

Quantifying Barriers to More Effective Private Sector Involvement in the Transition to Low Carbon Energy Systems

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Energy Challenges



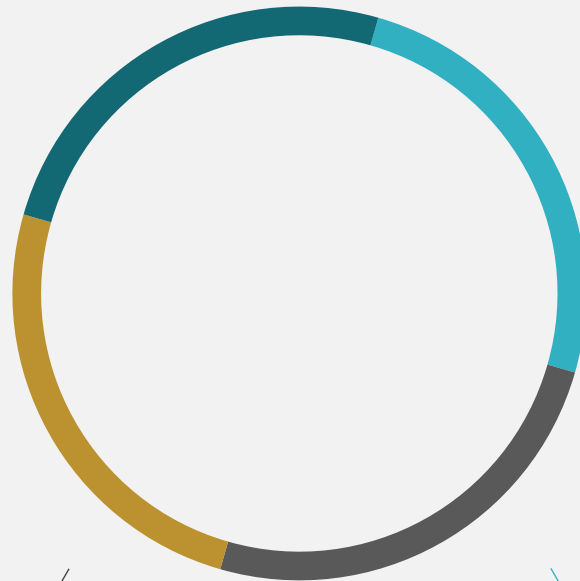
Climate change

There is a need to reduce the historic dependence on fossil fuel-based energy



Increase demand

Energy demand is dominated by fossil fuel-based energy



Economic growth

Economic growth leads to an increasing energy demand from all sectors in the economy



Low carbon energy system


Greater uptake of low carbon energy is crucial to address energy challenges




Transition towards low carbon energy system



Huge investment needed



Governments are cash-strapped



Private finance mobilization



Quantify barriers to more effective private sector involvement in low carbon investment

- Measure the direct effect and interaction of barriers that influence low carbon investment
- Explore how these barriers are being defined, evaluated, and managed



Research Objective

Theoretical Framework

Sociotechnical theory

Conceptualises the energy transition as a large scale structural change that deeply transforms patterns of energy production and consumption.

Energy transition is perceived as:

- Multidimensional

Involve interactions between actors and institutions at different levels

- Long time span

Multi-level Perspective Approach

Provides a conceptual framework for low carbon transition based on tripartite taxonomy: **macro-, messo-, and micro-level** determinants.



Elicited measures for low carbon investment barriers

Policy

Macro level

- Lack of coordination among institutions
- Inconsistent policies
- Complex land procurement
- Complex permitting process
- Fossil fuel subsidies
- Policy uncertainty
- Due diligence
- Inconducive PPA
- International bank regulation
- FDI restrictions

Market

Messo level

- Underdeveloped local supply chain
- Volatile energy prices
- Lack of secondary market for debt
- oligopoly/market power

Firm

Micro level

- Lack of financing options
- Capacity on assessing the investment
- High upfront costs
- Inadequate portfolio standard
- Lack of grid connectivity
- High perceived risks
- Difficult cost-saving estimation

Elicited measures for low carbon investment enablers

Policy changes

- Low carbon subsidies
- Harmonised policies
- Shortened period to get license
- International bank regulation
- Market liberalization
- Market competition
- Cost sharing mechanism
- Financial market stabilization
- Ease procurement property
- Credit rating
- Excessive credit for fossil fuel
- Local content
- Bank insolvency

Policy tools

- Carbon price
- RD&D
- Technology commercialization
- Public funding
- Energy tax
- Green bonds
- Investment incentives
- Asset-backed securities
- Fossil fuel subsidies
- Municipal tax credits

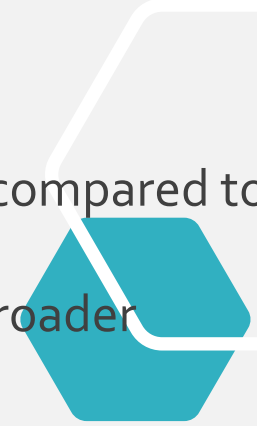
Financial incentives

- Government guarantee
- Low carbon fund
- Capacity building for risks assessment
- Low carbon definition and standards
- Project securitization
- Equity funding
- Tax incentives

Perceived barriers for low carbon investment

ASEAN respondents have generally positive coefficients on the LCI barriers variables compared to OECD respondents

Perceived barriers are more uniform at the firm level, and are more divergent at the broader sociotechnical level (e.g., policy- and market-level)



Most important barriers

Policy

Lack of coordination among ministries | inconsistent policies | complex land procurement process

Market

Underdevelop local supply chain | volatile energy prices

Firm

Lack of financing options | lack of information for project appraisal | high up front costs

Investment enablers

- Low carbon subsidies (e.g., loan guarantee)
- Harmonised policies
- Shorter time to get license
- Explicit carbon pricing
- Government guarantees (e.g., off taker risk)

Semi structured interviews

Scaling up LCI is not only require willingness from financial institutions to supply capital into low carbon projects, but also the attractiveness of LCIs for project developers that in turn will generate demand for low carbon finance.

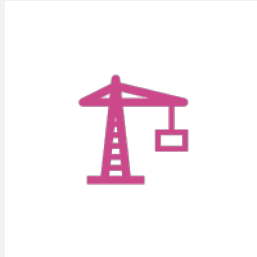
- Geothermal investments in Indonesia and New Zealand
Upstream area and indirect use (i.e., electricity generation)
- Targeted respondents (not limited): project developers and financial institutions



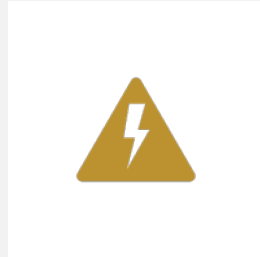
How these barriers are being played out in LCI?



Exploration



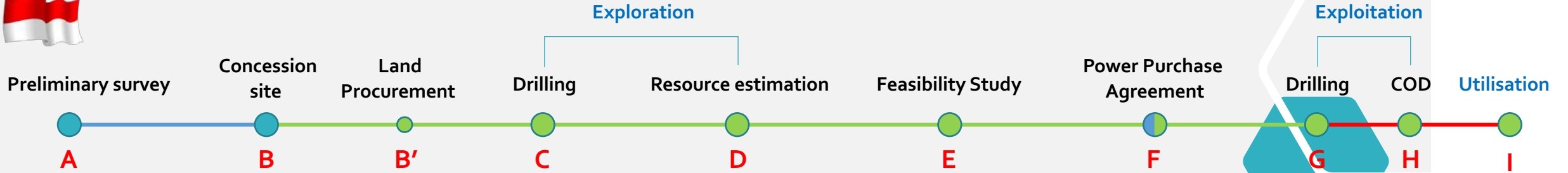
Exploitation



Utilisation

A dark teal background illustration featuring a city skyline with various buildings, wind turbines, and solar panels, all rendered in a stylized, semi-transparent manner.

Risk Profile for Geothermal Projects *Indonesia*



Not Bankable

Bankable

Medium risk

High risk

Low risk

Stakeholders:

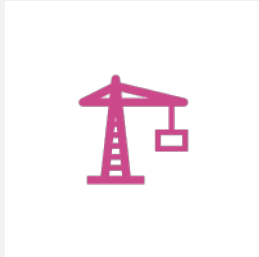
- Government
- Project developers (SOEs, private company)

Risk:

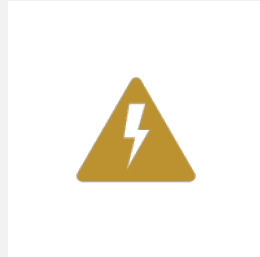
- Government
- Project sponsor(s)
- Project sponsor(s) and lender(s)



Exploration



Exploitation



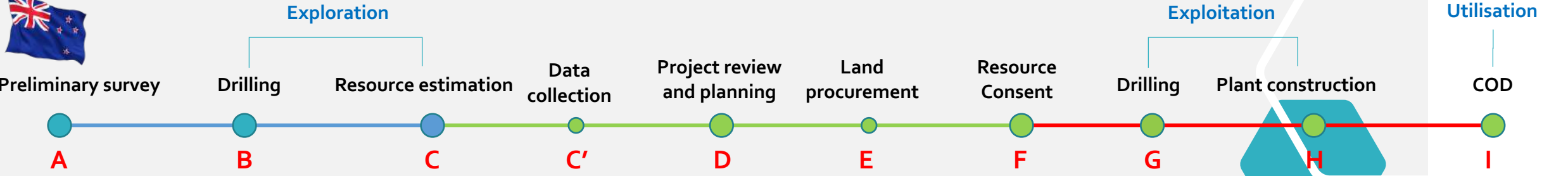
Utilisation



Risk Profile* for Geothermal Projects

New Zealand

**indicative*



Resource identification risks

- Resource risk
- Technical risk

- Resource risk
- Regulatory risk

• Financial risk

- Sociocultural risk

- Regulatory risk
- Delay risk

- Resource risk
- Technical risk
- Completion and delay risk
- Financial risk

- Resource risk
- Demand risk
- Financial risk

Not Bankable

Bankable

Medium risk

High risk

Low risk

Stakeholders:

- Government
- Project developers (SOEs, private company)

Risk:

- Government
- Project sponsor(s)
- Project sponsor(s) and lender(s)

Bottlenecks for geothermal investments

Indonesia

Firm

- Prohibitive initial costs and high resource risks
- Investment uncertainty (e.g., revenue stream)

Market

- Unfavourable energy tariffs to repay the investment costs
- Geothermal energy prices are uncompetitive with dominant energy sources (e.g., coal)

Policy

- Government main targets are electrification and affordability
- Government priority is to generate electricity at the least costs

New Zealand

Firm

- Prohibitive initial costs and high resource risks
- Investment uncertainty (e.g., resource utilization permit from land owners, Resource Consent approval)

Market

- Unclear regulation for multi-tappers

Policy

- Difficulties to access geothermal-related data for project appraisal





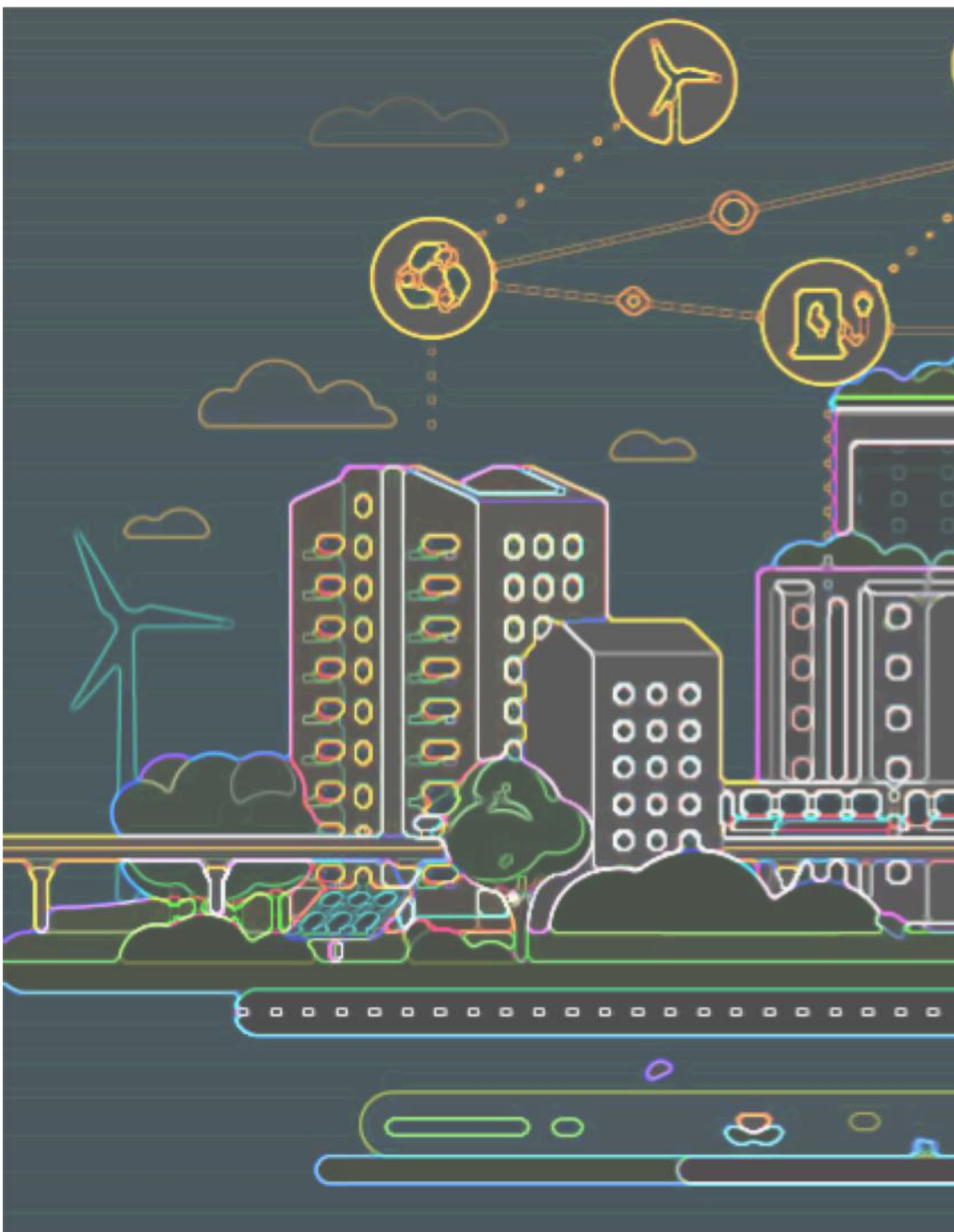
What
can be
done?

?


Investment certainty

- Government policy and regulatory settings (e.g., code of conduct for low carbon investment)
- Clear revenue stream to repay the investment costs (e.g., demand guarantee, competitive energy price)





Thank you

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