Power Sector Implementation of a Country Coal-to-Clean Transition

BRIEF FOR IMPLEMENTERS

Charting a path to a clean, prosperous, and reliable power system in Southeast Asia

APRIL 2023

Authors, Contributors and Acknowledgements

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About RMI

RMI is an independent nonprofit founded in 1982 that transforms global energy systems through market-driven solutions to align with a 1.5°C future and secure a clean, prosperous, zero-carbon future for all. We work in the world's most critical geographies and engage businesses, policymakers, communities, and NGOs to identify and scale energy system interventions that will cut greenhouse gas emissions at least 50 percent by 2030. RMI has offices in Basalt and Boulder, Colorado; New York City; Oakland, California; Washington, D.C.; and Beijing.

Thank you to Edo Mahendra, from KEMENKO-MARVES, for his inputs.
RMI would like to thank Bloomberg Philanthropies for their support of this work.

Objectives and Key Audiences

This brief highlights key questions relevant to implementing the coal-to-clean transition in the power sector.

By indicating which questions are well-understood and which are less understood, it identifies where knowledge sharing will help drive the transition and where further exploration and new insights are needed.

Finally, the brief lays out how these various questions interconnect and shares an integrated roadmap to address them collectively.

AUDIENCES

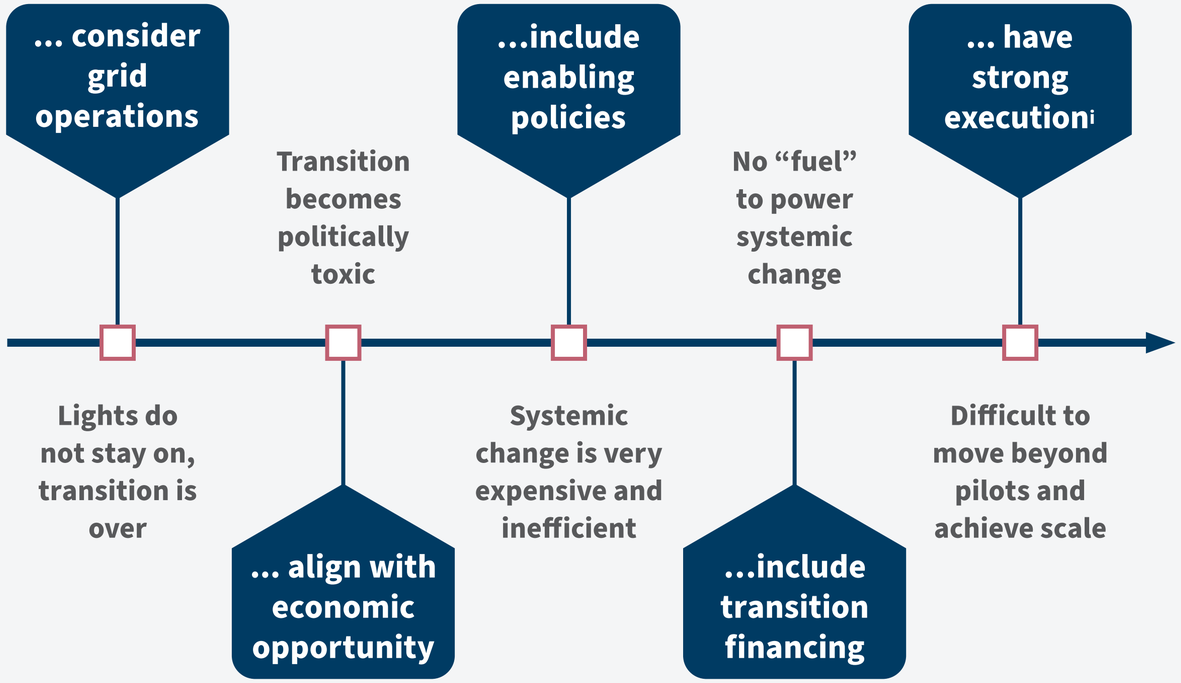
- **Implementation-focused and regulatory bodies** — identify how levers (e.g., policy, financing, community input), additional resources (e.g., analysis, research), and stakeholder engagement can ensure answers to identified questions are developed, adapted, and implemented at scale to advance the transition.
- **Utilities** — identify areas for sharing best practices with other utilities and regulators, and areas for further resourcing to best position the utility to engage on the transition.
- **Local CSOs (technical and non-technical)** — share existing tools and solutions relevant to the identified solutions, develop new areas of work for questions that need answering, and advocate for better, more comprehensive, and inclusive processes.

Table of Contents

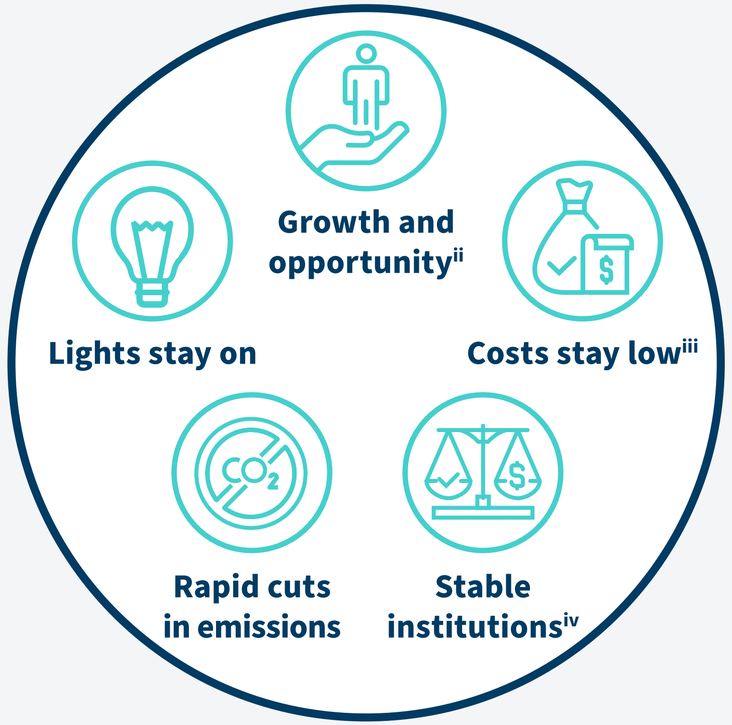
Executive Summary

Building off momentum for a coal-to-clean transition, countries are now pivoting to designing and implementing it. A multi-faceted approach is needed – one that integrates **grid operations**, alignment with **economic opportunity**, enabling **policies**, transition **financing**, and strong **execution**.

IF TRANSITION DOES NOT ...

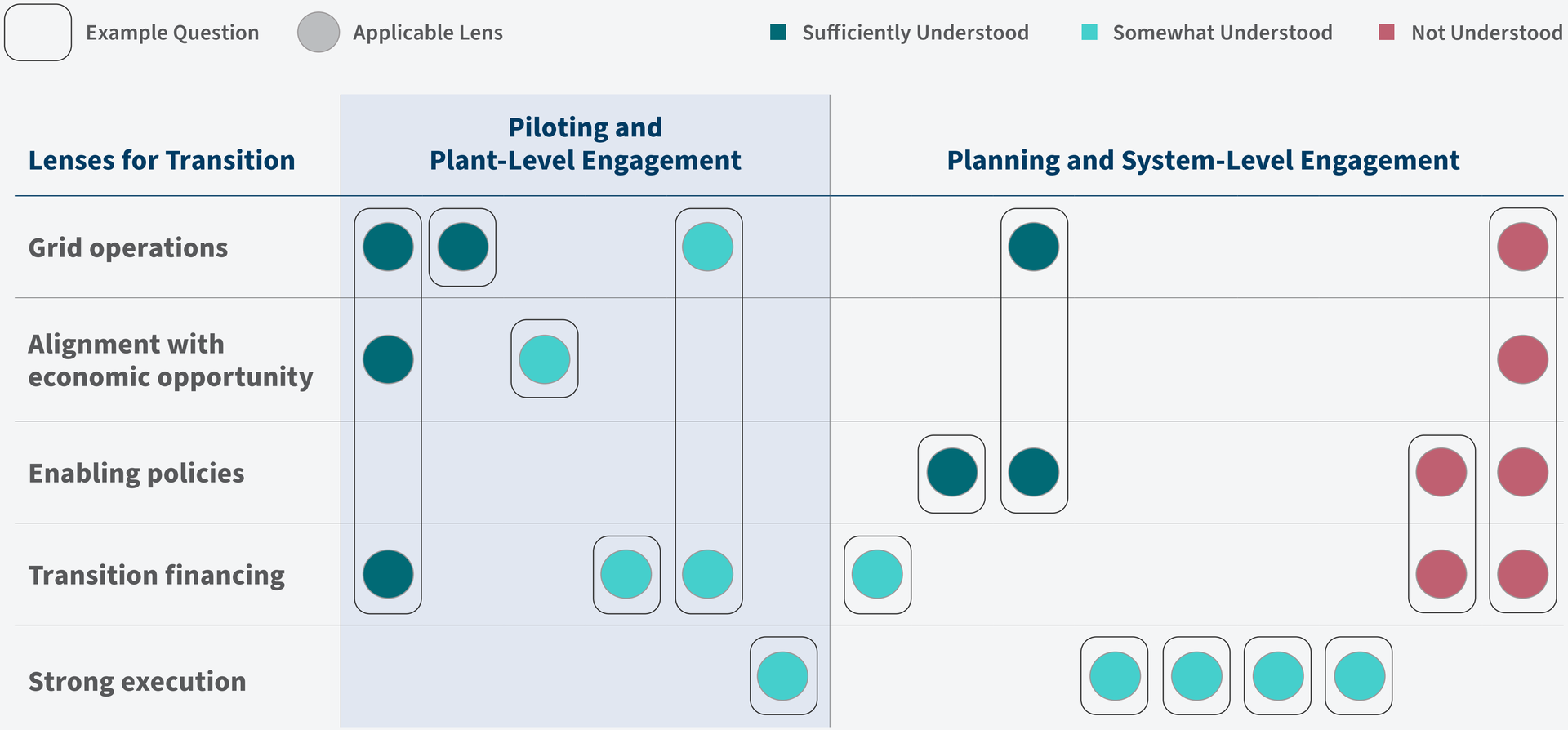


WHERE WE NEED TO BE



i Strong execution includes sufficient institutional capacity and know-how, and clear governance structures. **ii** Support for people affected by the transition, and economic growth opportunities. **iii** Costs for customers and taxpayers stay low. **iv** Key companies and sovereigns are financially stable.

Such an approach raises a set of **key questions** that need to be answered **along the road to implementation**, some that are **better understood** than others.



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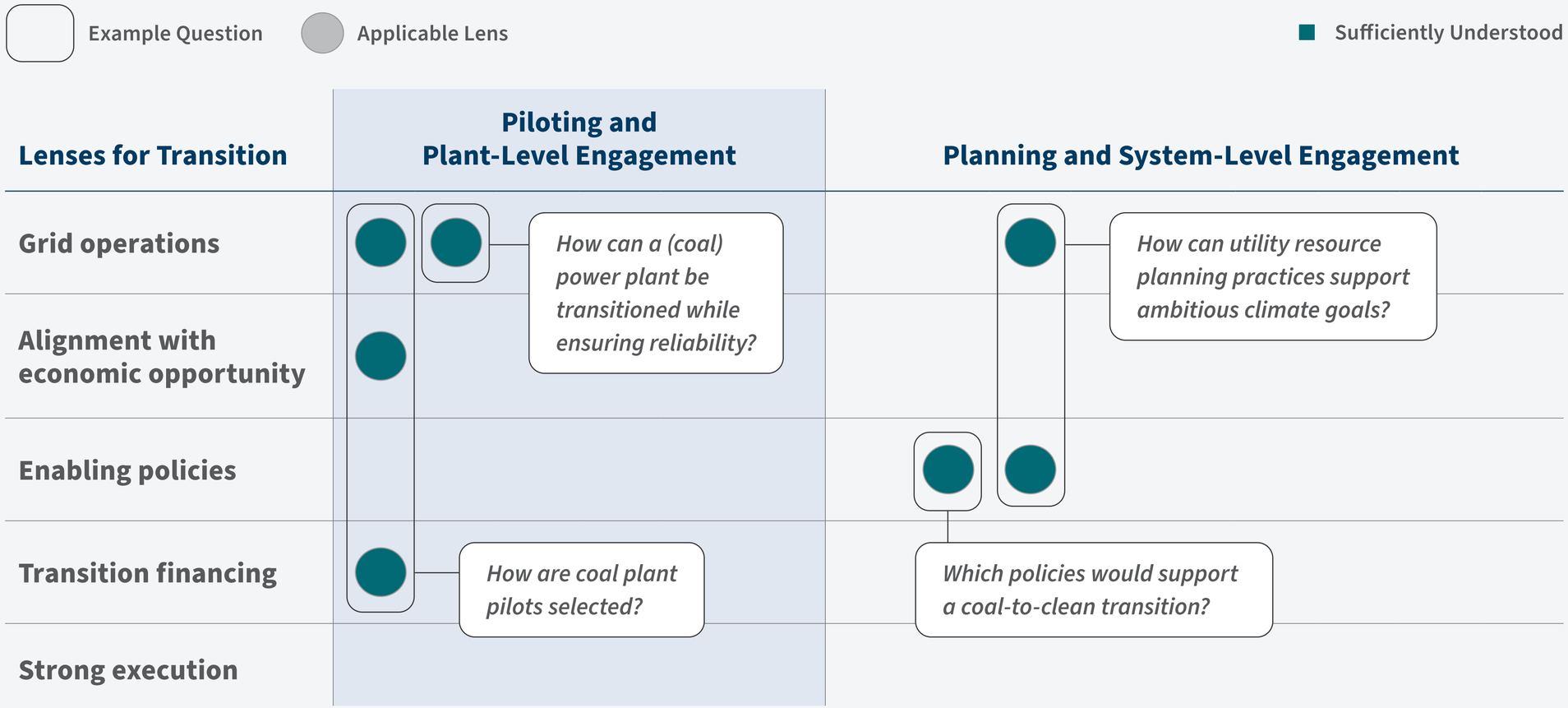

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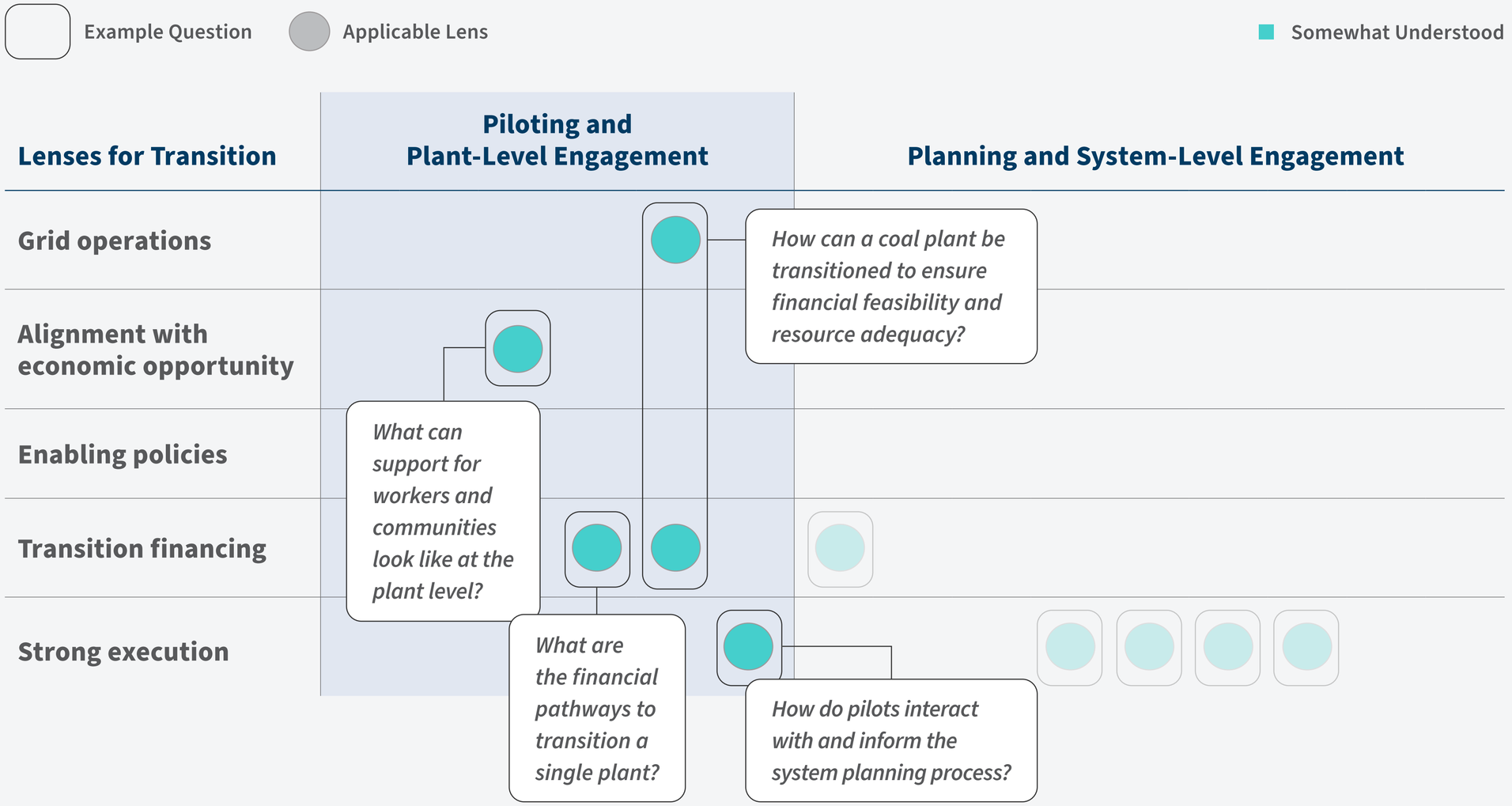

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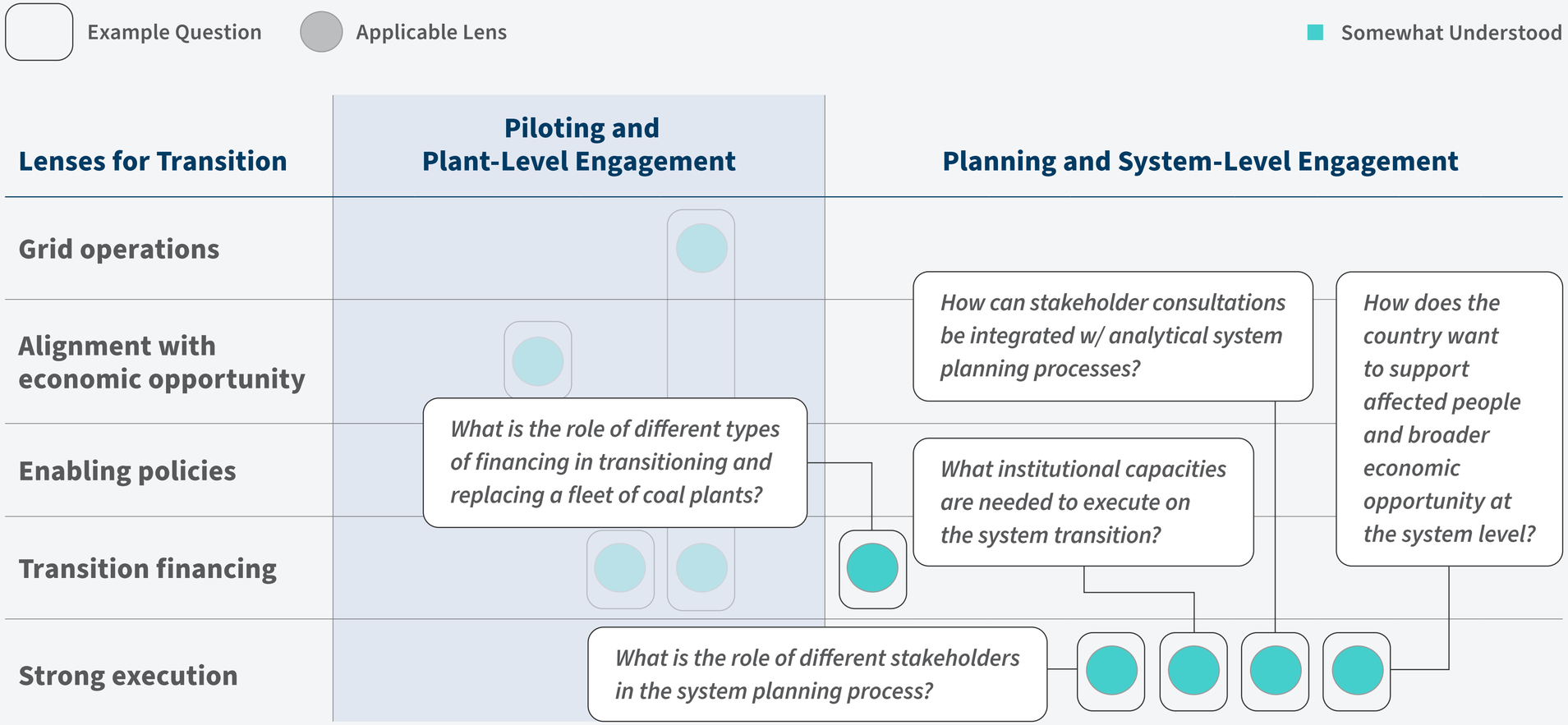

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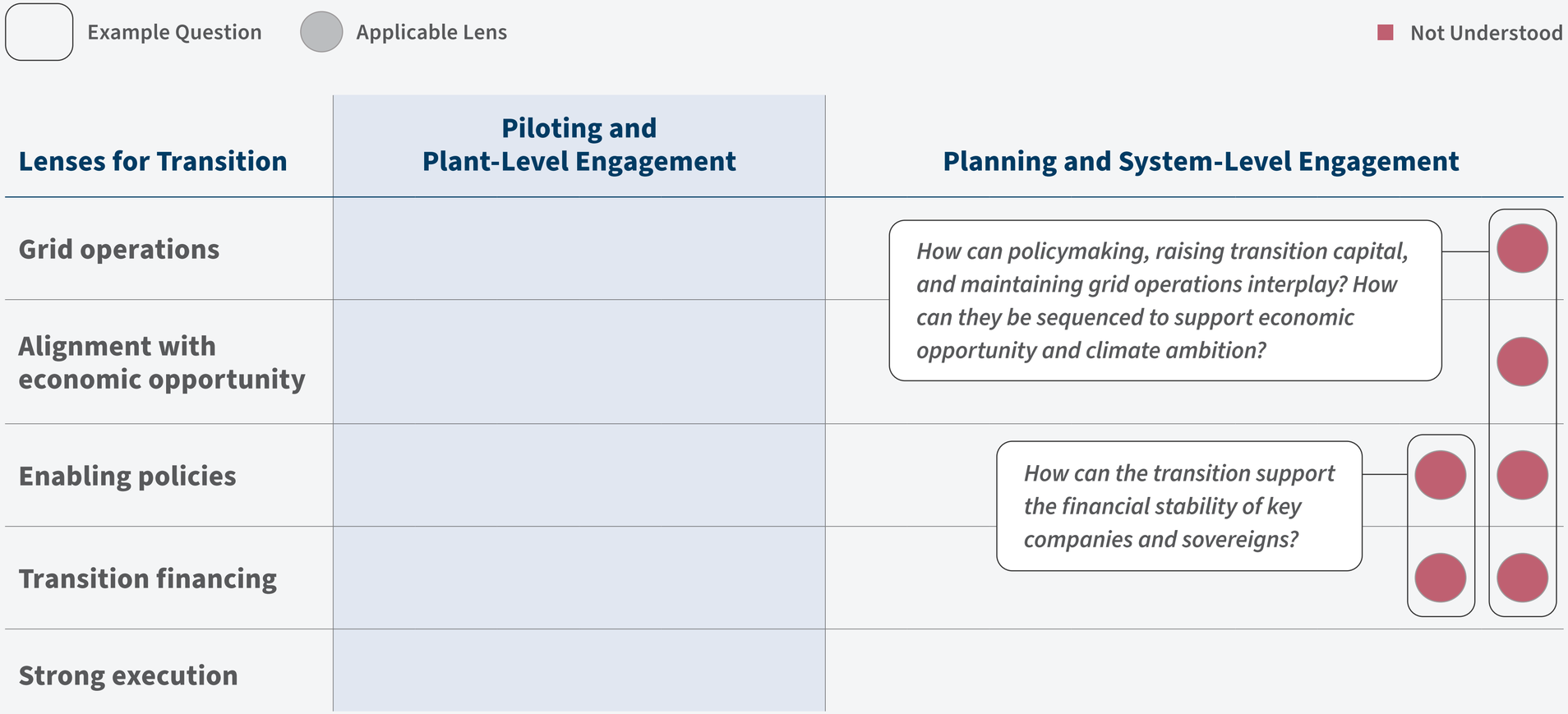
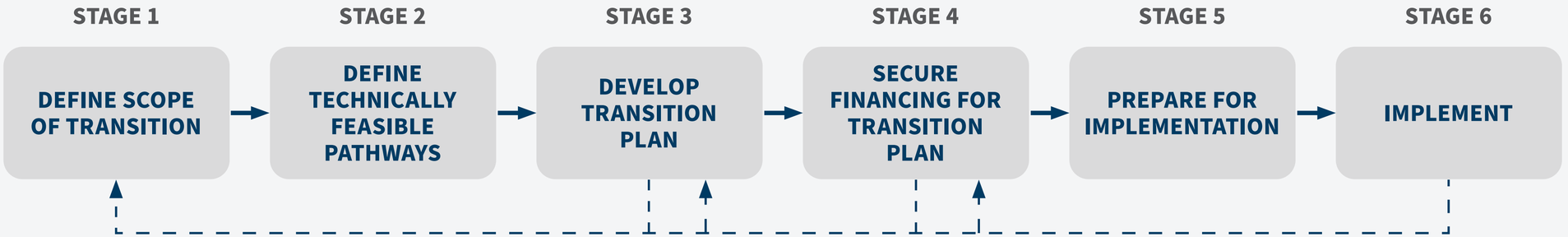


As an example, RMI shares a **high-level process** for how **pilots** can interact with and inform the **investment planning process** ...

SYSTEM PLANNING



PLANT LEVEL

“EARLY WIN” COAL TRANSITION PILOT

Pilot projects to kick-start stakeholder interest, generate early learnings, and build trust and momentum in the broader transition effort.

“NEW FRONTIER” COAL TRANSITION PROJECT

Pilot projects that explore new frontiers of the country’s coal-to-clean transition (e.g., pathways to repurposing coal plants) and begin answering unanswered questions.

… and how **policymaking**, raising **transition capital**, and maintaining **grid operations** can be **co-considered** and sequenced to develop an **effective transition** and investment plan.

Leverage capacity expansion and production cost modeling to identify subset of technically feasible scenarios that are low cost and have reasonable financing needs.

Solicit input from relevant stakeholders and communities to eliminate any scenarios that are unrealistic or burdensome to disadvantaged people.

Identify policies (including regulations) to be introduced, modified, or removed. Layer policy options onto scenarios to further narrow down technically feasible options.

For narrowed subset of scenarios, define activities that would need financial support (e.g., coal emissions reductions, clean infrastructure, support, and remediation).

Leverage portfolio financial modeling to identify financial mechanisms for coal and clean generation that support capital mobilization and low costs and impacts.

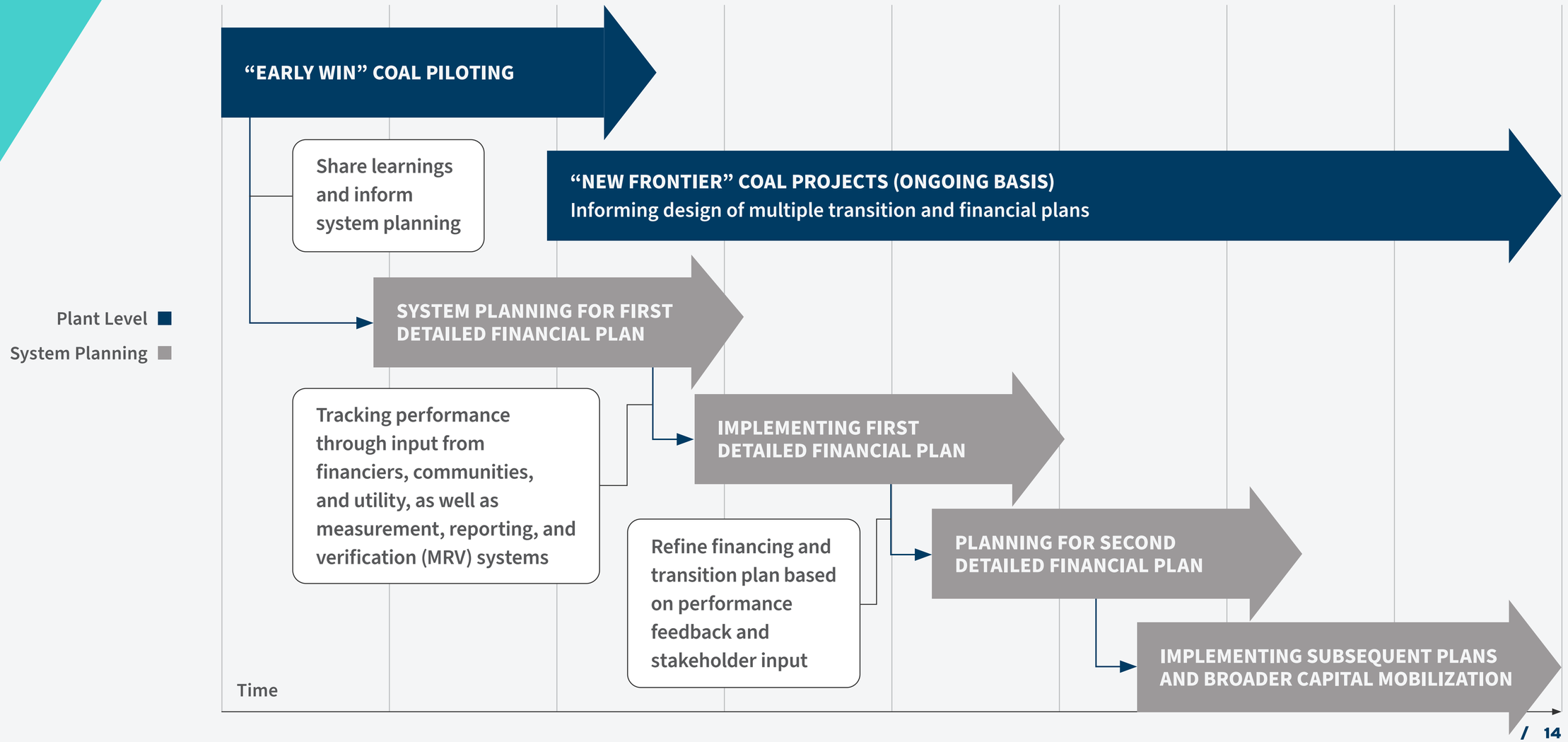
Leverage outputs from techno-economic modeling to estimate financing needs for clean infrastructure.

Consult affected workers and communities, as well as experts, to define financing needs for support, remediation, and pre-closure planning.

INITIAL TRANSITION PLAN

Develop financial plan

This plan needs to then be carefully designed, iterated, and implemented – incorporating learnings from pilots and input from stakeholders and monitoring systems, and building the bridge to broader capital mobilization.

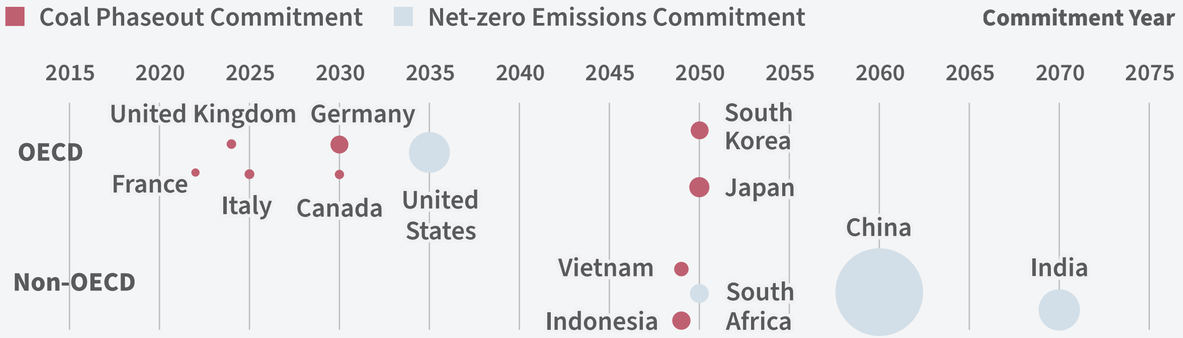


Introduction

The past few years have seen significant momentum for the global coal-to-clean transition with several emissions, coal phaseout, and financing commitments. However, there are structural barriers to implementing the transition, and it needs careful planning and consideration.

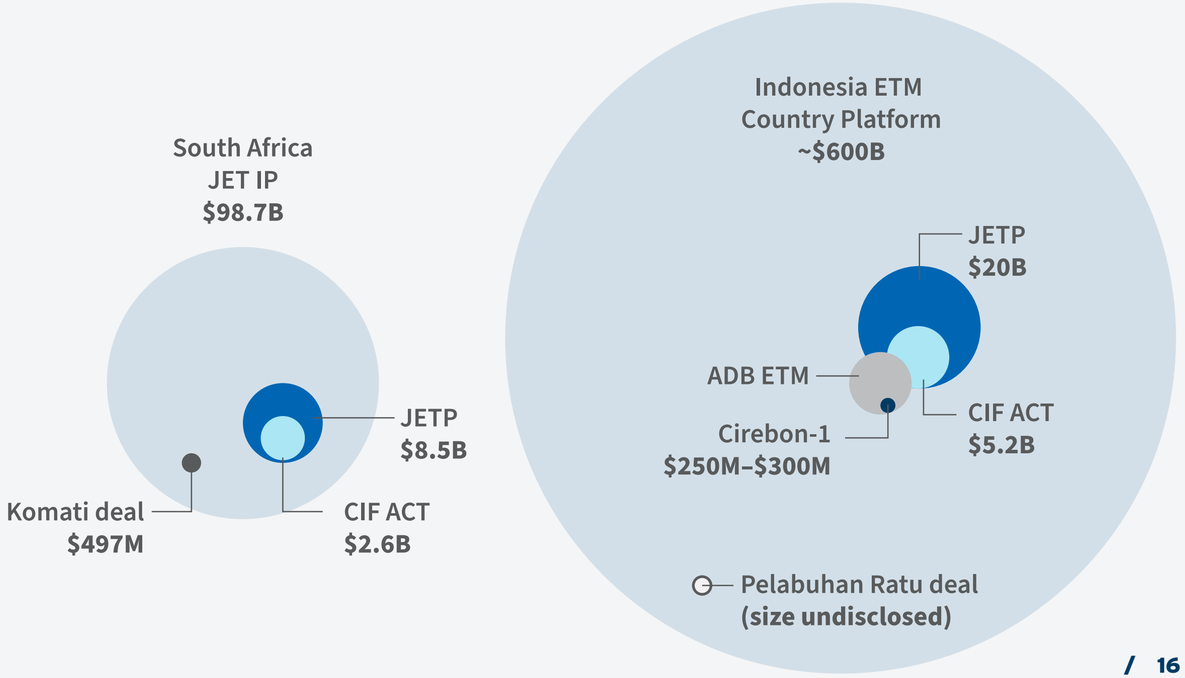
Many utilities and regulators face the challenge of ensuring **sufficient power supply** for **rapidly growing economies** as they manage **heavy indebtedness, wavering grid reliability,** and **insufficient capacity** for implementation.

Countries (>1GW) with Coal Phaseout Commitments



NOTE: According to the IEA's Net Zero Emissions by 2050 Scenario, advanced economies would need to phase out unabated coal by 2030 and the rest of the world by 2040 to limit average global temperature rise to 1.5°C compared to pre-industrial levels.

Relationship Between Coal Transition Programs in South Africa and Indonesia



A successful coal-to-clean transition must not only facilitate rapid **emissions cuts** and keep the **lights on**, but it also must **support economic opportunity**, ensure **affordability**, and support the **financial stability** of key institutions.

Lights stay on

Ensures short- and long-term grid reliability and resource adequacy for all customers.

Growth and opportunity

Includes support for people affected by the transition (e.g., workers, communities, local governments) in the short and long run, as well as broader economic growth and diversification.

Costs stay low

Costs for electricity (and associated services) are low for customers and taxpayers.

Rapid cuts in emissions

Carbon dioxide emissions decline rapidly as the economy grows and electrifies.

Stable institutions

Key companies (e.g., utilities) and sovereigns are financially stable through and at the end of the transition.

Successful implementation of the transition requires an integrated approach that considers grid operations, aligns with economic opportunity, and includes enabling policies, transition financing, and strong execution. While all are valued, ensuring the lights stay on and the transition is politically viable are crucial.

IF TRANSITION DOES NOT ...

... consider grid operations

Lights do not stay on, transition is over

Transition becomes politically toxic

... align with economic opportunity

...include enabling policies

Systemic change is very expensive and inefficient

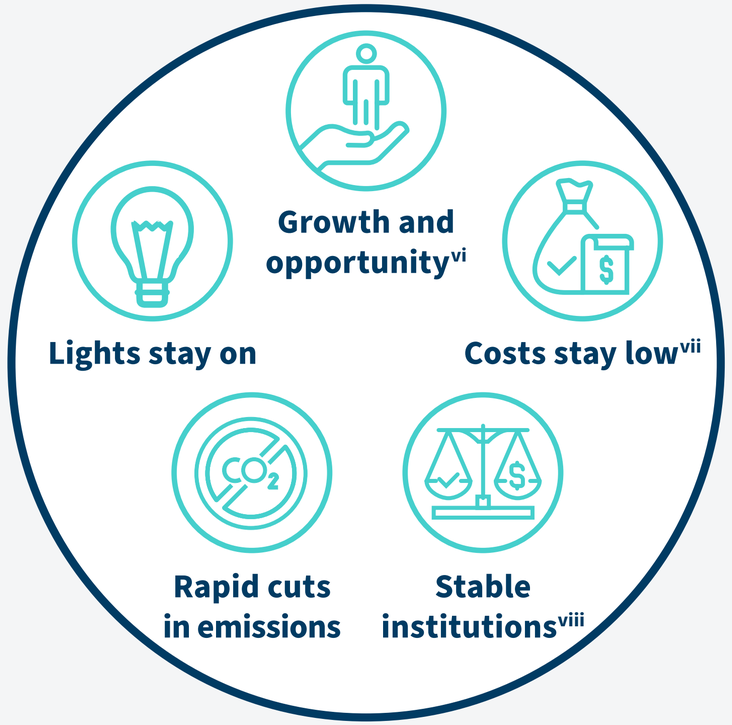
No "fuel" to power systemic change

...include transition financing

... have strong execution[v]

Difficult to move beyond pilots and achieve scale

WHERE WE NEED TO BE



v Strong execution includes sufficient institutional capacity and know-how, and clear governance structures. vi Support for people affected by the transition, and economic growth opportunities. vii Costs for customers and taxpayers stay low. viii Key companies and sovereigns are financially stable.

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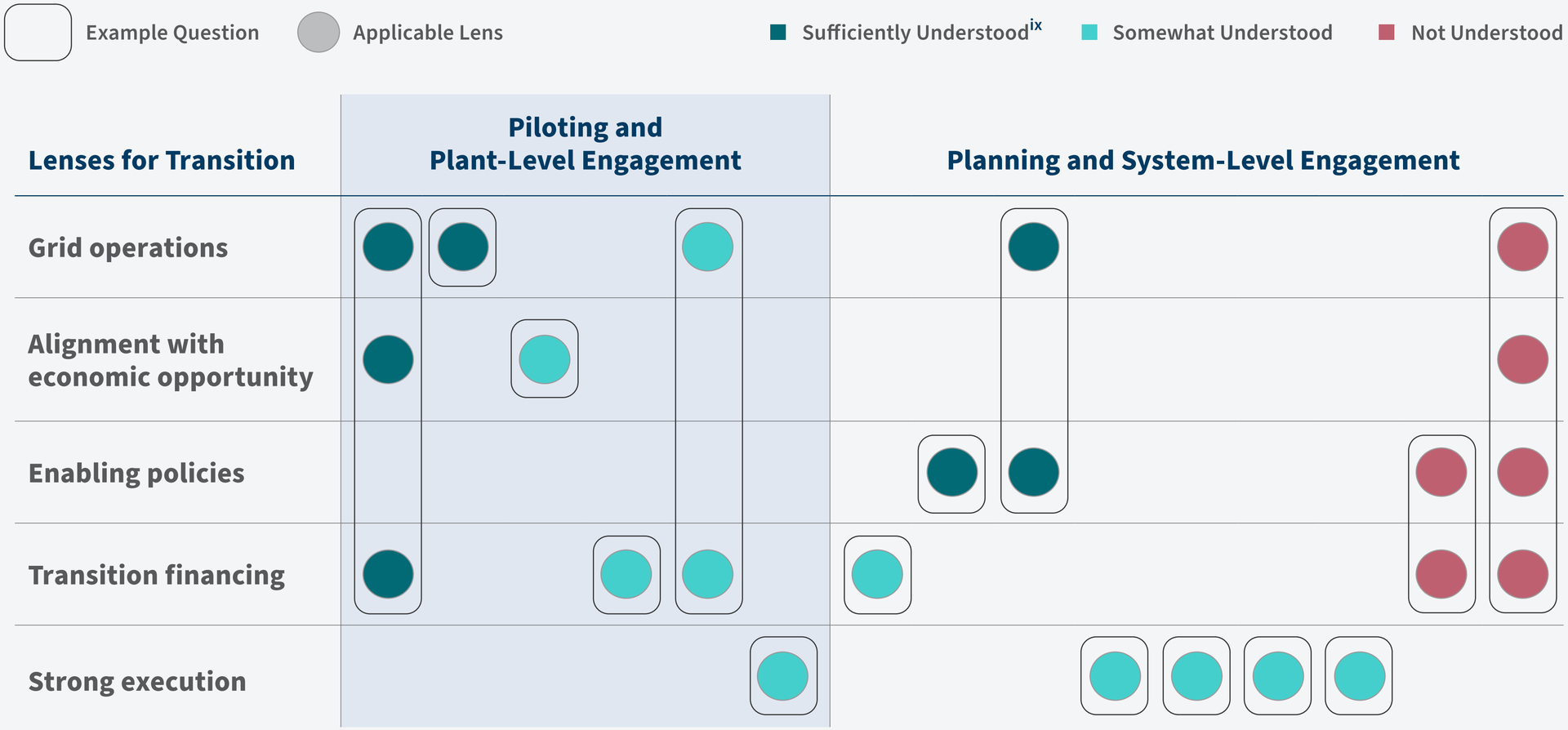

ix Understood collectively by the global community acting on coal-to-clean transitions.

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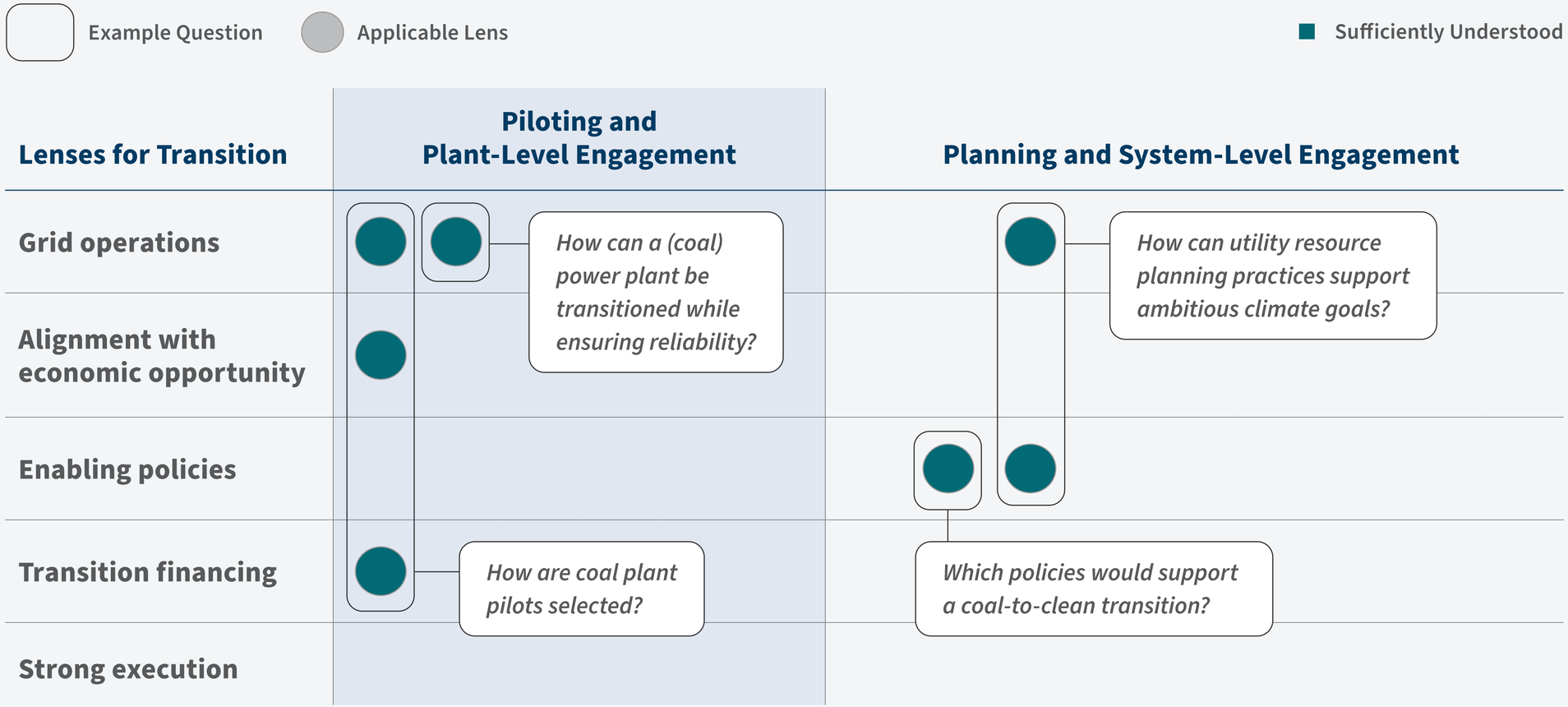

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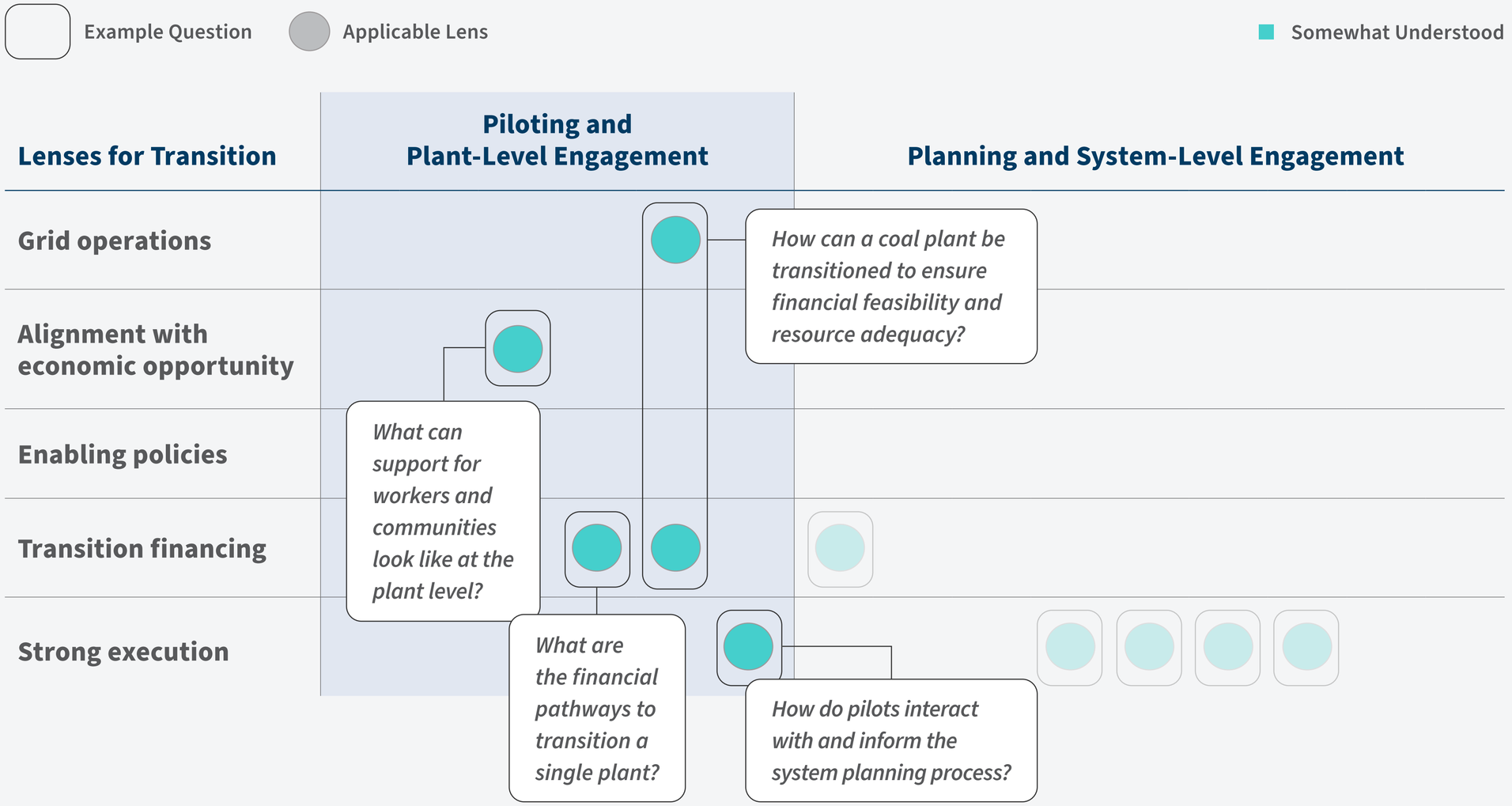

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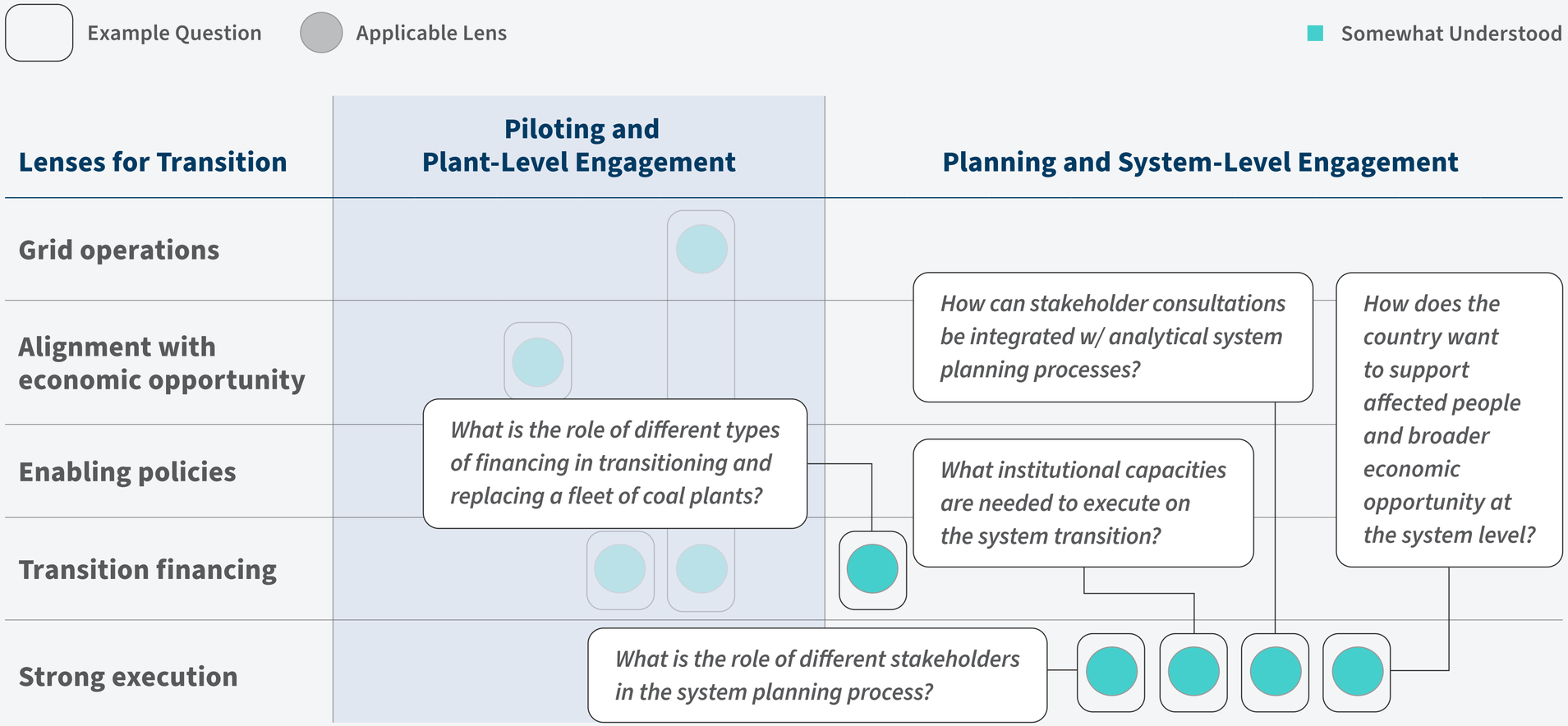

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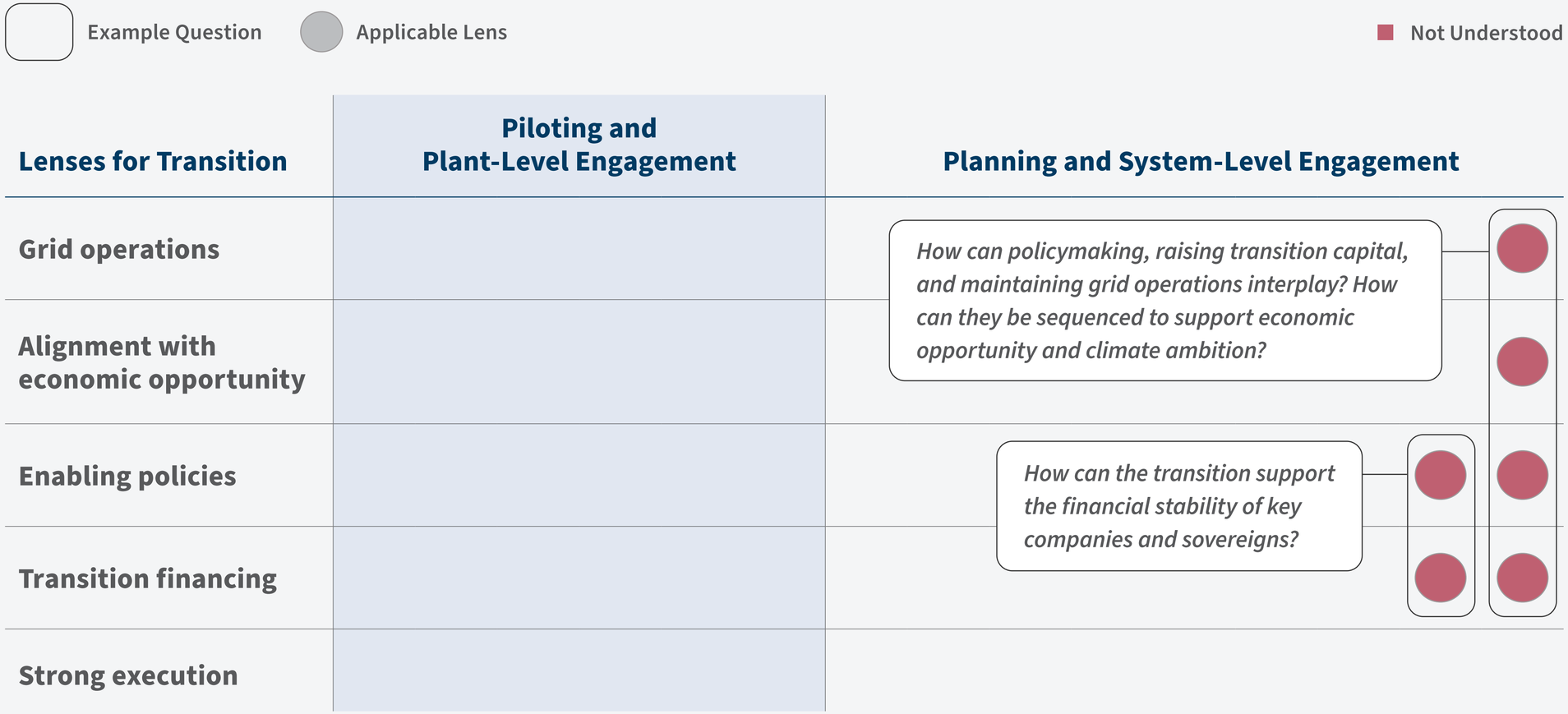


Context and Guide on Using This Brief

The framework and solutions offered in this brief **build off the work of others, broadening and distilling insights** from the **investment plans** developed through the Climate Investment Funds Accelerating Coal Transition (**CIF ACT**) and Just Energy Transition Partnership (**JETP**) processes.

Additionally, RMI's framework **complements** other existing frameworks, by highlighting **questions** relevant to the **power sector implementation** of a country's coal-to-clean transition.

The framework also **shares** established, emerging, and new **insights** that address those questions and demonstrates how those insights **interconnect.**

COMPLEMENTARY FRAMEWORKS ON COAL-TO-CLEAN TRANSITION

World Economic Forum's (WEF's) System Value Framework

Defines **"system value"** as a holistic framework that evaluates economic, environmental, social, and technical outcomes of potential energy solutions.

Evaluates list of Indonesian decarbonization **solutions against framework**, in terms of **feasibility and impact**.

British International Investment's (BII's) Transition Finance for Africa

Shares guidance on how to strategically and credibly **deploy (blended) capital across sectors**, to mitigate emissions and support economic development.

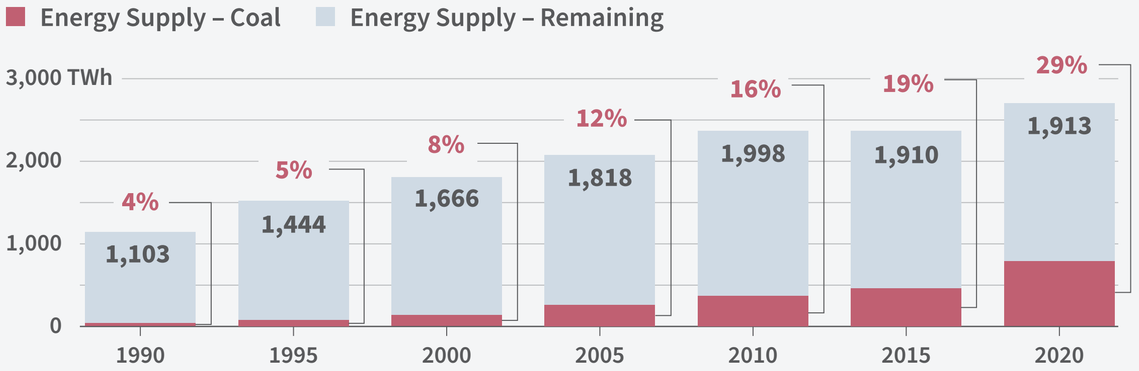
World Bank's A Road Map for a Managed Transition of Coal-Dependent Regions in Western Macedonia

Shares framework around **regional coal transition planning**, social protection and labor divestiture, land reclamation planning, and governance systems.

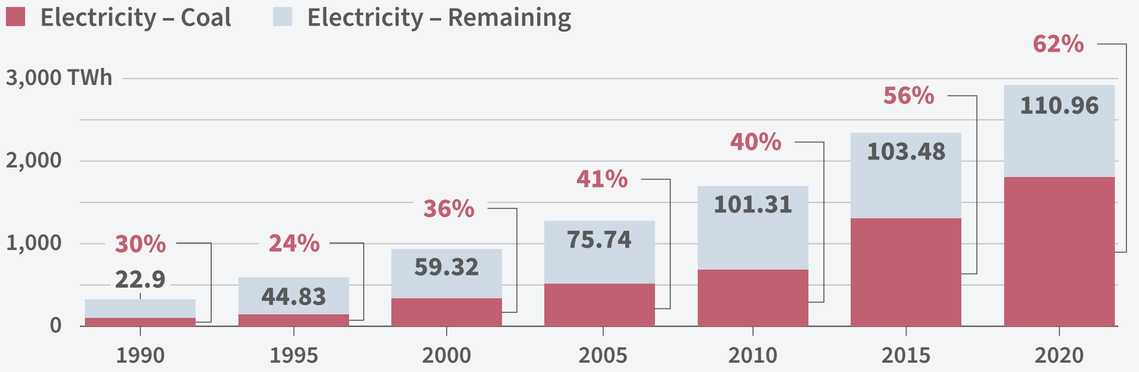
Heavy focus on coal mining, less on power sector.

This brief uses Indonesia as an example. It is particularly apt for this as a major economy in Southeast Asia that has increasingly relied on coal to power its economy and its electricity (40 GW of current coal capacity and 13 GW in the pipeline) but also has gathered substantial momentum to phase it out.

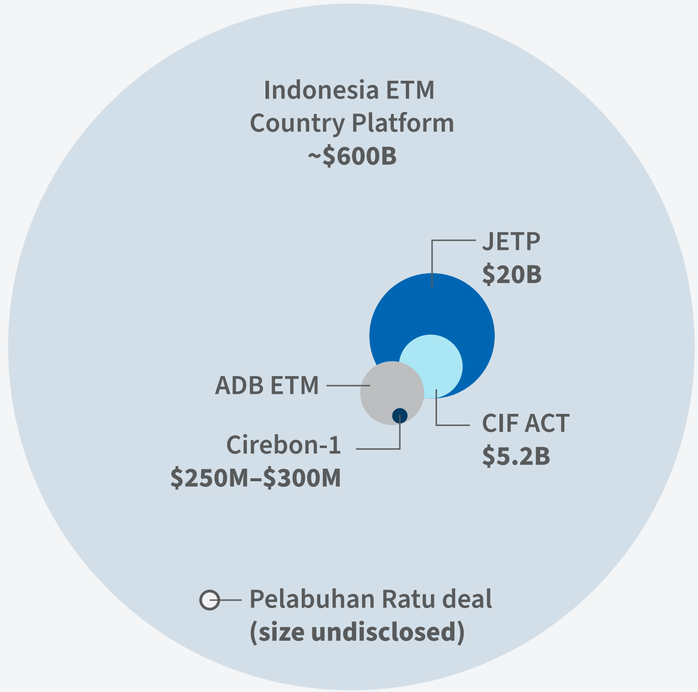
Breakdown of Indonesia's Energy Supply, by Source[1]



Breakdown of Indonesia's Electricity Generation, by Source[2]



Various Financing Commitments Made to Support Indonesia's Coal-to-Clean Transition



For more information, see here

How should readers use this brief?

This brief uses the Indonesian example to ground abstract concepts into reality, and highlight where progress has been made in the coal-to-clean transition and where work remains to be done – both within and outside of Indonesia.

LEGEND

STAGE 1

DEFINE SCOPE OF TRANSITION

References **stage of planning or piloting process**, for users to track as they review the brief

CONCEPTUAL

APPLIED

Indicates whether the current page is laying out a **conceptual process**, or sharing **real-world** use cases, examples, and case studies

Questions Being Addressed

What are the financial pathways to transition a single plant?

How can a coal plant be transitioned to ensure financial feasibility and resource adequacy?

References the **specific questions** (questions key to implementation of the transition) **being answered** in the current page

WHAT HAS BEEN DONE?

WHAT COULD BE DONE?

For pages that walk through real-world examples, breaks out where there has been **progress** in Indonesia (and other geographies), and where more **work remains to be done**

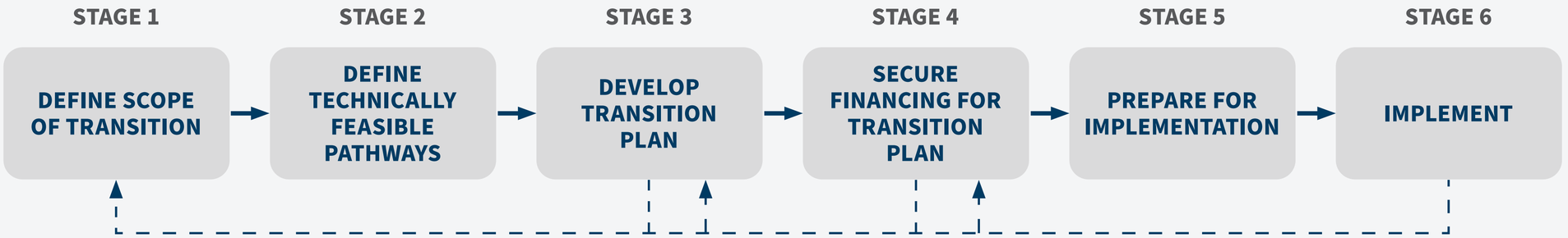
CONTEXT

- The brief highlights questions relevant to the **power sector implementation** of a country's coal-to-clean transition and **shares existing and new insights** to address those questions. Thus, by design, it will not share (detailed) insights for all issues but aims to point the reader in helpful directions.
- The brief is grounded in Indonesia **as an example, but is applicable** to other geographies.
- Local stakeholders could consider this brief as a **starting point** and **adapt** it as they see fit for their context. They may "pick and choose" parts of this brief as is relevant for their contexts.
- The brief reflects RMI's understanding of the current state of the transition — it should be **updated as answers emerge** and collective experience accumulates.

Power Sector Implementation Framework

The roadmap for a country's coal-to-clean transition involves planning and implementation at the system and plant level, with learnings from each process informing the development of the other.

SYSTEM PLANNING



PLANT LEVEL

"EARLY WIN" COAL TRANSITION PILOT

Pilot projects to kick-start stakeholder interest, generate early learnings, and build trust and momentum in the broader transition effort.

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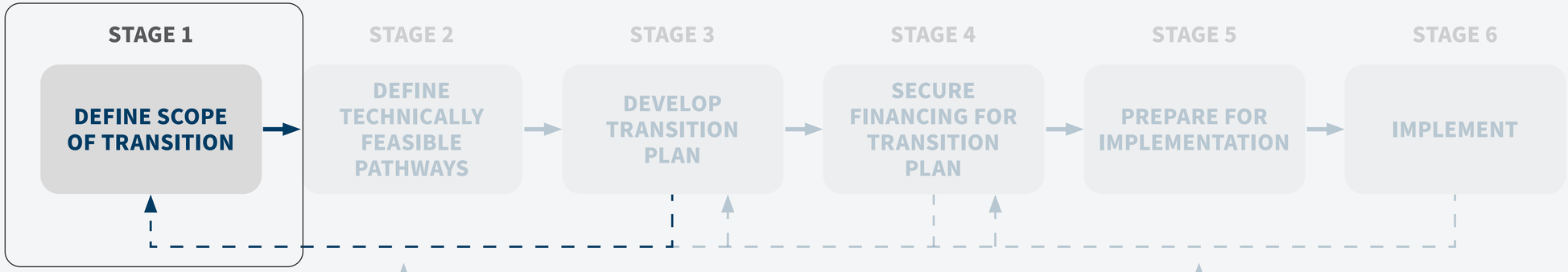
Pilot projects that explore new frontiers of the country's coal-to-clean transition (e.g., pathways to repurposing coal plants) and begin answering unanswered questions.

System Planning Process – Stage 1

SYSTEM PLANNING



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System Planning Process – Stage 1 Overview

STAGE 1

DEFINE SCOPE OF TRANSITION

CONCEPTUAL

What is the scope of the country's climate ambitions for its power sector and its coal fleet?

What is the scope for the country's support for supporting impacted people (e.g., workers and communities), providing them opportunities, and remediating their surroundings?

How does the country define its economic and human development objectives?

What are the roles of different stakeholders in the coal-to-clean transition?

What other domestic or geopolitical objectives does the country have, that overlap with the electricity and energy sector?

OUTPUTS

- **Emissions**, power system capacity, **plant phaseout and buildout** targets
- Scope of activities for **supporting affected people**, related economic development, and environmental remediation
- Which stakeholders will be playing **what roles**

POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 1 Steps

STAGE 1

DEFINE SCOPE OF TRANSITION

APPLIED

(IN INDONESIA)

Questions Being Addressed

How does the country want to support affected people and the broader economic opportunity at the system level?

What is the scope of the country's climate ambitions for its power sector and its coal fleet?

What is the scope for the country's support for supporting impacted people (e.g., workers and communities), providing them opportunities, and remediating their surroundings?

How does the country define its economic and human development objectives?

What are the roles of different stakeholders in the coal-to-clean transition?

What other domestic or geopolitical objectives does the country have, that overlap with the electricity and energy sector?

WHAT COULD BE DONE?

- Initiate **stakeholder consultation process** with civil society, local governments, labor, local communities, and others (South Africa's JET IP consultations are one example).

WHAT HAS BEEN DONE?

- Updated NDC with net zero by 2060; 32% emissions reduction (unconditional) vs. 2010 levels by 2030
- Partially signing onto Global Coal to Clean Power Transition Statement at COP26

WHAT COULD BE DONE?

- Explicit coal phaseout and power sector decarbonization targets in **closer alignment with a 1.5°C trajectory — conditional** on significant financial support.
- Providing **concrete plans** (e.g., integrated resource plans, schedule of plant tenders, commitments in legislation) to demonstrate commitment and **provide certainty to financiers** on the intention and ambition to transition.

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POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 1 Steps

STAGE 1

DEFINE SCOPE OF TRANSITION

APPLIED

Questions Being Addressed

What is the role of different stakeholders in the system planning process?

What institutional capacities are needed to execute on the system transition?

What is the scope of the country's climate ambitions for its power sector and its coal fleet?

What is the scope for the country's support for supporting impacted people (e.g., workers and communities), providing them opportunities, and remediating their surroundings?

How does the country define its economic and human development objectives?

What are the roles of different stakeholders in the coal-to-clean transition?

What other domestic or geopolitical objectives does the country have, that overlap with the electricity and energy sector?

WHAT HAS BEEN DONE?

- **National Medium Term Development Plan** 2020-24, which specifies that the green economy is to be the foundation for Indonesia's development. Promotes community resilience, reduced emissions, rural economic development, and more.
- **Annual National Development Targets** that explicitly tie emissions and development. The 2021 version targeted a 5% growth rate, 7%–9% unemployment rate, emissions reductions ~30% by 2030, and more.

WHAT HAS BEEN DONE?

- Structure of the **Indonesian ETM Country Platform** that includes stakeholders involved in financing, advising, steering, running, and implementing projects.

WHAT COULD BE DONE?

- Beyond the government and financiers, **which other stakeholders must be involved** and in what capacities?

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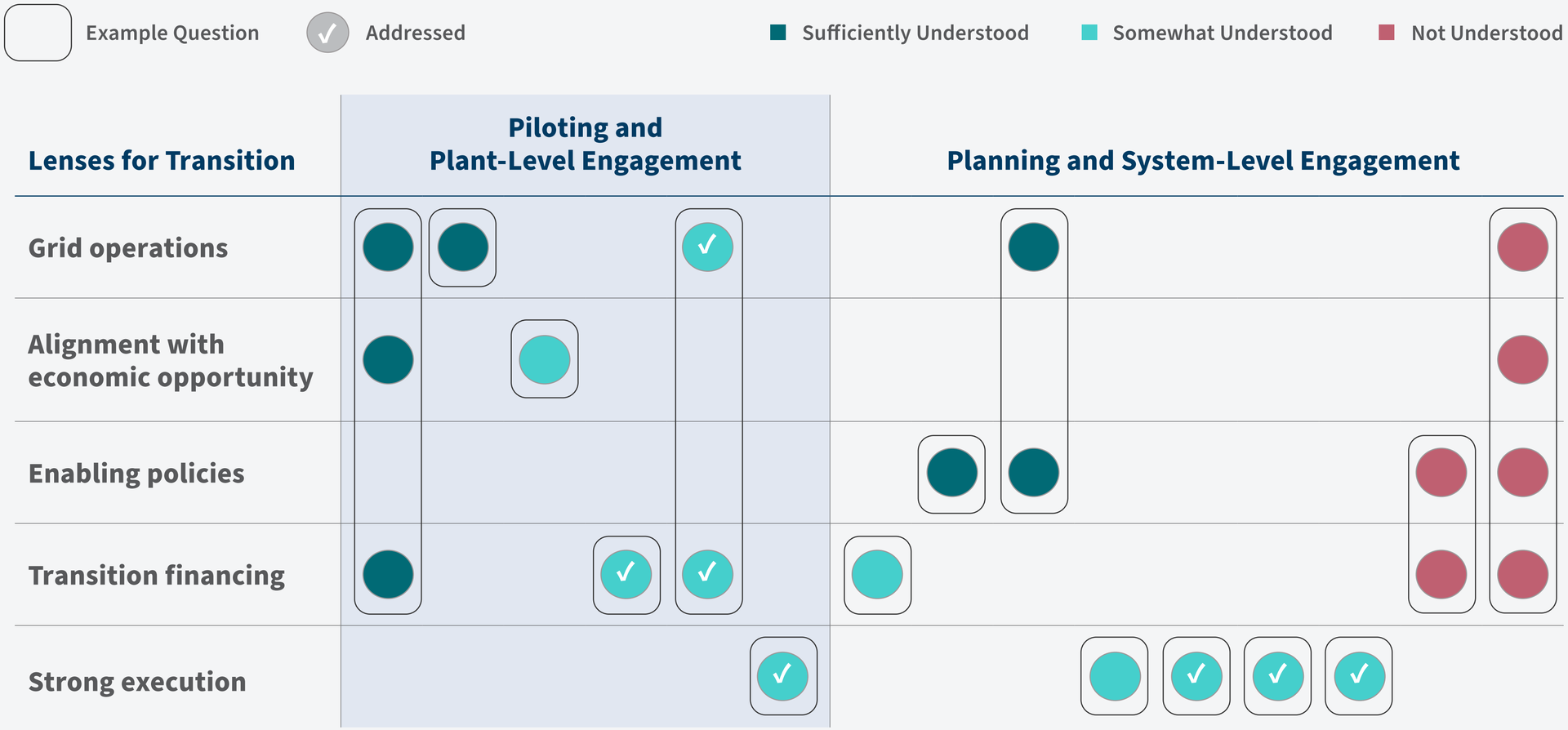
Summary – Stage 1

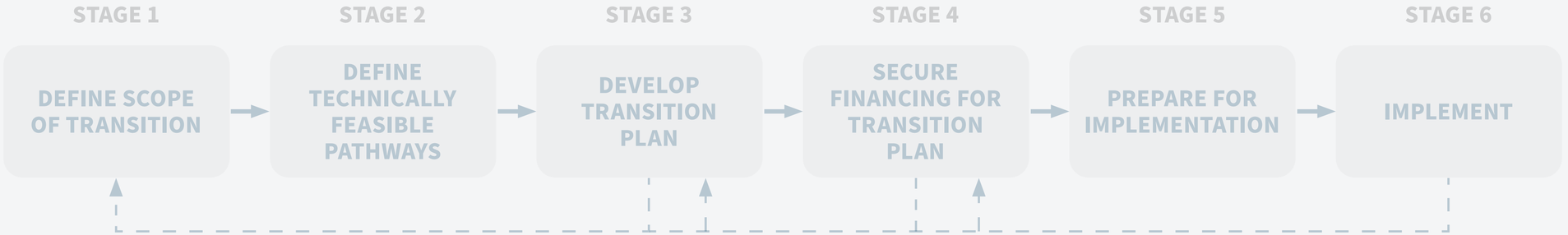
Output includes:

- Emissions, power system capacity, plant phaseout and buildout targets
- Scope of activities for supporting affected people, related economic development, and environmental remediation
- Which stakeholders will be playing what roles



"Early Win" Coal Transition Pilot

SYSTEM PLANNING



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POWER SECTOR IMPLEMENTATION FRAMEWORK

"Early Win" Coal Transition Pilot Overview

"EARLY WIN" COAL TRANSITION PILOT

CONCEPTUAL

Questions Being Addressed

What are the financial pathways to transition a single plant?

How can a coal plant be transitioned to ensure financial feasibility and resource adequacy?

How do pilots interact with and inform the system planning process?

PLANT LEVEL

"Early win" coal transition project selected

Using current and projected techno-economic data about the coal plant and surrounding resources, conduct simplified techno-economic modeling to determine feasible technical pathways to reduce plant emissions

Narrow down on technical pathways based on credible emissions reductions

Identify any legal constraints around financing mechanisms and plant phaseout

Identify any financial constraints for plant owners (e.g., being heavily indebted) and stakeholder priorities (managing cost burden, maximizing emissions reductions, minimizing plant owner impacts)

Using identified legal and financial constraints, as well as stakeholder priorities, identify Coal Transition Mechanisms (CTMs) to facilitate early transition of coal plant

Using pathways identified from techno-economic model as inputs, run plant-level financial model to evaluate impact of using CTMs (vs. business-as-usual) on all relevant stakeholders and emissions

Select viable integrated financial and techno-economic option for decarbonizing coal plant

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POWER SECTOR IMPLEMENTATION FRAMEWORK

"Early Win" Coal Transition Pilot Steps

"EARLY WIN" COAL TRANSITION PILOT

APPLIED

Questions Being Addressed

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How do pilots interact with and inform the system planning process?

"Early win" coal transition project selected

Using current and projected techno-economic data about the coal plant and surrounding resources, conduct simplified techno-economic modeling to determine feasible technical pathways to reduce plant emissions

Narrow down on technical pathways based on credible emissions reductions

Identify any legal constraints around financing mechanisms and plant phaseout

Identify any financial constraints for plant owners (e.g., being heavily indebted) and stakeholder priorities (managing cost burden, maximizing emissions reductions, minimizing plant owner impacts)

Using identified legal and financial constraints, as well as stakeholder priorities, identify Coal Transition Mechanisms (CTMs) to facilitate early transition of coal plant

Using pathways identified from techno-economic model as inputs, run plant-level financial model to evaluate impact of using CTMs (vs. business-as-usual) on all relevant stakeholders and emissions

Select viable integrated financial and techno-economic option for decarbonizing coal plant

WHAT HAS BEEN DONE?

Cirebon Power Plant, owned by an Independent Power Producer (IPP)

- Asian Development Bank (ADB) signs MoU with Cirebon Electric Power (CEP) and PLN to discuss early retirement of Cirebon-1 in West Java.
- It is anticipated that ADB would provide an early retirement facility in the form of concessional senior debt, on the condition the PPA between CEP and PLN is shortened.

Pelabuhan Ratu Power Plant, owned by Indonesian Utility PLN

- Indonesian state-owned coal mining company PT Bukit Asam Tbk (PTBA) to take over ownership of the plant and shorten its operation from 24 to 15 years.
- The takeover will use low-cost funding under Indonesia's Energy Transition Mechanism (ETM) country platform.

RMI

POWER SECTOR IMPLEMENTATION FRAMEWORK

"Early Win" Coal Transition Pilot Steps

"EARLY WIN" COAL TRANSITION PILOT

APPLIED

Questions Being Addressed

What are the financial pathways to transition a single plant?

How can a coal plant be transitioned to ensure financial feasibility and resource adequacy?

How do pilots interact with and inform the system planning process?

"Early win" coal transition project selected

Using current and projected techno-economic data about the coal plant and surrounding resources, conduct simplified techno-economic modeling to determine feasible technical pathways to reduce plant emissions

Narrow down on technical pathways based on credible emissions reductions

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Using pathways identified from techno-economic model as inputs, run plant-level financial model to evaluate impact of using CTMs (vs. business-as-usual) on all relevant stakeholders and emissions

Select viable integrated financial and techno-economic option for decarbonizing coal plant

WHAT HAS BEEN DONE?

Guidelines for Financing a Credible Transition, developed by RMI, Climate Policy Initiative (CPI), and Climate Bonds Initiative (CBI), introduces a framework to assess coal plant eligibility, coal transition pathways, social protection, and accountability associated with a CTM.

- The CTM results in emissions savings compared with a case without the use of the CTM and has a backstopping commitment to phase out unabated coal combustion at the coal plant by country-specific, 1.5°C-aligned coal phaseout deadlines.
- The coal plant owner has an entity-level commitment to no new coal power plant development or procurement.

RMI

POWER SECTOR IMPLEMENTATION FRAMEWORK

"Early Win" Coal Transition Pilot Steps

"EARLY WIN" COAL TRANSITION PILOT

APPLIED

Questions Being Addressed

What are the financial pathways to transition a single plant?

How can a coal plant be transitioned to ensure financial feasibility and resource adequacy?

How do pilots interact with and inform the system planning process?

- "Early win" coal transition project selected
- Using current and projected techno-economic data about the coal plant and surrounding resources, conduct simplified techno-economic modeling to determine feasible technical pathways to reduce plant emissions
- Narrow down on technical pathways based on credible emissions reductions
- Identify any legal constraints around financing mechanisms and plant phaseout
- Identify any financial constraints for plant owners (e.g., being heavily indebted) and stakeholder priorities (managing cost burden, maximizing emissions reductions, minimizing plant owner impacts)
- Using identified legal and financial constraints, as well as stakeholder priorities, identify Coal Transition Mechanisms (CTMs) to facilitate early transition of coal plant
- **Using pathways identified from techno-economic model as inputs, run plant-level financial model to evaluate impact of using CTMs (vs. business-as-usual) on all relevant stakeholders and emissions**
- **Select viable integrated financial and techno-economic option for decarbonizing coal plant**

WHAT HAS BEEN DONE?

RMI developed a model that **pairs** detailed asset and corporate-level **financial analysis** with a **simple economic dispatch model**, to understand the transition of a coal plant owned by Indonesian utility PLN.

Power plant **capacity projections** and **marginal costs** by resource, and current relative merit order position of pilot plant

Techno-economic data about pilot plant and replacement resources

Simple dispatch model that balances projections of hourly demand with hourly dispatch, tracks curtailment and must-run resources

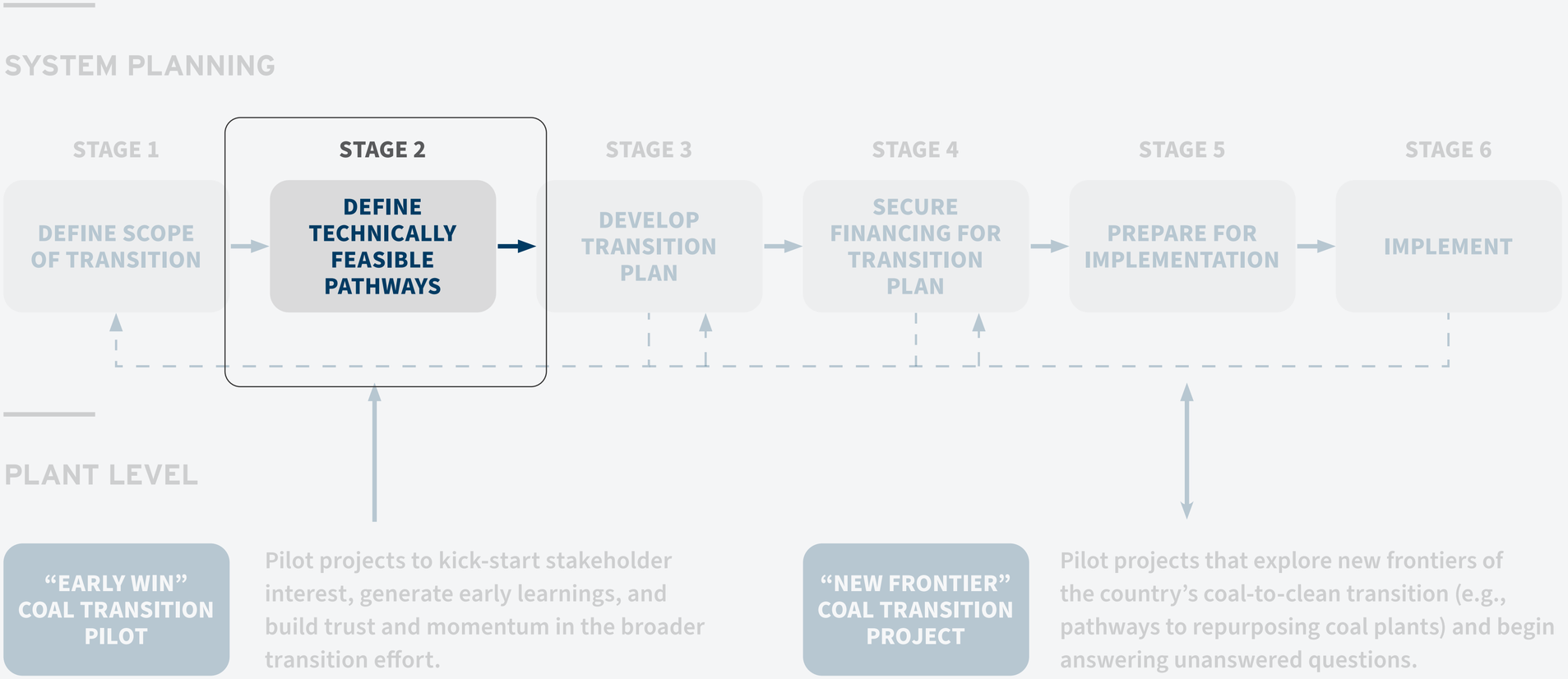
Utility and plant **financials** and costs of capital

Plant-level financial model that examines impacts of transition with and without CTMs, and compares with business as usual

Impacts on: i) Utility financials (earnings, cash flow); ii) System costs (including broader grid costs); iii) Implicit cost of carbon for concessional funds; iv) Lifetime CO_2 emissions savings

RMI

System Planning Process – Stage 2



System Planning Process – Stage 2 Overview

STAGE 2

DEFINE TECHNICALLY FEASIBLE PATHWAYS

CONCEPTUAL

Questions Being Addressed

How can policymaking, raising transition capital, and maintaining grid operations interplay? How can they be sequenced to support economic opportunity and climate ambition?

Given plan developed in Stage 1, governmental and regulatory bodies leverage capacity expansion and production cost modeling to develop a set of technically feasible scenarios that meet country climate goals[x]

For each scenario, estimate:
a) aggregate financing needs[xi]
b) costs to customers and taxpayers

Input from community and workforce representatives, and from assessments that estimate impacts of transition on workers and communities

Input from other stakeholders (e.g., industries, project financiers)

Leverage modeling results and stakeholder input

ITERATE, IF NEEDED

MOVE FORWARD

Governmental and regulatory bodies eliminate any scenarios that are:
- **Unrealistic or politically infeasible**[xii]
- **Asking disadvantaged people to bear risks best borne by others**

x Currently excluding captive power plants. **xi** Financing needs for generation pathways identified from techno-economic modeling. **xii** Consider eliminating scenarios that do not support the bankability of the broader project pipeline.

POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 2 Steps

STAGE 2

DEFINE TECHNICALLY FEASIBLE PATHWAYS

APPLIED

Questions Being Addressed

How can policymaking, raising transition capital, and maintaining grid operations interplay? How can they be sequenced to support economic opportunity and climate ambition?

Given plan developed in Stage 1, governmental and regulatory bodies leverage capacity expansion and production cost modeling to develop a set of technically feasible scenarios that meet country climate goals.

For each scenario, estimate:
a) aggregate financing needs
b) costs to customers and taxpayers

Input from other stakeholders (e.g., industries, project financiers)

Input from community and workforce representatives, and from assessments that estimate impacts of transition on workers and communities

Leverage modeling results

Governmental and regulatory bodies eliminate any scenarios that are:
- Unrealistic or politically infeasible
- Asking disadvantaged people to bear risks best borne by others

WHAT HAS BEEN DONE?

Institute of Energy Services Reform's (IESR's) Deep Decarbonization of Indonesia's Energy System used the LUT Energy Transition Model — an economy-wide energy-sector deep decarbonization model. It was used to develop various **decarbonization scenarios for the electric and electrifying sectors.**

The model considered **policy sensitivities** and **optimized for system cost** while ensuring resource adequacy and grid integrity.

WHAT COULD BE DONE?

Instead of using capacity expansion and production cost modeling to identify a single final scenario on a least-cost basis, it could instead be leveraged to develop a **selection of technically feasible** scenarios based on different assumptions and constraints that are **down-selected on criteria beyond just system cost.**

POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 2 Steps

STAGE 2

DEFINE TECHNICALLY FEASIBLE PATHWAYS

APPLIED

Questions Being Addressed

How can stakeholder consultations be integrated w/analytical system planning processes?

Given plan developed in Stage 1, governmental and regulatory bodies leverage capacity expansion and production cost modeling to develop a set of technically feasible scenarios that meet country climate goals.

For each scenario, estimate:

a) aggregate financing needs

b) costs to customers and taxpayers

Input from other stakeholders (e.g., industries, project financiers)

Input from community and workforce representatives, and from assessments that estimate impacts of transition on workers and communities

Leverage modeling results

Governmental and regulatory bodies eliminate any scenarios that are:

- Unrealistic or politically infeasible
- Asking disadvantaged people to bear risks best borne by others

WHAT COULD BE DONE?

Stakeholder-driven modeling and robust input into the resource planning process. This includes:

- Open access on as much nonconfidential data used in utility modeling as possible
- Ensuring stakeholder input into modeling assumptions early in the planning process (e.g., The regulators of the US state of Hawaii require use of public data for resource and fuel costs)
- If there is capacity, encourage alternative stakeholder-driven modeling portfolios

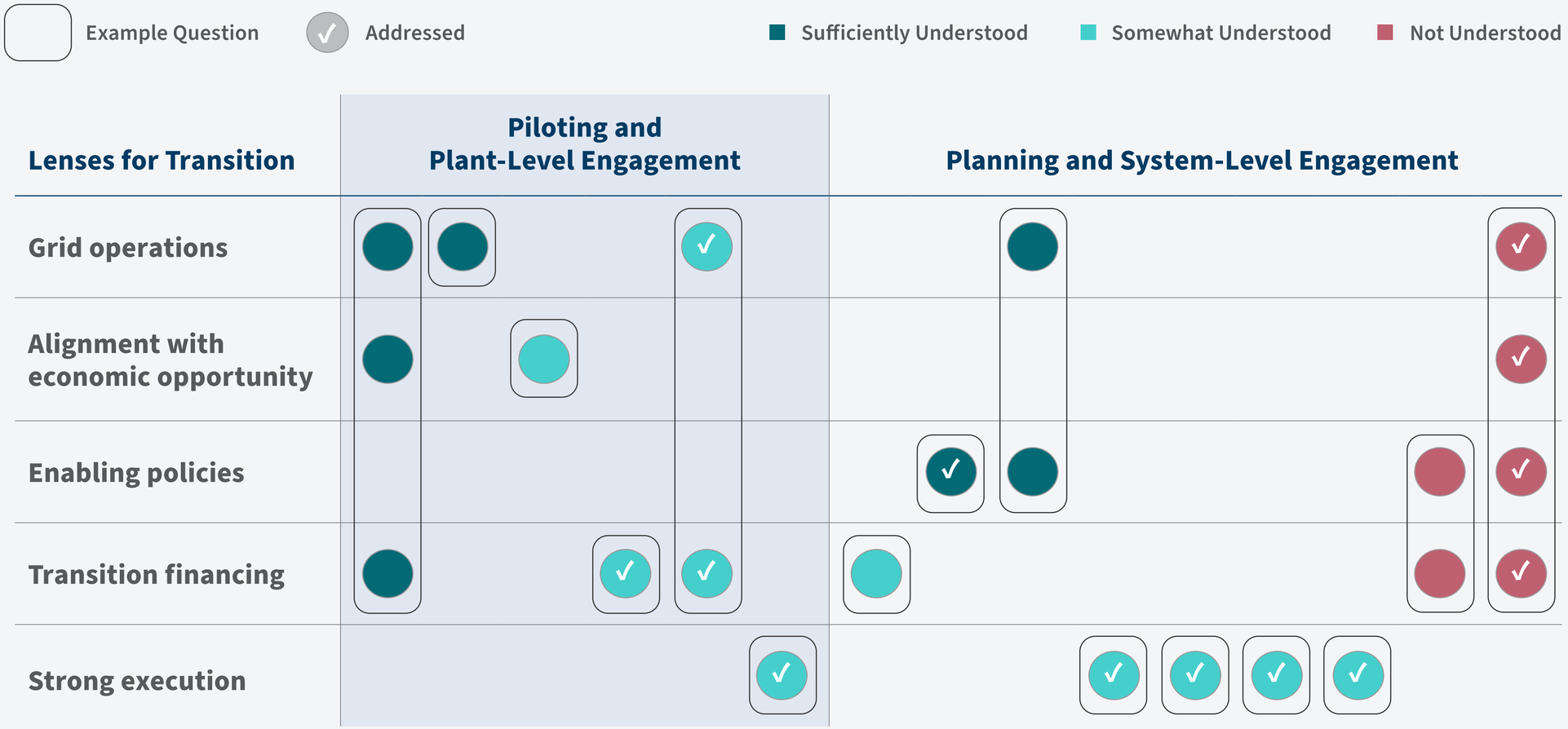
Summary – Stage 2

Output includes subset of technically feasible scenarios that:

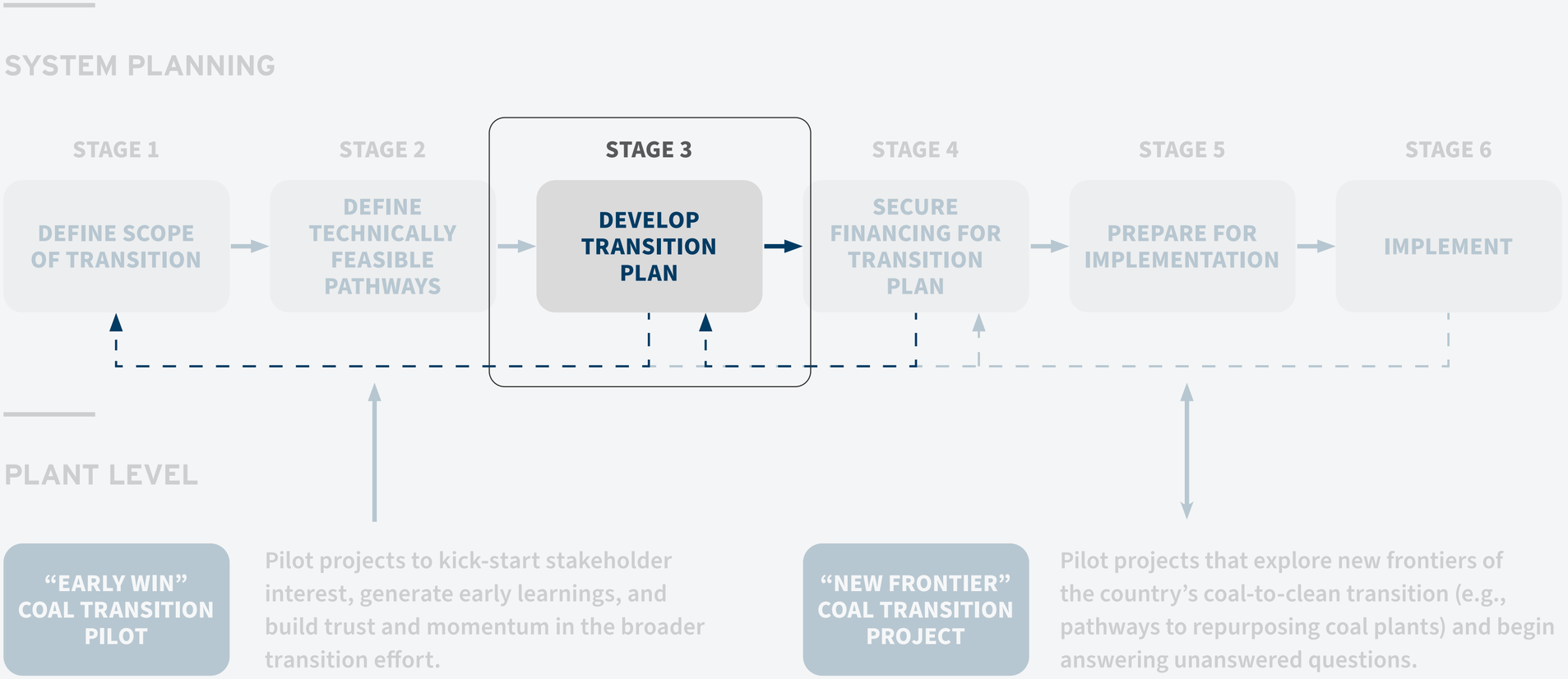
- Incorporate worker and community support and compensation
- Minimize customer/taxpayer costs
- Have realistic aggregate financing needs

STAGE 2

DEFINE TECHNICALLY FEASIBLE PATHWAYS



System Planning Process – Stage 3



System Planning Process – Stage 3 Overview

STAGE 3

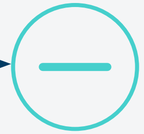
DEVELOP TRANSITION PLAN

CONCEPTUAL

Questions Being Addressed

How can policymaking, raising transition capital, and maintaining grid operations interplay? How can they be sequenced to support economic opportunity and climate ambition?

Given subset of technically feasible scenarios, define role of policy[xiii]



What inhibiting policies or regulations are being modified or removed?

What supporting policies or regulations are being added or modified?

Layer techno-economic modeling with various policy options and down-select scenarios according to:
- **Aggregate financing needs**
- **Costs to customers and taxpayers**

Define the role of finance

Develop set of activities that need support. Activity buckets include:
- **Coal emissions reductions**
- **Clean infrastructure**
- **Support and remediation**
- **Planning and implementation**

Continued on next page

xiii Policies here can refer to national or local legislation, utility regulation, proclamations that carry the force of law, or current paradigms on market and contractual structures.

System Planning Process – Stage 3

Continued from previous page

STAGE 3

DEVELOP TRANSITION PLAN

CONCEPTUAL

Questions Being Addressed

How can policymaking, raising transition capital, and maintaining grid operations interplay? How can they be sequenced to support economic opportunity and climate ambition?

Define amount of support needed for other clean infrastructure

Use net present value (NPV) of costs for new transmission additions from capacity expansion modeling to quantify financing needed for clean infrastructure bucket

Define amount of support needed for coal and clean generation

Which subset of financial mechanisms are a good fit given local context and priorities?

Identify combination of mechanisms that:

- Ensure mobilization of capital
- Minimize costs
- Minimize impacts on workers and communities

Define amount of support needed for all other activities

Consult stakeholders (especially workers and communities) and experts extensively to define

Identify characteristics of financing (debt, equity, blended, costs, term length) needed, as well as any applicable financing mechanisms

Transition and investment plan that includes details on financing needs for each activity bucket, the generation and transmission transition plan, and relevant timelines

POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 3 Steps

STAGE 3

DEVELOP TRANSITION PLAN

APPLIED

Questions Being Addressed

Which policies would best support a coal-to-clean transition?

Given subset of technically feasible scenarios, define role of policy

What inhibiting policies or regulations are being modified or removed?

What supportive policies or regulations are being added or modified?

Layer techno-economic modeling with various policy options and down-select scenarios according to:

- Aggregate financing needs
- Costs to customers and taxpayers

Define the role of finance

Define set of activities that need support. Activity buckets include:

WHAT HAS BEEN DONE?

Clean energy PPA prices were **capped at an index** that was heavily weighted by subsidized coal-based production prices, making it challenging for clean projects to **recover their costs**. Regulation 112 altered this to **cap prices** close to the levelized cost of renewable energy (**LCOE**) — providing more room for projects to grow. Further modification may be needed.

WHAT COULD BE DONE?

Articles 2 and 3 of Act No. 31/1999 (“Eradication of the Criminal Act of Corruption”) — which recommends imprisonment for anyone that “…may cause loss to the state finance or state economy…” — may need to reconsidered or modified to ensure sufficient safeguards against corruption while **not disincentivizing innovation and risk-taking by PLN.**

Indonesia’s **Local Content Requirement (LCR)** stipulates that **~40%** of clean energy project materials and **100%** of project services must be **procured in-country.**[xiv]

The current version of LCR, while designed to protect and grow domestic industry, has made it **difficult to source cheaper materials and services** internationally — thus, challenging the profitability of clean energy projects. Modification may be needed.

RMI

POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 3 Steps

STAGE 3

DEVELOP TRANSITION PLAN

APPLIED

Questions Being Addressed

Which policies would best support a coal-to-clean transition?

Given subset of technically feasible scenarios, define role of policy

What inhibiting policies or regulations are being modified or removed?

What supportive policies or regulations are being added or modified?

Layer techno-economic modeling with various policy options and down-select scenarios according to:

- Aggregate financing needs
- Costs to customers and taxpayers

Define the role of finance

Define set of activities that need support. Activity buckets include:

- Coal emissions reductions
- Clean infrastructure
- Support and remediation
- Planning and implementation

Continued on page 53

WHAT HAS BEEN DONE?

Presidential Regulation 112, which:

- Bans the development of new coal power, unless already in the pipeline
- Provides a pathway (and state support) to terminate coal PPAs early
- Raises the ceiling tariff for new renewable energy, improving chances at profitability
- Provides incentives and support for geothermal energy

WHAT COULD BE DONE?

Reforming utility procurement of power to be **all-source, inclusive of utility and distributed-scale, transparent,** and aligned to the objectives laid out by regulators and policymakers.

POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 3 Steps

STAGE 3

DEVELOP TRANSITION PLAN

APPLIED

Questions Being Addressed

How can utility resource planning practices support ambitious climate goals?

Which policies would best support a coal-to-clean transition?

Given subset of technically feasible scenarios, define role of policy

- **What inhibiting policies or regulations are being modified or removed?**
- **What supportive policies or regulations are being added or modified?**

Layer techno-economic modeling with various policy options and down-select scenarios according to:

- Aggregate financing needs
- Costs to customers and taxpayers

Define the role of finance

Define set of activities that need support. Activity buckets

CASE STUDY – UNITED STATES

The US state of Hawaii comprehensively reformed its utility's business model so that its **earnings were directly linked to performance** across a wide variety of outcomes, including i) affordability, ii) decarbonization, iii) grid modernization, iv) customer engagement, v) distributed energy development, and more.

CASE STUDY – INDIA

Considering short-term markets that move away from bilateral procurement of power purchase agreements (PPAs) and include:

- **Real-time and ancillary markets** that allow for low-cost and rapid procurement of flexible resources
- **Demand and supply-side resource participation** that allows for optimization of demand and supply-side dispatch of wide range of available and new resources (e.g., storage, electric vehicles, behind-the-meter solar)

CASE STUDY – KENYA

Kenya implemented its Renewable Energy Auction Policy in 2021, which seeks to ensure **renewable power** projects are **competitively procured** through rounds of transparent auctions, all in line with utility and national energy plans. Furthermore, its accompanying 2021 Feed-In Tariff (FiT) Policy aims to **standardize PPA terms** and provide renewables incentives, building on previous, successful FiT programs.

POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 3 Steps

STAGE 3

DEVELOP TRANSITION PLAN

APPLIED

Questions Being Addressed

What is the role of different types of financing in transitioning and replacing a fleet of coal plants?

Given subset of technically feasible scenarios, define role of policy

What inhibiting policies or regulations are being modified or removed?

What supportive policies or regulations are being added or modified?

Layer techno-economic modeling with various policy options and down-select scenarios according to:

- Aggregate financing needs
- Costs to customers and taxpayers

Define the role of finance

Define set of activities that need support. Activity buckets include:

- Coal emissions reductions
- Clean infrastructure
- Support and remediation
- Planning and implementation

Continued on page 53

WHAT HAS BEEN DONE?

Climate Investment Funds (CIF) established the multi-lateral **Accelerating Coal Transition (ACT)** program to support country coal-to-clean transitions in a holistic, integrated, socially inclusive and gender-equal manner. **Indonesia was selected in October 2021.** CIF ACT aims to mobilize $2B in MDB co-financing and over $1B in commercial co-financing.

Activity Bucket	Indicative Financing *(US$ MM)*	Type of Financing
Coal emissions reductions	2,801	Concessional and commercial debt, grants
Clean infrastructure	1,060	Concessional and commercial debt
Support, remediation, planning, and implementation	1,364	Concessional and commercial debt, grants
TOTAL	**5,225**	

System Planning Process – Stage 3 Steps

STAGE 3

DEVELOP TRANSITION PLAN

APPLIED

Questions Being Addressed

What is the role of different types of financing in transitioning and replacing a fleet of coal plants?

Given subset of technically feasible scenarios, define role of policy

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- Aggregate financing needs
- Costs to customers and taxpayers

Define the role of finance

Define set of activities that need support. Activity buckets include:

- Coal emissions reductions
- Clean infrastructure
- Support and remediation
- Planning and implementation

Continued on page 53

CASE STUDY – SOUTH AFRICA

A group of developed countries have agreed to mobilize an initial amount of **US$8.5 billion** over the next 3 to 5 years to advance a long-term **Just Energy Transition Partnership (JETP)** that will support South Africa's decarbonization journey.

Activity Bucket	Indicative Financing *(US$ MM)*	Type of Financing	Offer from Countries *(US$ MM)*
Coal emissions reductions	150	Guarantees	1,300
Clean infrastructure	7,450	Concessional debt	5,325
Support and development	50	Grants	330
Planning and implementation	900	Commercial debt	1,500
TOTAL	8,550	TOTAL	8,455

POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 3 Steps

STAGE 3

DEVELOP TRANSITION PLAN

APPLIED

Questions Being Addressed

How can policymaking, raising transition capital, and maintaining grid operations interplay? How can they be sequenced to support economic opportunity and climate ambition?

Define amount of support needed for coal and clean generation

Which subset of financial mechanisms are a good fit given local context and priorities?

Identify combination of mechanisms that:

- **Ensure mobilization of capital**
- **Minimize costs**
- **Minimize impacts on workers and communities**

Define amount of support needed for other clean infrastructure

Use net present value (NPV) of costs for new transmission additions from capacity expansion modeling to quantify financing needed for clean infrastructure bucket

Identify characteristics of financing (debt, equity, blended, costs, term length) needed for each bucket, as well as any applicable financing mechanisms

Define amount of support needed for all other activities

Consult stakeholders (especially workers and communities) and experts extensively to define.

Transition and investment plan that includes details on financing needs for each activity bucket, the generation and transmission transition plan, and relevant timelines.

CASE STUDY – UNITED STATES

RMI has developed Optimus — a comprehensive utility model — that quantifies the impacts of financing mechanisms and policy scenarios on customers, shareholders, and other stakeholders.

It **quantifies** the **impacts of local and national policies, CTMs, different utility business models**, and more. Optimus is a complementary analytical tool to **capacity expansion modeling** — it uses the results from that modeling and applies a variety of policy and financial levers to calculate stakeholder impacts.

RMI has used Optimus (in collaboration with partners) for the **North Carolina carbon plan,** and the model demonstrated that an alternative scenario with more clean power was cheaper, less exposed to fuel price hikes, and lower emitting.

RMI

POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 3 Steps

STAGE 3

DEVELOP TRANSITION PLAN

APPLIED

Questions Being Addressed

What is the role of different stakeholders in the system planning process?

Define amount of support needed for coal and clean generation

Which subset of financial mechanisms are a good fit given local context and priorities?

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Define amount of support needed for all other activities

Consult stakeholders (especially workers and communities) and experts extensively to define.

Transition and investment plan that includes details on financing needs for each activity bucket, the generation and transmission transition plan, and relevant timelines.

CASE STUDY – SOUTH AFRICA

South Africa's Just Transition Framework — released by the Presidential Climate Commission (PCC) — puts people at the center of decision-making, especially those most impacted, the poor, women, people with disabilities, and youth. The policy areas that constitute the framework include skills development, economic diversification and innovation, and social protection.

South Africa launched its Just Energy Transition Investment Plan (JET IP) at COP 27 in November 2022, setting out the scale of need and the investments required at US$98.7 billion for the five-year period, 2023–2027, to support its decarbonization commitments.

RMI

POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 3 Steps

STAGE 3

DEVELOP TRANSITION PLAN

APPLIED

Questions Being Addressed

What is the role of different stakeholders in the system planning process?

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Define amount of support needed for all other activities

Consult stakeholders (especially workers and communities) and experts extensively to define.

Transition and investment plan that includes details on financing needs for each activity bucket, the generation and transmission transition plan, and relevant timelines.

CASE STUDY – UNITED STATES

After an extensive consultation process with a wide array of stakeholders (including worker and community representatives), the state of Colorado passed legislation to support coal transition in the state.

In addition to having strong customer protections, the law enables use of CTM proceeds to mitigate worker and community impacts and requires utilities to fund already approved local government or school district projects.

The law also supports the financing of a newly established Just Transition Office tasked with ensuring coal transition in the state supports affected people.

RMI

POWER SECTOR IMPLEMENTATION FRAMEWORK

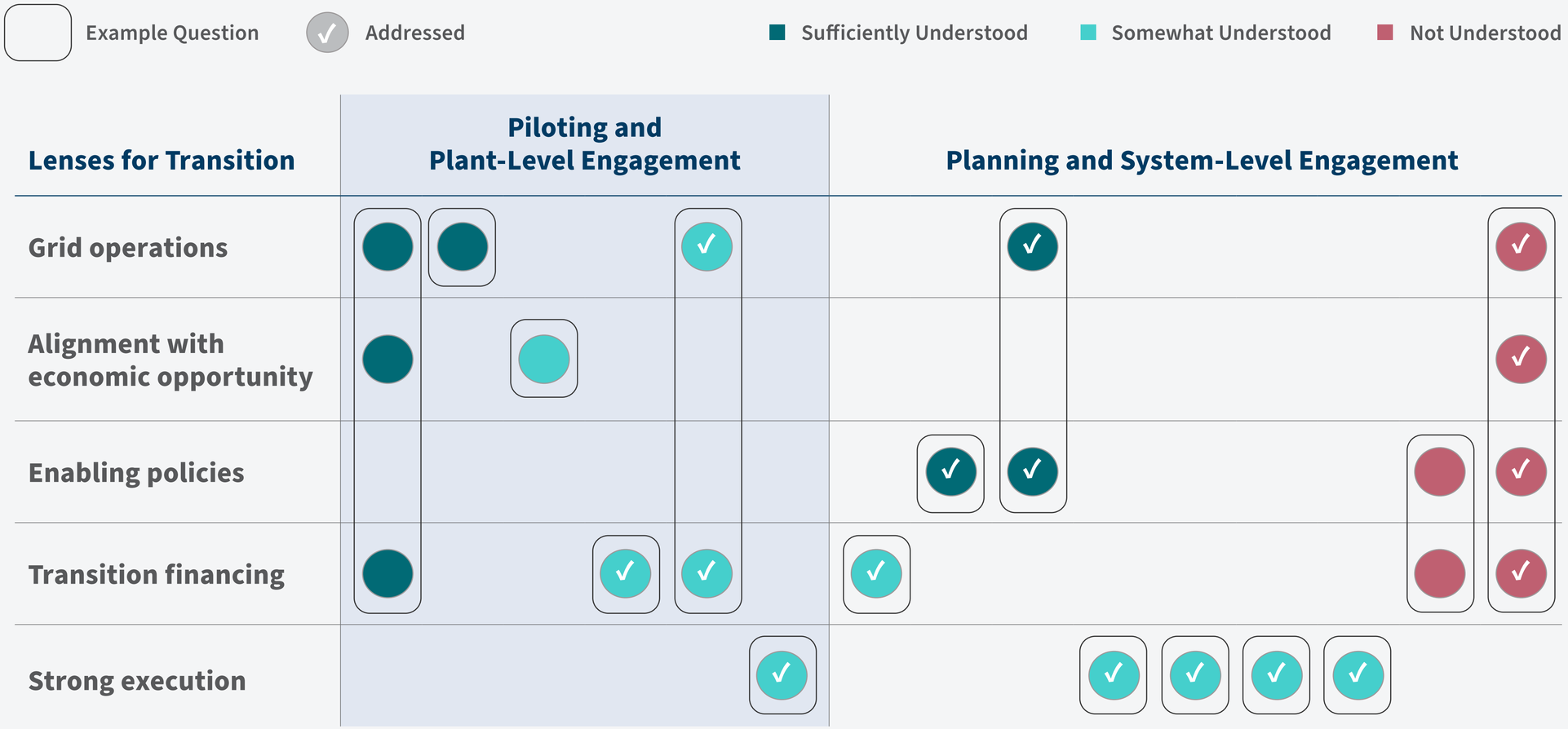
Summary – Stage 3

Output includes transition and investment plan that contains:

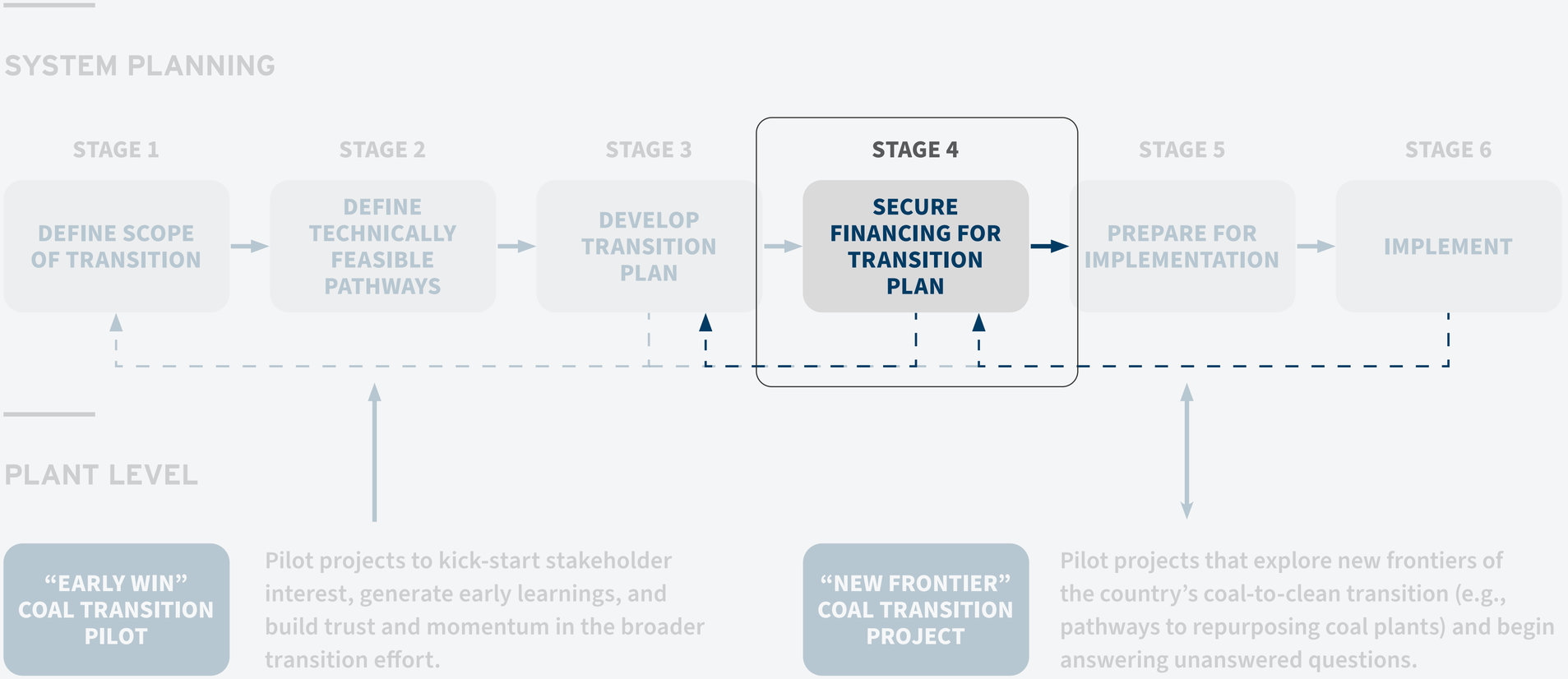
- Set of policies and regulations to be modified, stopped, or introduced
- Resource plan with plant additions, retirements, and operations
- Financing needs, allocated by each “activity bucket

STAGE 3

DEVELOP TRANSITION PLAN



System Planning Process – Stage 4



System Planning Process – Stage 4 Overview

STAGE 4

SECURE FINANCING FOR TRANSITION PLAN

CONCEPTUAL

Based on first draft of transition & investment plan, governmental implementation bodies develop:

High-level, long-term financing plan with aggregate financing needs and timelines[xiv]

Detailed, near-term financing plan with breakdown by financing type and financial institution,[xv] **and allocations for specific activities**[xvi]

Do a roadshow with financiers to test appetite for financing plan

Refine and even revisit transition plan based on input from financiers and country priorities

Sign term sheets and secure financing for transition plan

xiv Should be publicly available. xv May not be publicly shared. RMI is assuming required due diligence and project preparation is completed before the detailed plant is developed. xvi This likely includes at least identifying (and potentially implementing) governance structures for measurement and verification.

POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 4 Steps

STAGE 4

SECURE FINANCING FOR TRANSITION PLAN

APPLIED

High-level, long-term financing plan with aggregate financing needs and timelines

Detailed, near-term financing plan with breakdown by financing type and financial institution, and allocations for specific activities

Do a roadshow with financiers to test appetite for financing plan.

Refine and even revisit transition plan based on input from financiers and country priorities.

Sign term sheets and secure financing for transition plan.

CASE STUDY – SOUTH AFRICA

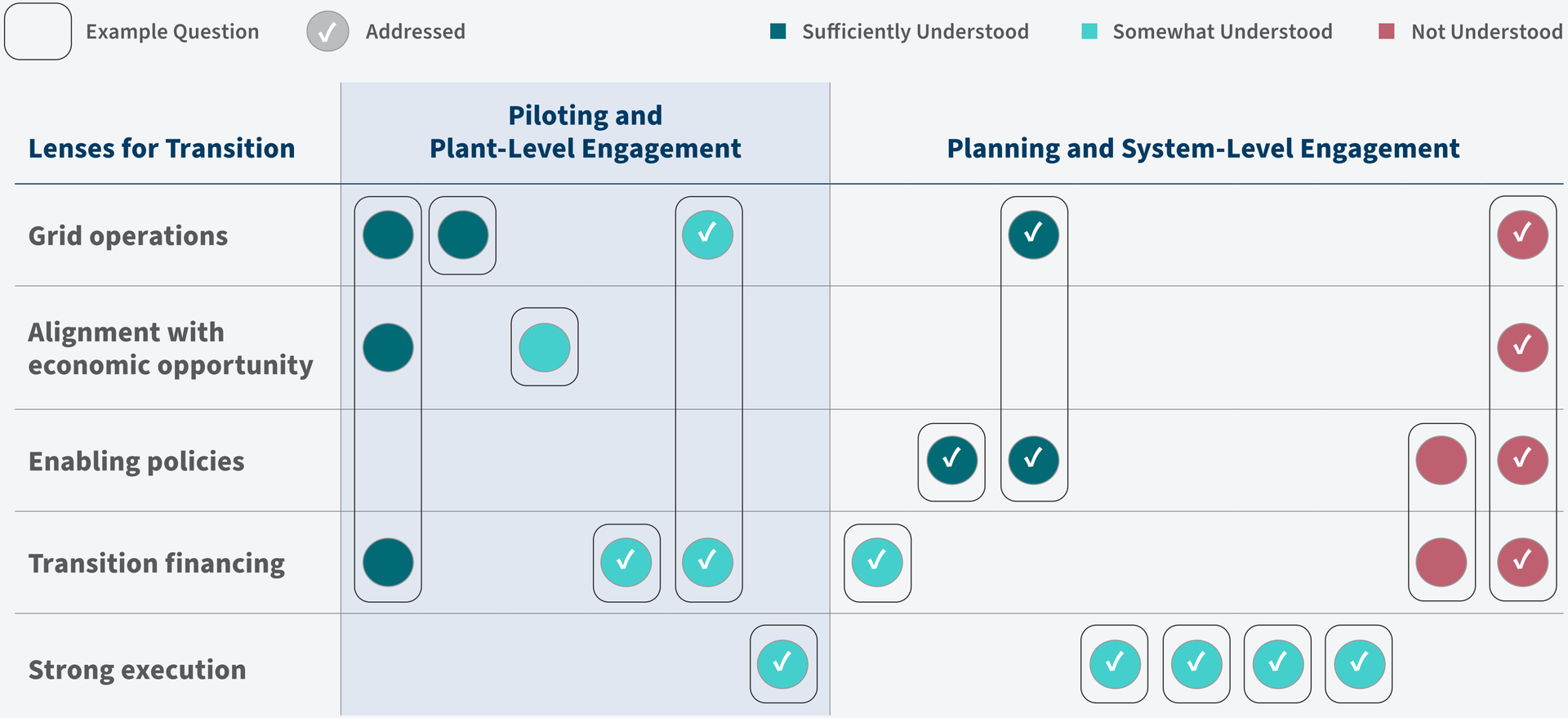
Details on financing by need, type of financing in JET IP

Investment Area	Financing *(ZAR billions)*	Concessional	Commercial	Venture Capital	Grant	Budget
Electricity						
Decommission coal plants	4	✓	✓			✓
Solar & Wind	498		✓			
Batteries	23	✓	✓			✓
Transmission & Distribution	465	✓	✓			✓
Just Energy Transition (Mpumalanga Region)						
Repurposing of coal plants + mines	16.4	✓	✓	✓	✓	✓
Improvement of infrastructure for development	12		✓			✓
Relief for coal workers + economic diversification	30	✓	✓	✓	✓	✓
Investment in youth	0.7				✓	✓
Policies for post-mining redevelopment	0.05				✓	
Plan and capacity for success	1.3				✓	✓

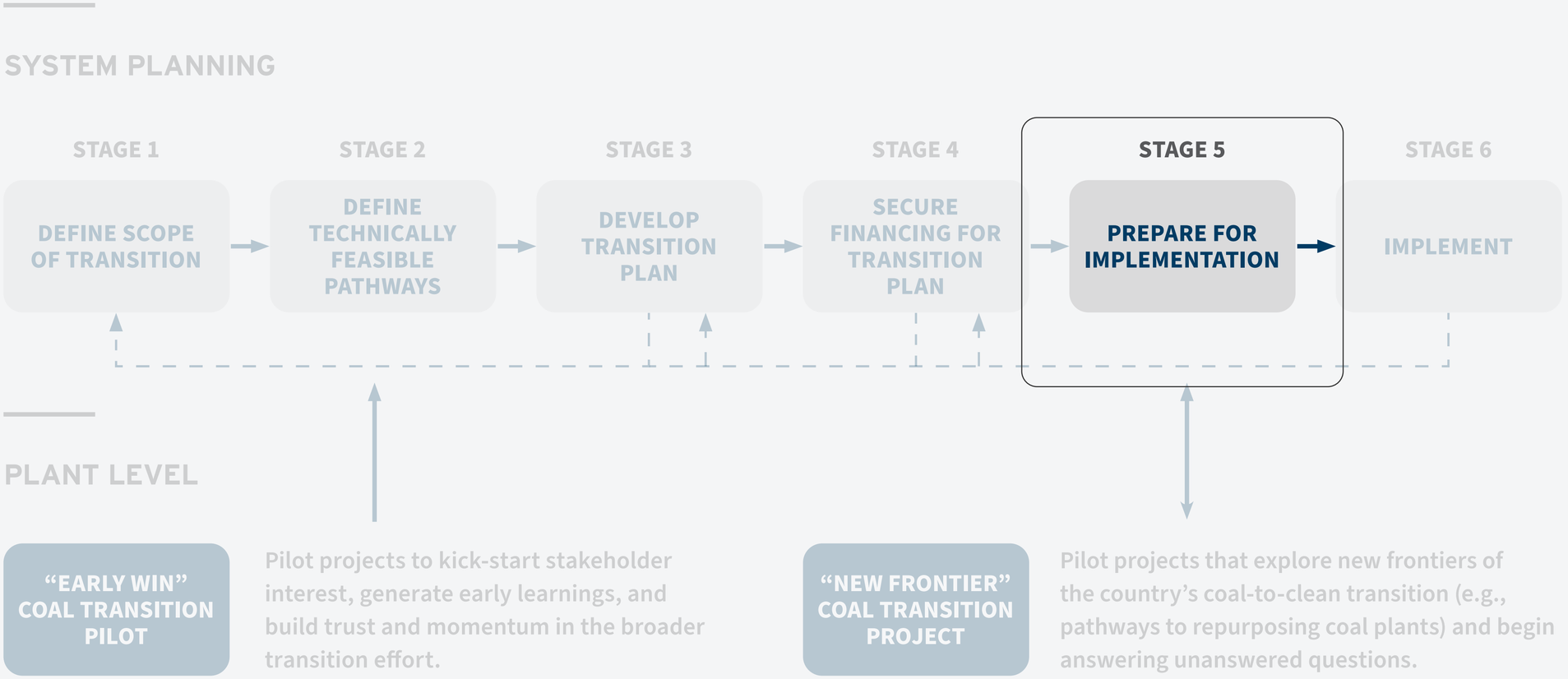
Summary – Stage 4

Output includes:

- High-level, long-term financing plan with aggregate financing needs and timelines; likely to be publicly available
- Detailed, near-term financing plan with specific financiers, allocations for financing of specific activities. Financial structuring (financing amounts, tenors, costs of financing) should be complete. Near-term plan supports mobilization of long-term financing; likely to *not* be publicly available



System Planning Process – Stage 5



POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 5 Overview

STAGE 5

PREPARE FOR IMPLEMENTATION

CONCEPTUAL

Questions Being Addressed

What institutional capacities are needed to execute on the system transition?

Scale appropriate governance structures identified in earlier stages and prepare them for wide-scale measurement, verification, and evaluation needs. Do this at all appropriate levels (national, provincial, local)

Strengthen capacity in key institutions at all appropriate levels (national, provincial, local)

Complete pre-closure planning through various lenses:

- **Technical and grid reliability**
- **Worker and community support**
- **Policies and regulations**

System Planning Process – Stage 5 Steps

STAGE 5

PREPARE FOR IMPLEMENTATION

APPLIED

Questions Being Addressed

What institutional capacities are needed to execute on the system transition?

Scale appropriate governance structures identified in earlier stages and prepare them for wide-scale measurement, verification, and evaluation needs. Do this at all appropriate levels (national, provincial, local)

Strengthen capacity in key institutions at all appropriate levels (national, provincial, local).

Complete pre-closure planning through various lenses:

- Technical and grid reliability
- Worker and community support
- Policies and regulations

CASE STUDY – GERMANY

Germany, as part of its Act to Reduce and End Coal-Powered Power Generation, is running a series of reverse coal auctions to identify, compensate, and retire its coal-fired power. To ensure scarce public funds are used effectively and to monitor progress, the country has a detailed monitoring, reporting, and verification (MRV) system.

Monitoring and Reporting
This includes **annual emissions self-reporting** based on standardized, electronic templates. These monitoring reports will be released every three years, and the accompanying **emissions data** will be recorded in a national registry and be **publicly available**.

Verification
Verification of the annual emissions data will be done by **accredited independent third-party** verifiers.

Enforcement
Under the National Emissions Trading System (which incorporates coal phaseout), before 2025, entities must pay an **excess emissions penalty** for each tCO2 emitted, set at two times the fixed price.

After 2025, entities must pay EUR 100/tCO2 for each excess tCO2 emitted. Entities have one calendar year for compliance, and **can be fined**, if deemed appropriate.

POWER SECTOR IMPLEMENTATION FRAMEWORK

System Planning Process – Stage 5 Steps

STAGE 5

PREPARE FOR IMPLEMENTATION

APPLIED

Questions Being Addressed

What institutional capacities are needed to execute on the system transition?

How does the country want to support affected people and broader economic opportunity at the system level?

Scale appropriate governance structures identified in earlier stages and prepare them for wide-scale measurement, verification, and evaluation needs. Do this at all appropriate levels (national, provincial, local)

Strengthen capacity in key institutions at all appropriate levels (national, provincial, local).

Complete pre-closure planning through various lenses:

- **Technical and grid reliability**
- **Worker and community support**
- **Policies and regulations**

CASE STUDY – SA JET-P PROCESS

To ensure a just transition, South Africa will conduct **pre-closure planning across four interdependent priority areas:**

- Repurposing coal power plants and coal mining lands
- Economic diversification
- Transition of workers and communities
- Enabling conditions for the transition (policies, regulations, and more)

Key components include:

- Holding **community consultations** on future uses of affected land and developing repurposing strategies.
- Sharing timeline and soliciting feedback on **plant closure schedules**
- Developing **pre-layoff plan** — income support, active labor market policies
- Performing interviews/focus groups with coal communities on **"future without coal" vision**, identifying pipeline of pilot projects in alternative promising sectors, and sharing call-for-proposals to implement pipeline
- Designing education, placement, and (public) **employment programs and schemes**

These specific community consultations build on consultations conducted through the process.

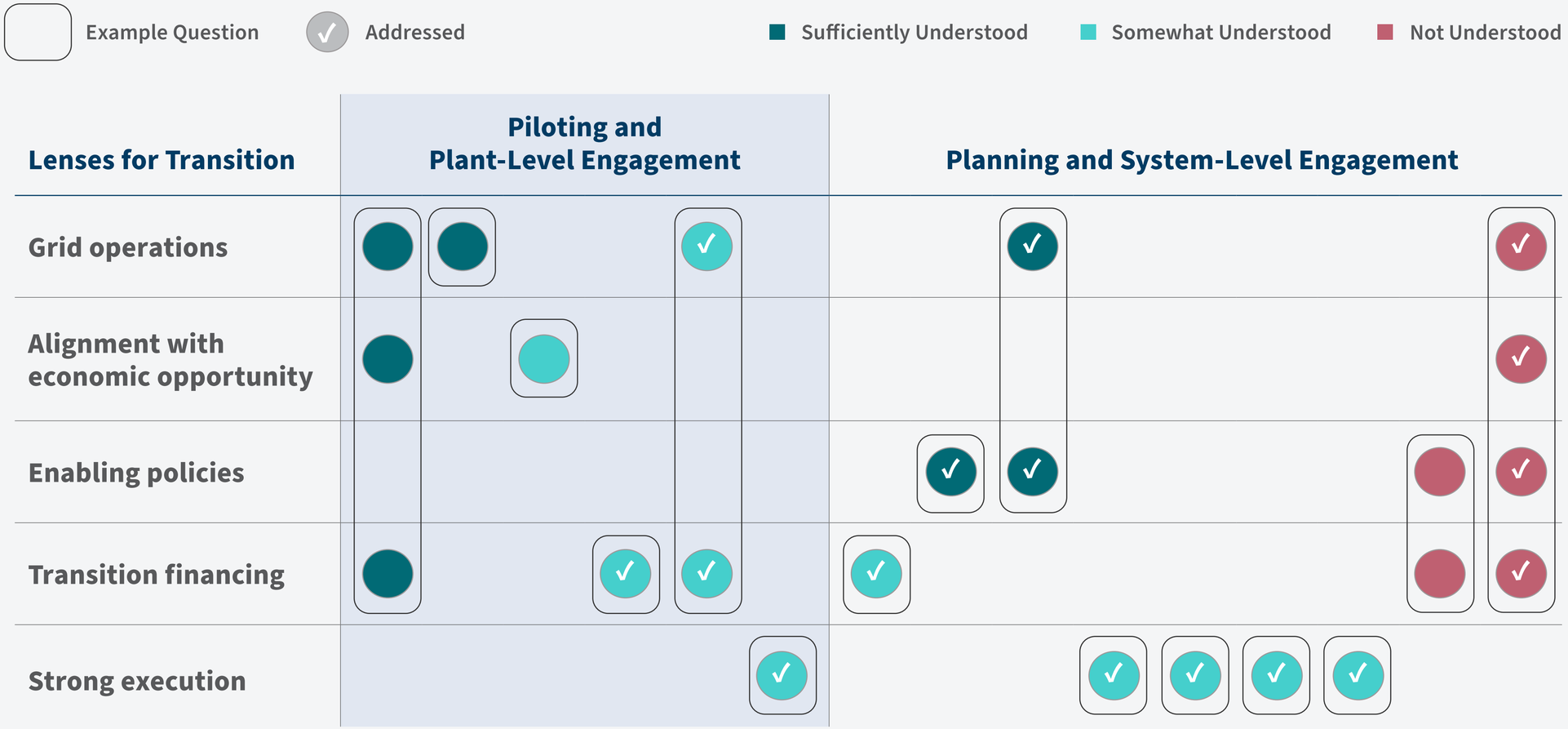
Summary – Stage 5

Output includes:

- Appropriate governance structures in place, pre-closure planning complete, institutional capacities built up

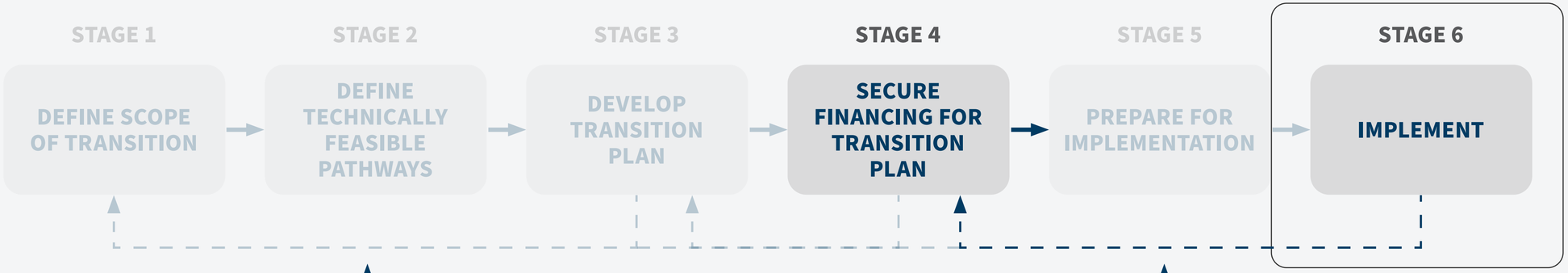
STAGE 5

PREPARE FOR IMPLEMENTATION



Stage 6: Implement and Scale

SYSTEM PLANNING



PLANT LEVEL

“EARLY WIN” COAL TRANSITION PILOT

Pilot projects to kick-start stakeholder interest, generate early learnings, and build trust and momentum in the broader transition effort.

“NEW FRONTIER” COAL TRANSITION PROJECT

Pilot projects that explore new frontiers of the country’s coal-to-clean transition (e.g., pathways to repurposing coal plants) and begin answering unanswered questions.

Stage 6: Implement and Scale Overview

STAGE 6

IMPLEMENT

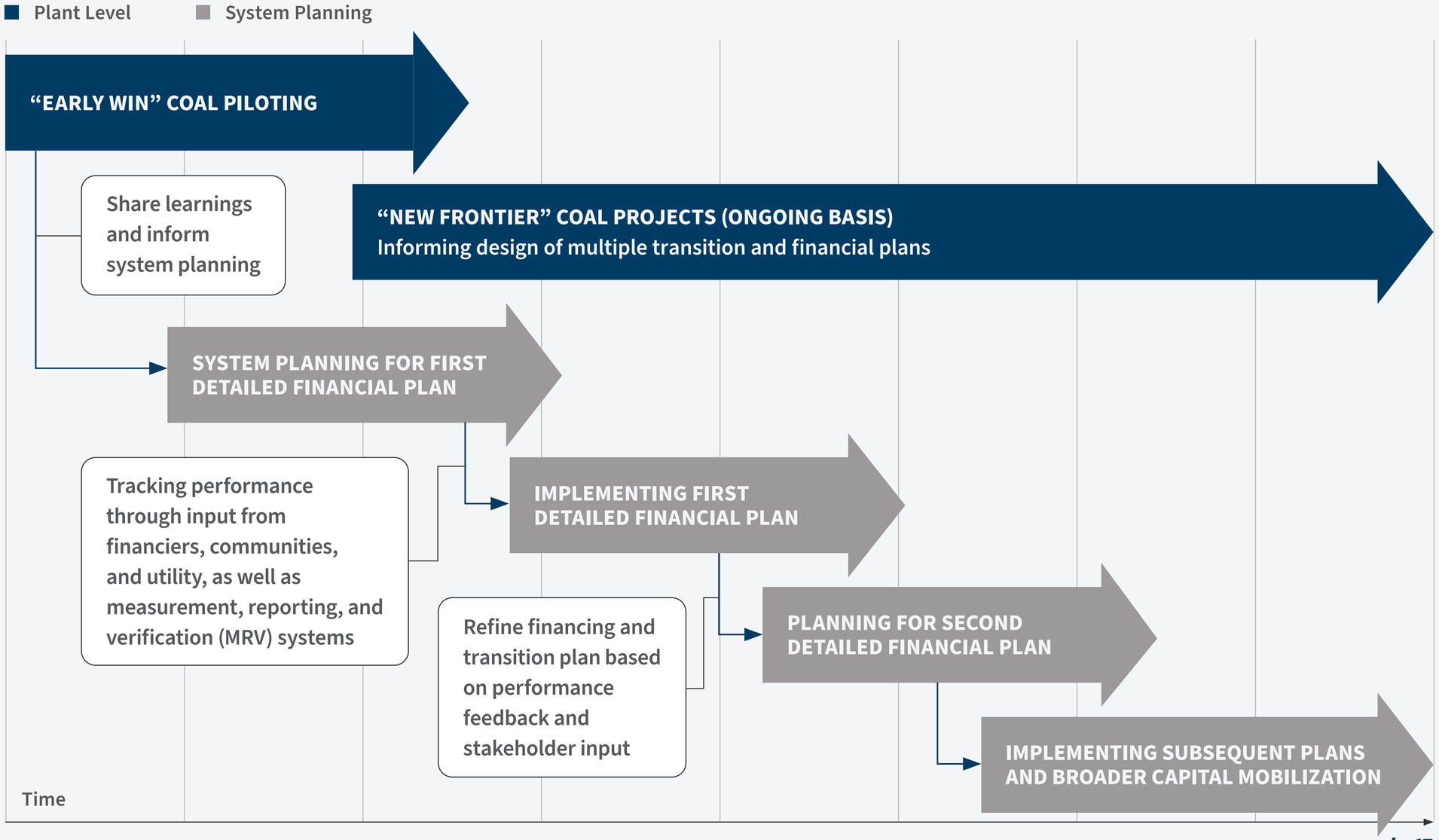
"NEW FRONTIER" COAL TRANSITION PROJECT

CONCEPTUAL

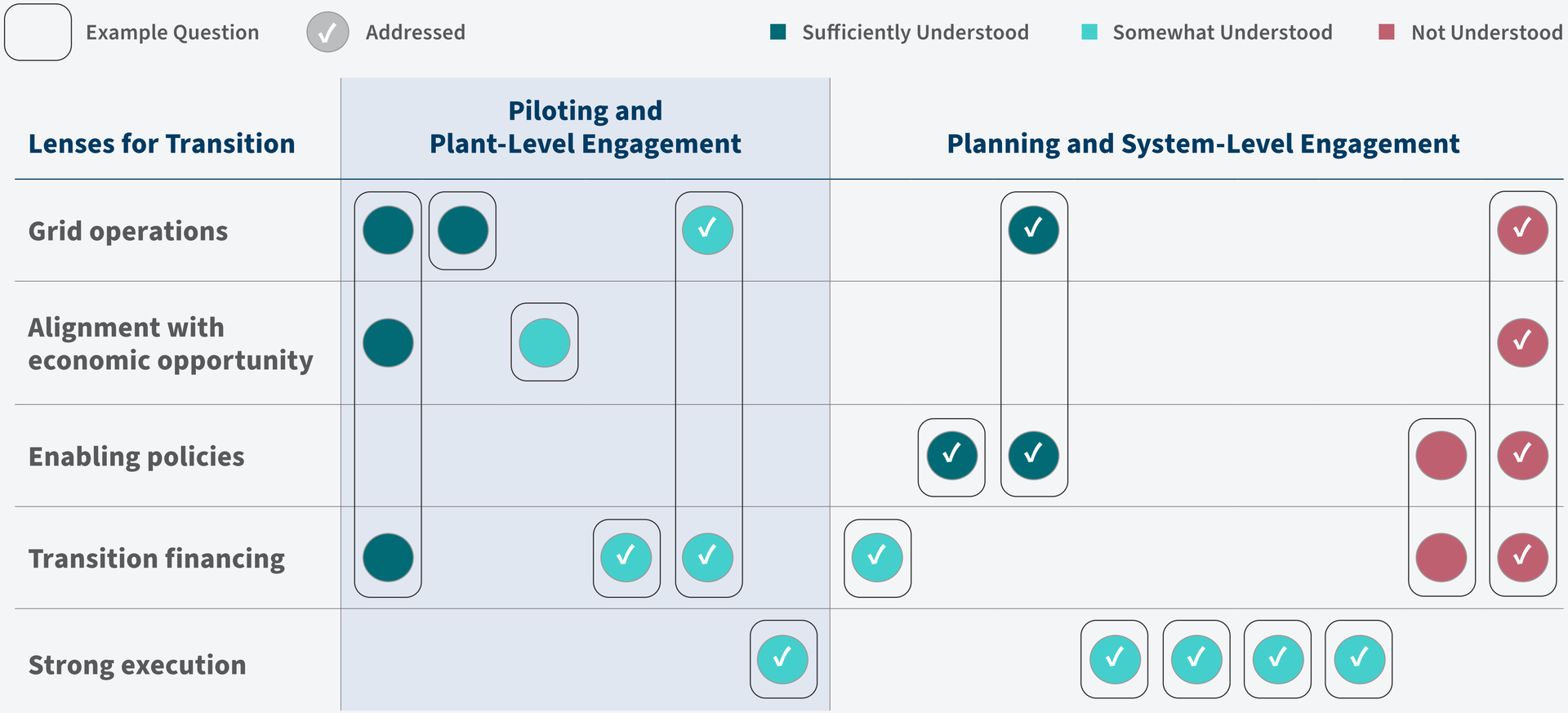
Questions Being Addressed

What institutional capacities are needed to execute on the system transition?

How can policymaking, raising transition capital, and maintaining grid operations interplay? How can they be sequenced to support economic opportunity and climate ambition?



Through this brief, RMI has highlighted questions key to the power sector implementation of a country coal-to-clean transition, pointed to insights that address those questions, and demonstrated how those questions interconnect. Further work is needed – more knowledge sharing, scaling of solutions, and original research – to deepen and accelerate implementation.



Appendix A: Indonesian Stakeholder Landscape

APPENDIX A:
INDONESIAN
STAKEHOLDER
LANDSCAPE

Stakeholder Landscape for Indonesia's Coal-to-Clean Transition[xvii]

	 Government	 Regulator	 Financier	 Workforce Rep.	 Community Rep.	 Civil Society	 Utilities & IPPs
Local	• MARVES • MoF • MEMR • MSOE • MOM	• MOF • MEMR	• PT SMI • INA • Local Banks	• APBI-ICMA • KSBSI	• WALHI • IRES	• IESR • Cerah • TrendAsia	• PLN • APLSI
International	• US Gov't • Japanese Gov't • IPG		• GFANZ • ADB • World Bank	• ILO		• CPI • E3G • NRDC • IEEFA • CWC	

xvii This is not a comprehensive stakeholder map.

Glossary of Stakeholders: Government Ministries, Organizations, and Agencies

Stakeholder Geographic Scope (Local/International)	Type	Short description
Ministry of Energy and Mineral Resources (MEMR) — esdm.go.id/en	Government	MEMR is responsible for providing assistance to the president and vice president in performing government's affairs in the field of energy and mineral resources.
Ministry of Finance (MOF) — kemenkeu.go.id/home	Government	MOF is responsible for the nation's finance and state assets.
Coordinating Ministry for Maritime and Investment Affairs (MARVES) — maritim.go.id	Government	MARVES is in charge of planning, coordinating, and synchronizing policies in maritime affairs.
Ministry of State-Owned Enterprises (MSOE) — bumn.go.id	Government	MSOE oversees the development of state-owned enterprises in Indonesia.
Ministry of Manpower (MOM) — kemnaker.go.id	Government	MOM is responsible for the workers and labor laws of Indonesia.
PT Sarana Multi Infrastruktur (Persero) (PT SMI) — ptsmi.co.id	Government	PT SMI is the Special Mission Vehicle (SMV) under the Ministry of Finance that is engaged in financing and preparing infrastructure projects.
PT Perusahaan Listrik Negara (Persero) (PLN) — portal.pln.co.id	Utility	PLN is an Indonesian government-owned corporation that has a monopoly on electric power distribution in Indonesia and generates the majority of the country's electrical power.
Indonesian Private Electricity Manufacturers Association (APLSI) — aplsi.id	IPP	APLSI is an association comprising Indonesian private electricity producers with PT.PLN (Persero), the government, and entrepreneurs regarding matters related to the activities of Indonesian private power producers.

Glossary of Stakeholders: Foreign Governments and International Organizations

Stakeholder Geographic Scope (Local/International)	Type	Short description
United States — whitehouse.gov	Government	The United States is working with Indonesia and International Partners Group countries to support the goal of a swift and just energy transition.
Japan — japan.kantei.go.jp	Government	Japan and the United States are co-leading the International Partners Group (IPG) in the Just Energy Transition Partnership (JETP) for Indonesia.
International Partners Group (IPG)	Group of countries	IPG is a group of countries working together to support Indonesia's energy transition. They include the Governments of Japan, the United States, Canada, Denmark, the European Union, the Federal Republic of Germany, the French Republic, Norway, the Republic of Italy, and the United Kingdom of Great Britain and Northern Ireland.
Glasgow Financial Alliance for Net Zero (GFANZ) — gfanzero.com	Group of financial orgs.	GFANZ is a coalition of financial institutions committed to accelerating the decarbonization of the economy. For Indonesia, they include Bank of America, Citi, Deutsche Bank, HSBC, Macquarie, MUFG, and Standard Chartered.
World Bank — worldbank.org	International financial org.	The World Bank is an international financial institution that provides loans and grants to the governments of low- and middle-income countries for the purpose of pursuing capital projects.
Asian Development Bank (ADB) — adb.org	International financial org.	ADB is a regional development bank committed to promoting social and economic development in Asia.
International Labour Organization (ILO) — ilo.org	International organization	The ILO is a United Nations agency with the mandate to advance social and economic justice by setting international labour standards.

Glossary of Stakeholders: Local and International NGOs

Stakeholder Geographic Scope (Local/International)	Type	Short description
Institute for Essential Services Reform (IESR) — iesr.or.id/en	NGO	IESR is a think-tank in the field of energy and environment that encourages transformation into a low-carbon energy system.
Yayasan Indonesia Cerah (CERAH) — cerah.or.id/en	NGO	CERAH is an Indonesian nonprofit organization working to advance the energy transition policy agenda in Indonesia.
Climate Policy Initiative (CPI) — climatepolicyinitiative.org	NGO	CPI is an analysis and advisory organization with deep expertise in finance and policy helping governments, businesses, and financial institutions drive economic growth while addressing climate change.
E3G — e3g.org	NGO	E3G is an independent climate change think tank with a global outlook tackling the barriers and advancing the solutions to a safe climate.
Natural Resources Defense Council (NRDC) — nrdc.org	NGO	NRDC is a global advocacy organization focused on protecting natural systems and the people that live within them. It works on climate change, food and water, health, and more.
Institute for Energy Economics and Financial Analysis (IEEFA) — ieefa.org	NGO	IEEFA examines issues related to energy markets, trends, and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable, and profitable energy economy.
Climateworks Centre (CWC) — climateworkscentre.org	NGO	CWC bridges research and action, to achieve the system-level transitions required to reach net-zero emissions across Australia, Southeast Asia, and the Pacific.

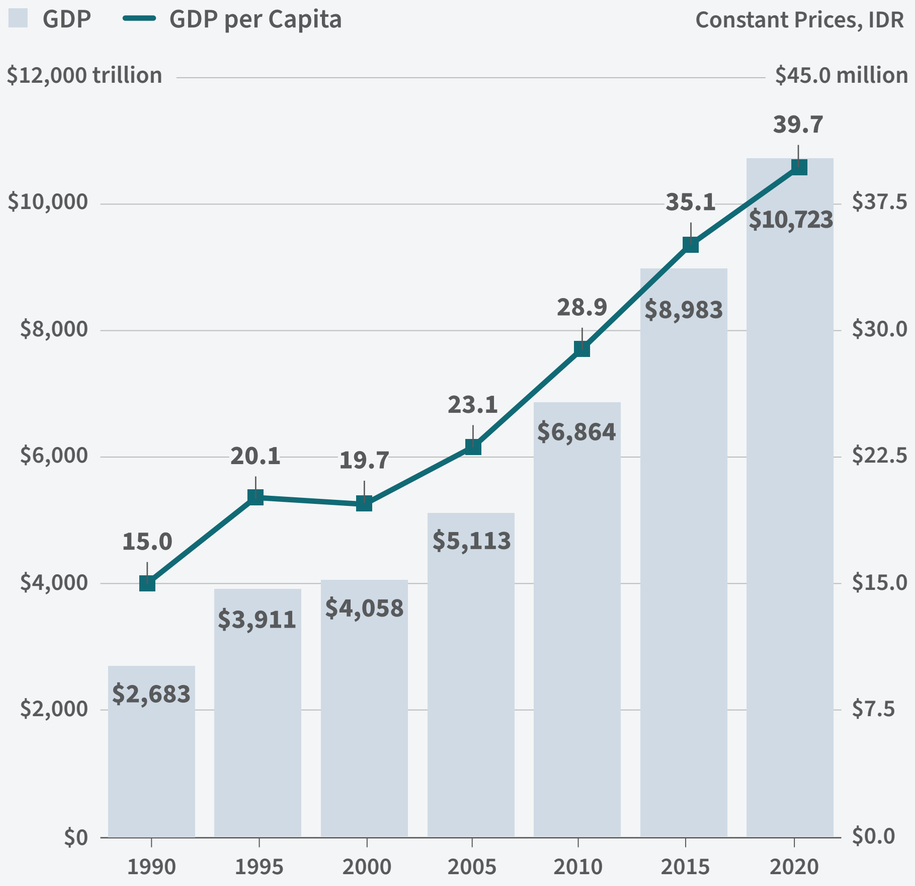
Glossary of Stakeholders: Workforce and Community Organizations

Stakeholder Geographic Scope (Local/International)	Type	Short description
Indonesian Forum for Living Environment (Wahana Lingkungan Hidup Indonesia, WALHI) — walhi.or.id	NGO	WALHI is the largest and oldest environmental advocacy NGO in Indonesia. WALHI is part of the Friends of the Earth International (FoEI) network.
Masyarakat Energi Terbarukan Indonesia (Indonesia Renewable Energy Society) (METI-IRES) — meti.or.id	NGO	METI is a forum to discuss and exchange views on strategic and pragmatic issues of using renewable energy to serve the nation's interest and objectives to be less dependent on fossil energy.
Indonesian Coal Mining Association (APBI-ICMA) — apbi-icma.org	NGO	APBI-ICMA is an organization that embraces both upstream and downstream aspects of the coal industry in Indonesia, creating an environment for its members to discuss the common concern, exchange ideas, and works toward a common goal for the coal mining industry.
Confederation of All Indonesian Trade Unions (KSBSI) — ksbsi.org	Trade union	KSBSI is a national trade union center in Indonesia. It was founded in 1992 and claims a membership of 2.1 million.

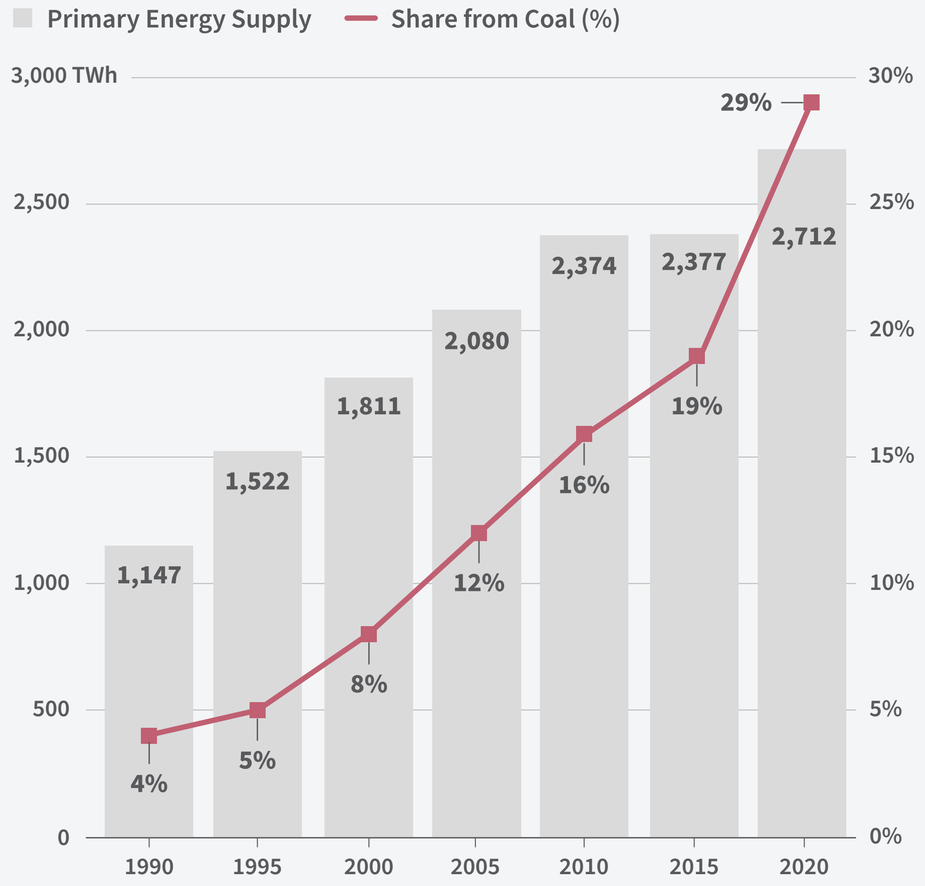
Appendix B: Indonesian Context

Indonesia's economy has grown rapidly in the past few decades, and its energy needs and coal consumption have quickly grown in parallel.

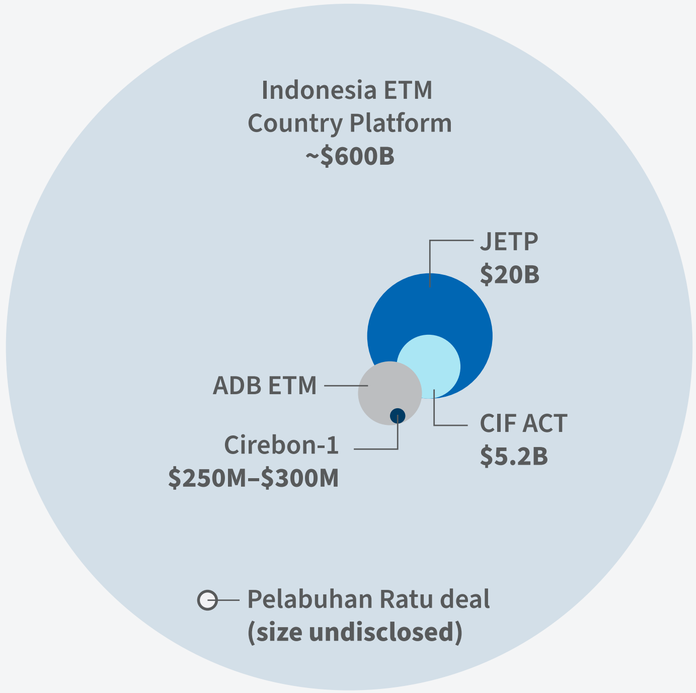
Indonesia's GDP and GDP per Capita Grew by ~160% and ~100% from 2000 to 2020[3]



Indonesia Consumed ~60% More Energy in 2020 than in 2000, and Coal Now Supplies ~30% of That Energy[4]



On the other hand, over the past year, Indonesia has been steadily raising its climate and coal transition ambitions – and has secured international commitments to bolster those ambitions.



October 2021

PLN's 2021–2030 Electricity Supply Business Plan (RUPTL) is released, with renewable energy projects being the majority of new generation capacity additions for the first time

March 2022

Country releases nationally determined contribution (NDC) aiming for 29% unconditional emissions reduction (from BAU by 2030) and 41% reduction conditional on support

November 2022

Asian Development Bank (ADB) and Indonesia partners sign MOU for the early retirement of the 660 MW Cirebon 1 coal plant

2021 2022 2023

November 2021

Indonesia partially signs onto PPCA statement saying it will "consider accelerating coal phaseout into the 2040s, conditional on agreeing additional international financial and technical assistance"

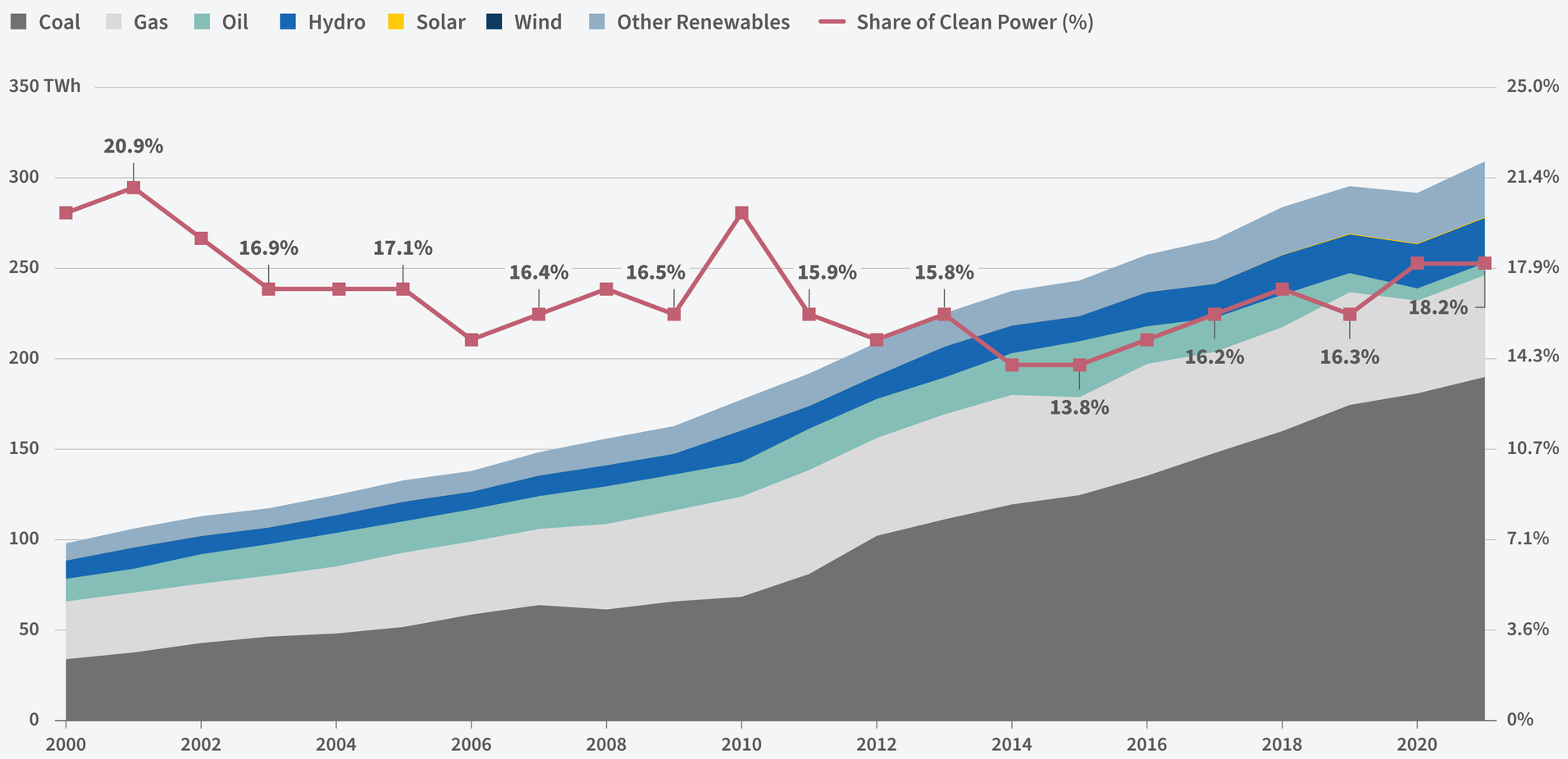
September 2022

Indonesia submits enhanced NDC, increasing its unconditional and conditional emissions targets from 29% to 32%, and from 41% to 43% respectively

November 2022

Indonesia and International Partners Group (IPG) announce $20 billion Just Energy Transition Partnership (JETP), in part to fund country's transition away from coal

The electricity mix in Indonesia has been **dominated by coal** and continues to be so. The share of **clean power** has remained largely **constant** over the past two decades.[xiii,5]

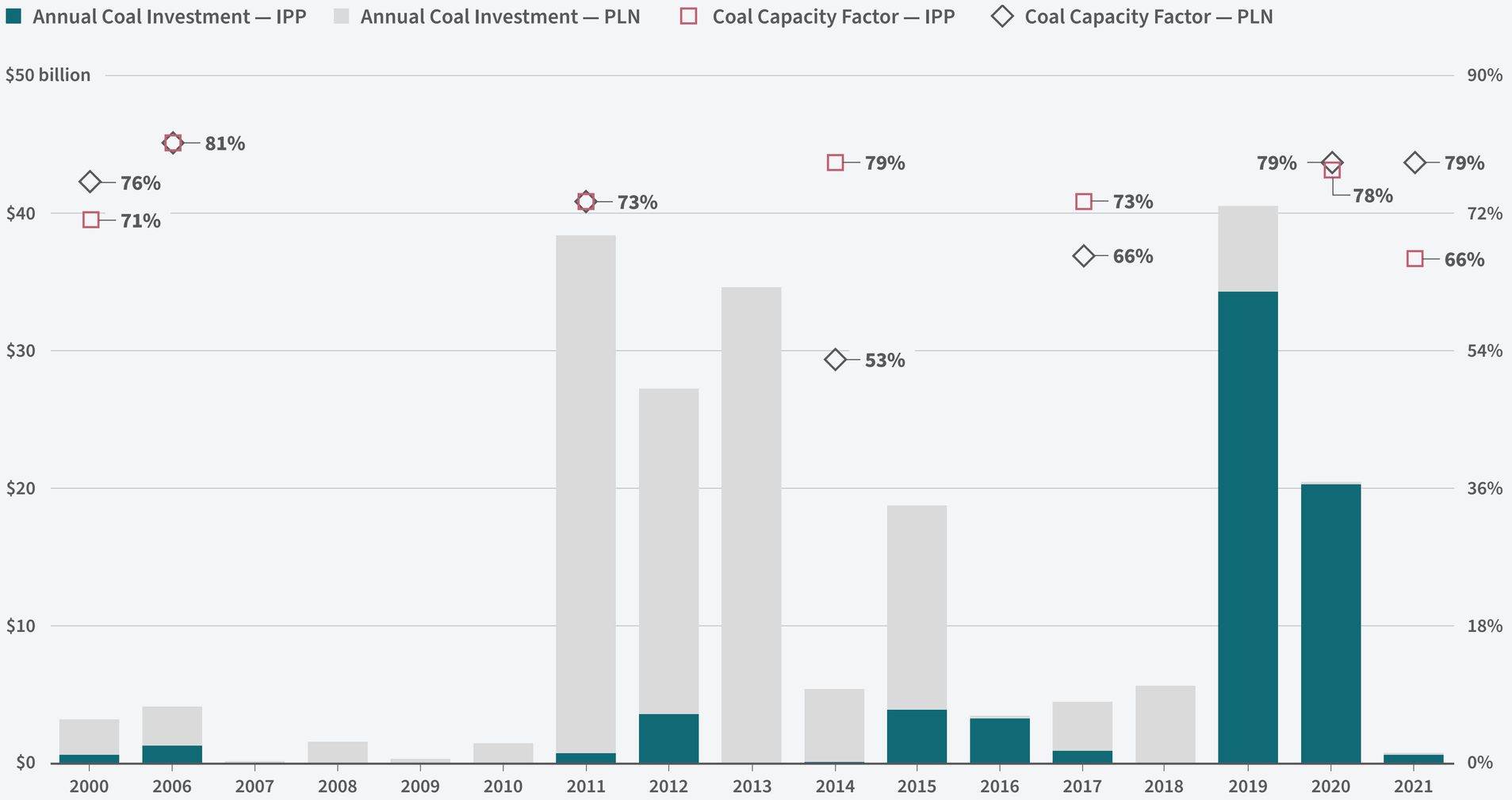


xiii Clean power includes all renewables (incl. hydro) and nuclear power.

PLN has a **de-facto monopoly** on transmission, distribution, and retail. On generation, it **produces two-thirds** of the country's power with the remainder produced by independent power producers (**IPPs**) and captive coal plants.[6]

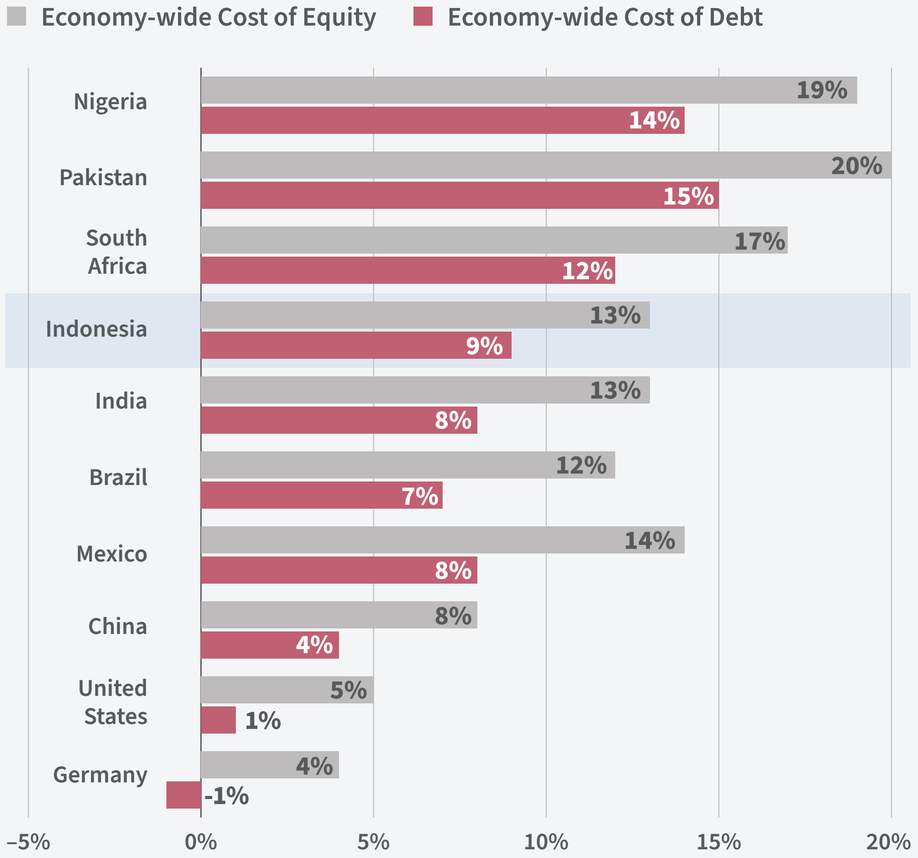
The Power Sector in Indonesia is Regulated and Supervised by the MoEMR, the MoSOE, and the MoF

Ownership of Indonesian coal power is **split** between PLN and IPPs. Recently, there has been **significant new investment** in **IPP coal** power.[7]

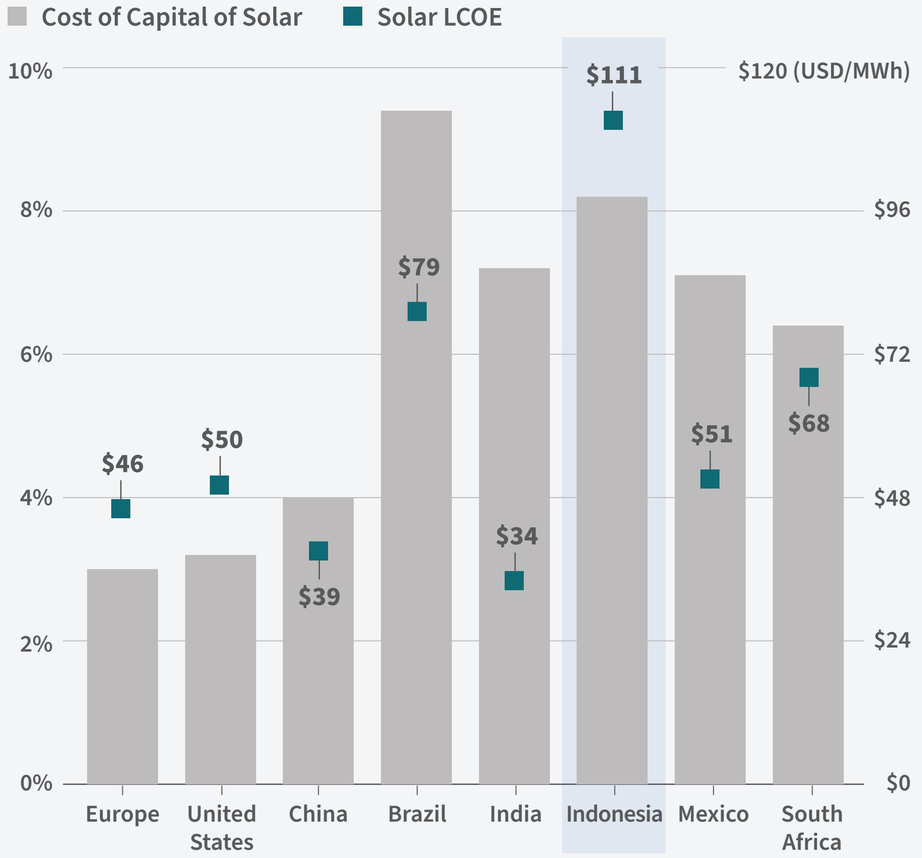


On both an economy-wide and project finance basis, Indonesia has **high costs of financing** – though in the same ballpark as developing economies – that translates to **high levelized costs** for renewable energy.[8]

Economy-wide Cost of Financing Estimates

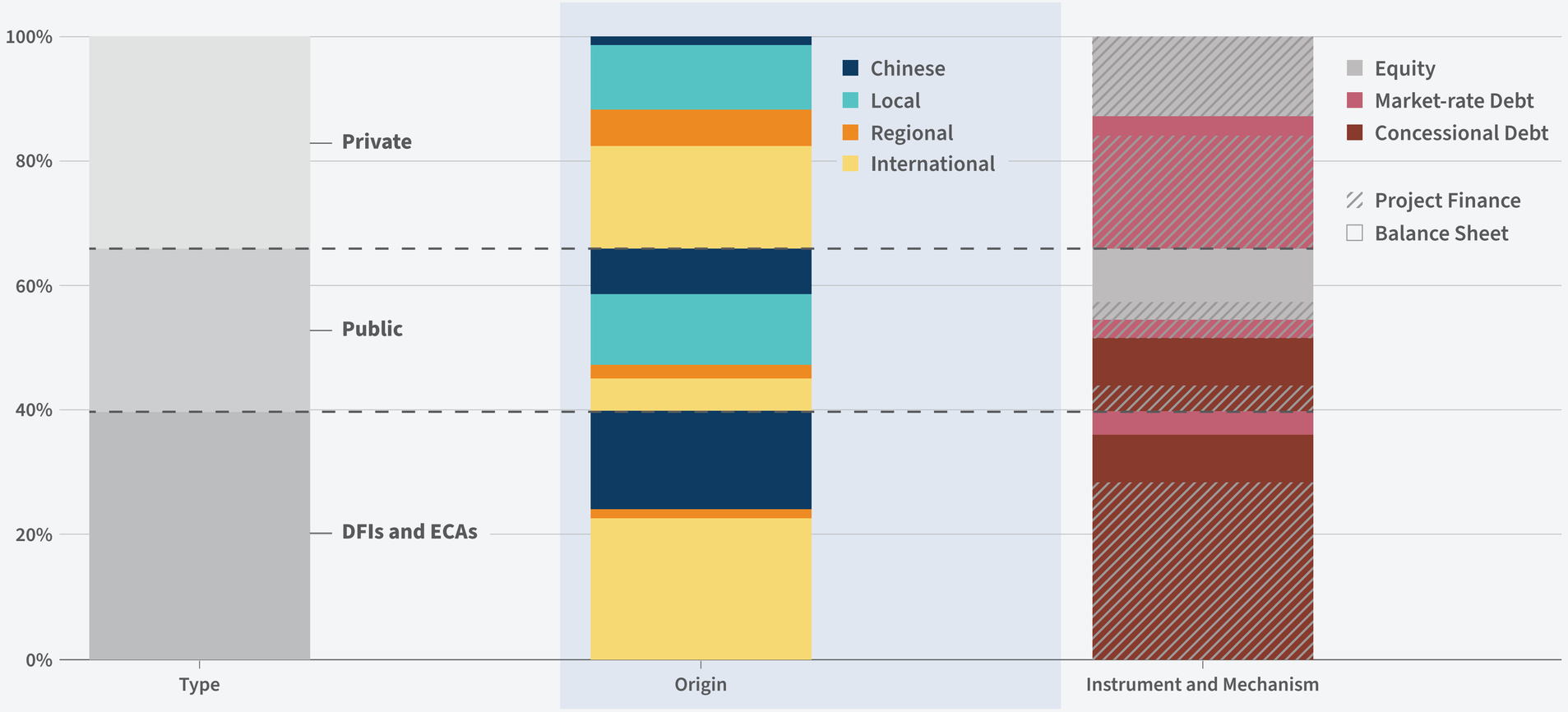


Levelized Costs for Renewable Energy



As a result, international financing (especially concessional debt) from development finance institutions (DFIs) has played a significant role in financing power investments.[9]

Breakdown of Indonesian Power Project Financing, by Source, Type, Origin, and Instrument



Endnotes

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