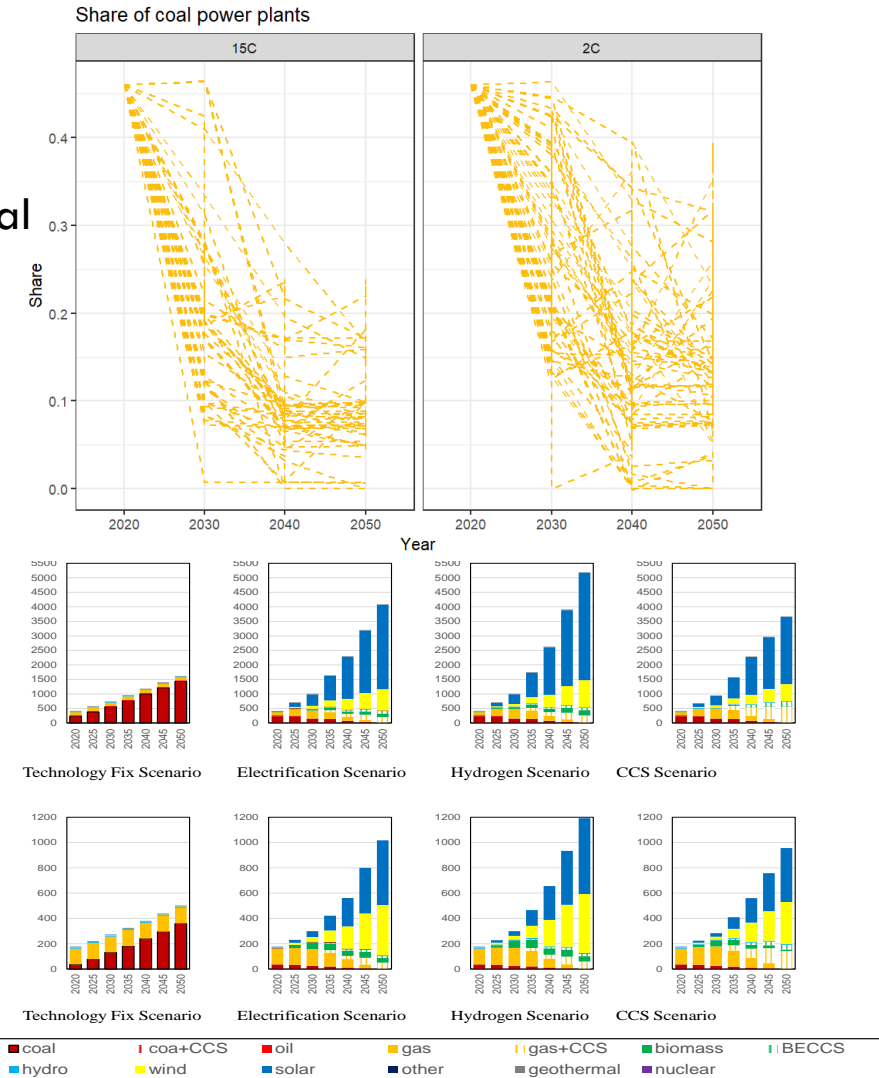
Rapid coal reduction before 2030

More gradual coal reduction before 2030

Share of coal power generation

Indonesia power mix

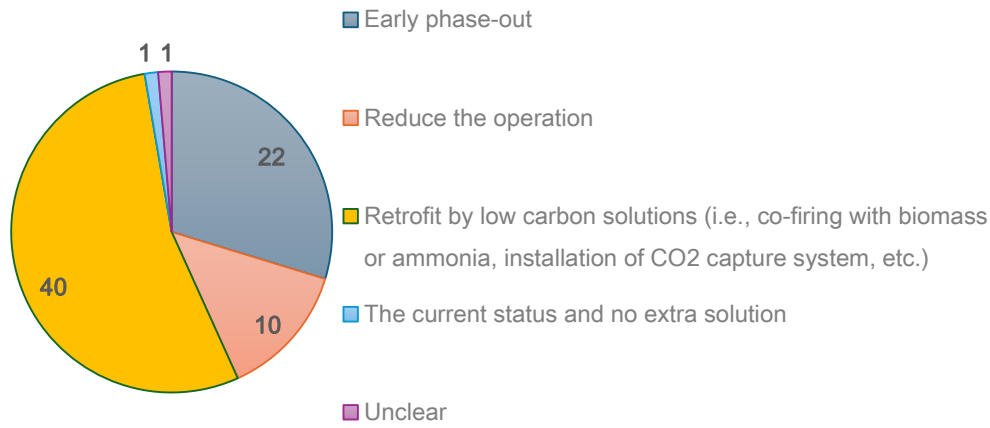
Thailand power mix



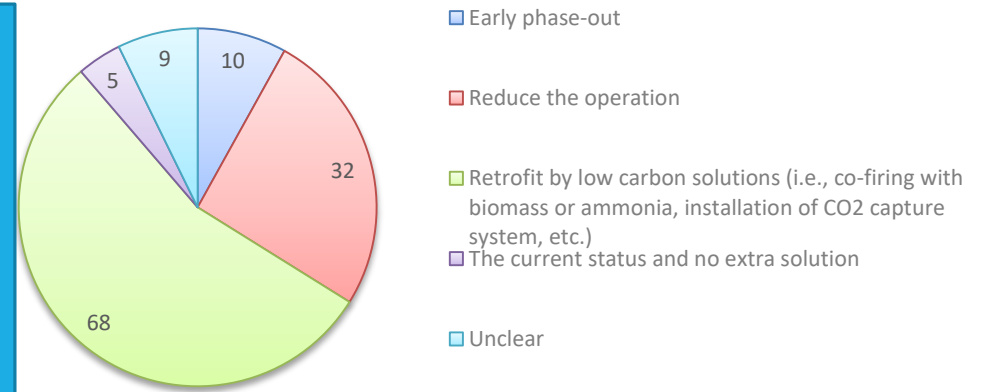
STAKEHOLDER SURVEY(GOV& NON-GOV) ON CPD AND CPO

- Most respondents(40%-60%) support **CPD and reduce operation**(5%-33%), while CPO support rate is around 5%-20%

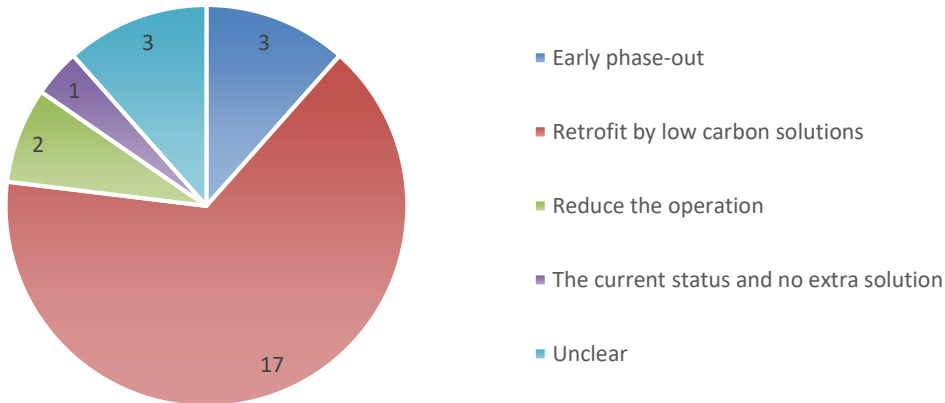
Indonesia



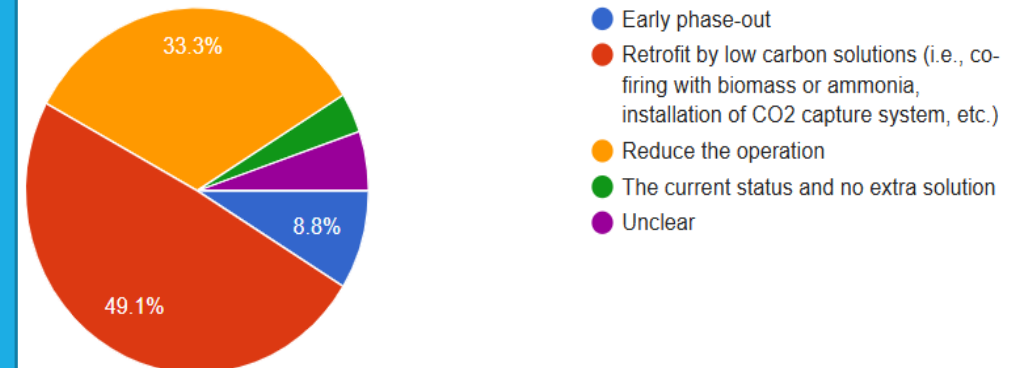
Philippines



Vietnam



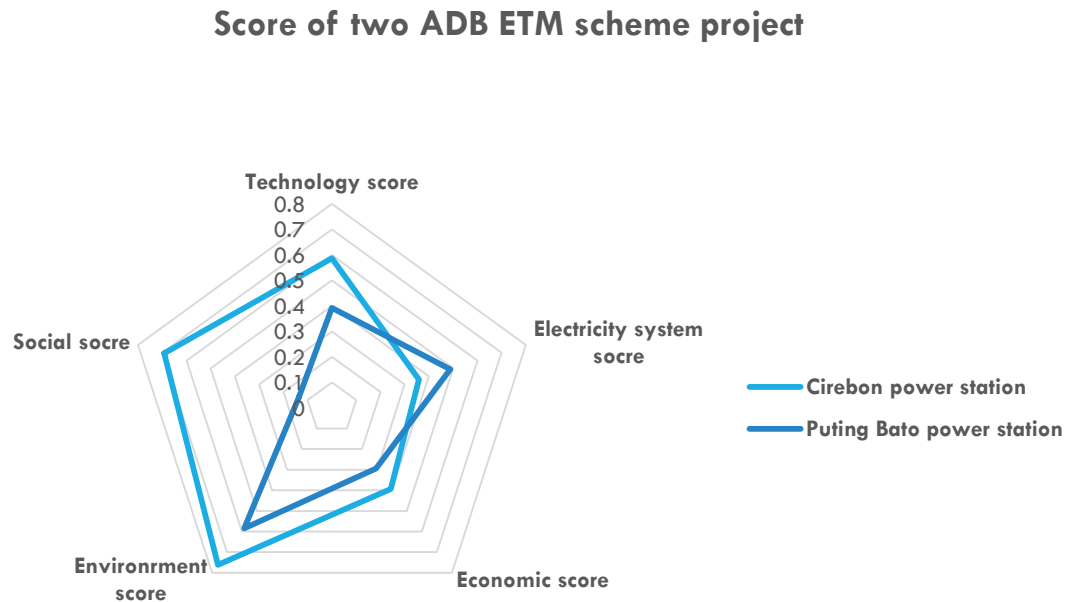
Thailand



RANKING PRIORITIZED OPERATING CFPP

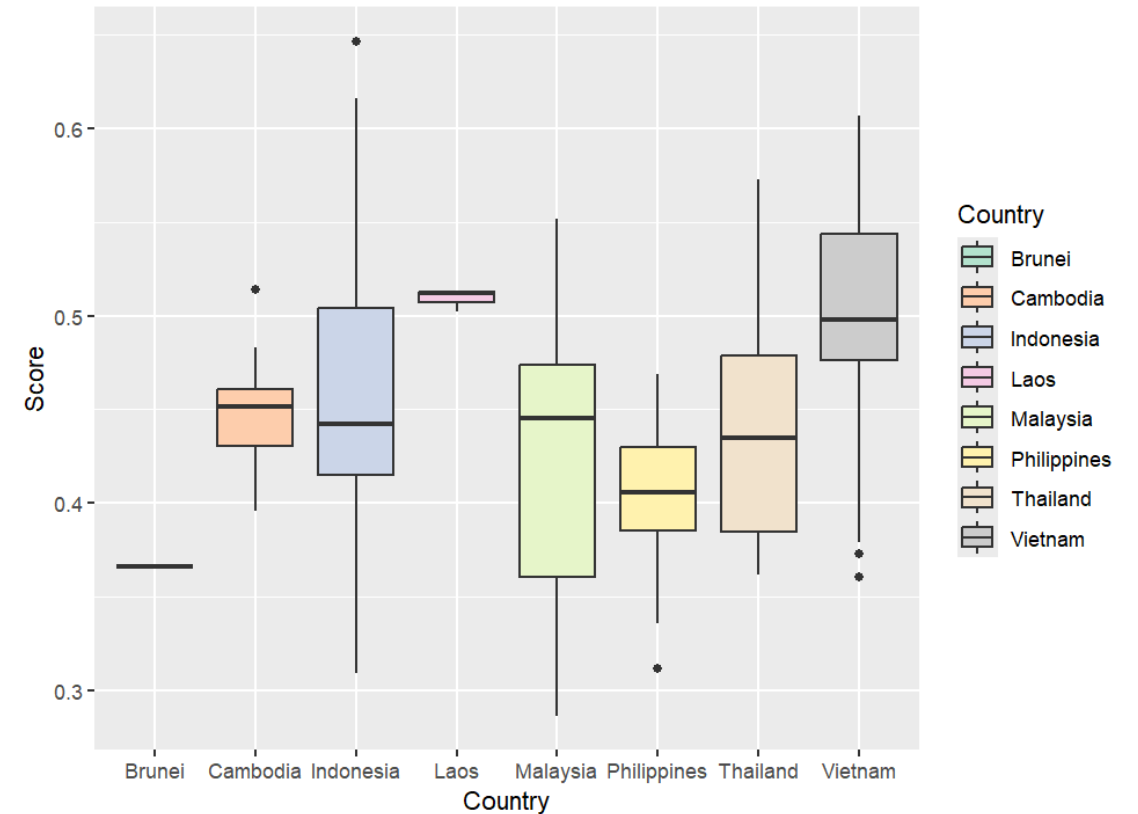
- Each CFPP is evaluated by five different dimensions
- Electricity systems are evaluated at country level, other scores are calculated at plant level

Estimated score of two ETM projects in Indonesia and Philippines



Source: Author

Distribution of normalized overall score by country

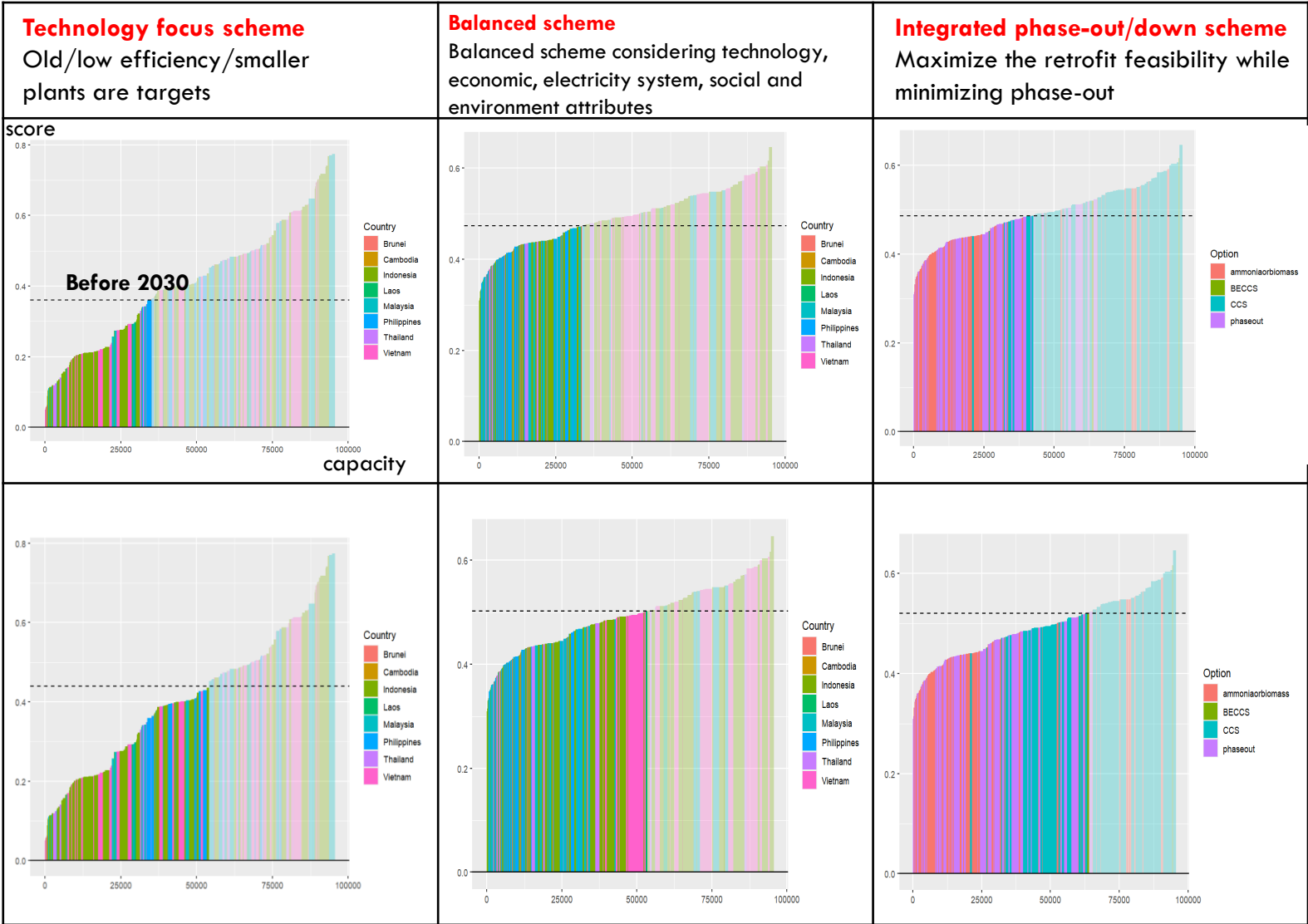


Source: Author

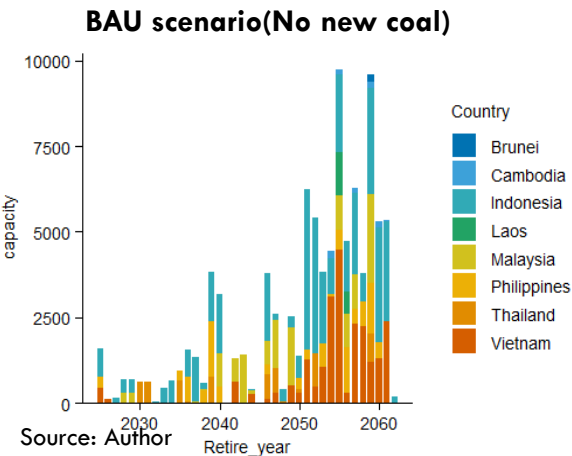
SCENARIO OF PLANT LEVEL PHASE-OUT/DOWN(REGIONAL MITIGATION PATHWAY)

- We identified 30GW-40GW CFPP as low hanging fruits of early phase-out/phase-down before 2030.
- Country level scenario coupled with NDC policy can reduce the analysis gap between ambition and feasibility

2C



1.5C

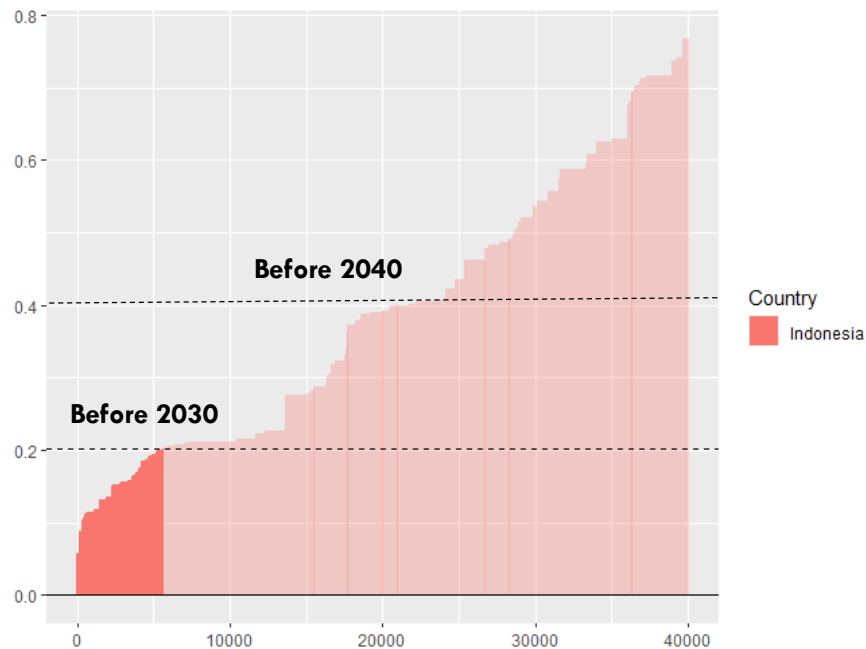


Source: Author

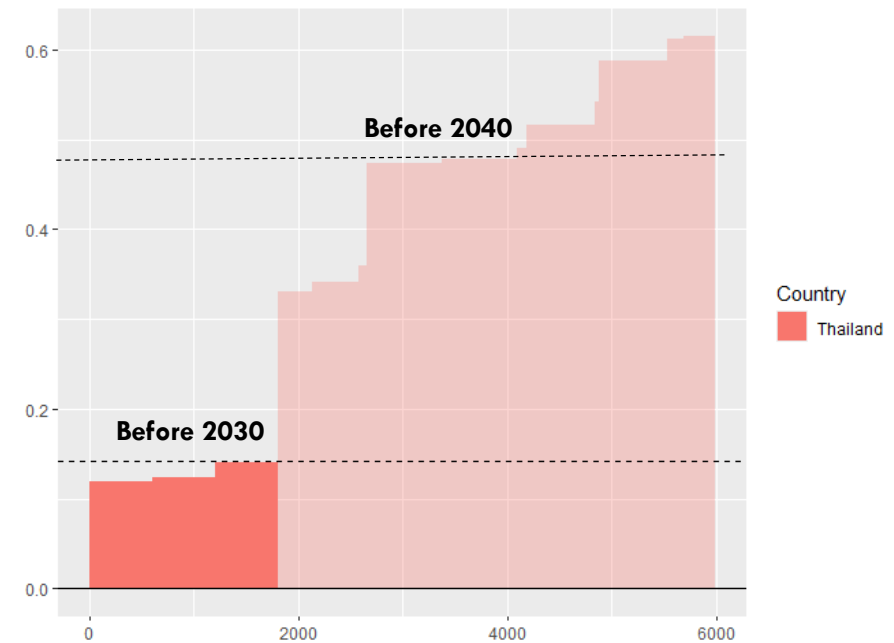
SCENARIO OF PLANT LEVEL PHASE-OUT/DOWN(COUNTRY-LEVEL MITIGATION PATHWAY)

- Coal phase-out scheme of Indonesia and Thailand following the net-zero scenarios by 2050 estimated by AIM-end-use model
- We do not include CPO options as they are not yet included in AIM models or expensive according to the model settings

Indonesia coal phase-out scheme (Balanced approach)



Thailand coal phase-out scheme (Balanced approach)



CONCLUSIONS AND IMPLICATIONS

- Rapid CFPP phase-out and phase-down in the power system is necessary for most 2° C and 1.5° C scenarios. Proper design of the phase-out and phase-down scheme can keep climate target on track
- The survey imply that governments and stakeholders prefer phase-down scenario rather than phase-out scheme
- Global scenarios can produce aggressive coal phase-out pathway, while the country-level scenarios highlight the importance of less aggressive and more feasible phase-out considering the growing electricity demand
- Combining coal phaseout and phasedown strategies can accelerate the reduction of emissions from existing coal power plants while contributing to grid and social stability. However, the technology lock-in and uncertainties of plant retrofitting might pose risks to these strategies. Technology sharing from other countries i.e., Japan and China, can accelerate the power system decarbonization in ASEAN countries
- Efficient allocation of climate finance, i.e., blended finance and public finance, will be required to tackle the risk of stranded assets. How to mobilize large-scale finance with an acceptable level of financial cost is a key to accelerating the coal phase-out and phase-down at the necessary speed and scale to achieve the regional climate target
- Current design of JETP and ETM scheme do not mobilize enough climate finance for phase-out and not include phase-down scheme

Thank you for supporting the project!
Looking forward to future collaborations!

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