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# Barriers to Geothermal Power Project Development in New Zealand

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Tsani Rakhmah

tsani.fauziah@postgrad.otago.ac.nz

# Content

- Power generation sector: upstream and downstream area
- Geothermal project development phase
  - Key activities involved
  - Project risk profile
- Barriers to geothermal project development
- Common financial sources for geothermal projects

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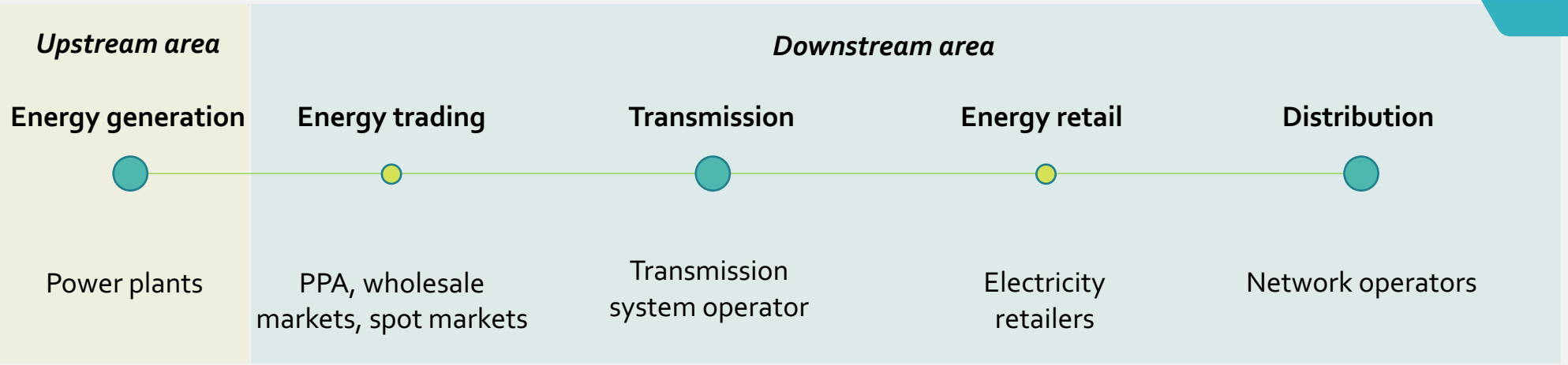
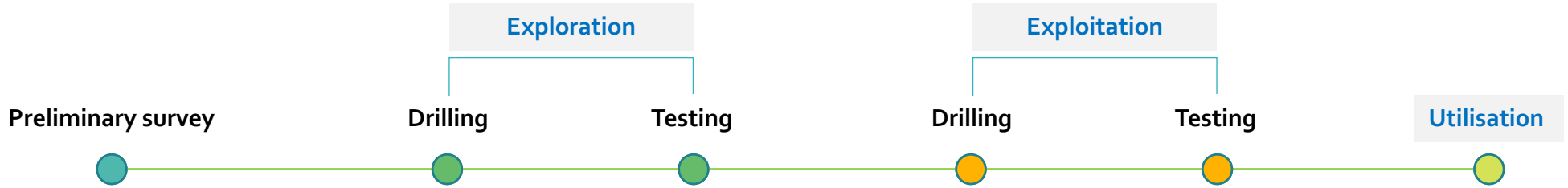
# Upstream and Downstream Area of Power Sector



# A typical full-size geothermal project development phase

## For electricity generation




| | | | | |
|---|---|---|---|---|
| ***Objective*** | To delineate geothermal potential area (i.e., concession site) | To confirm the geothermal reserve amount | To extract the geothermal fluids for commercial utilisation | To convert geothermal energy into electricity |
| ***Overall project risks**** | Medium risk | High risk | | Low risk |
| ***Bankability*#*** | Not bankable | | | More bankable |

* indicative
\# the project ability to attract finance from commercial sources

Source: Adopted from ESMAP, 2012

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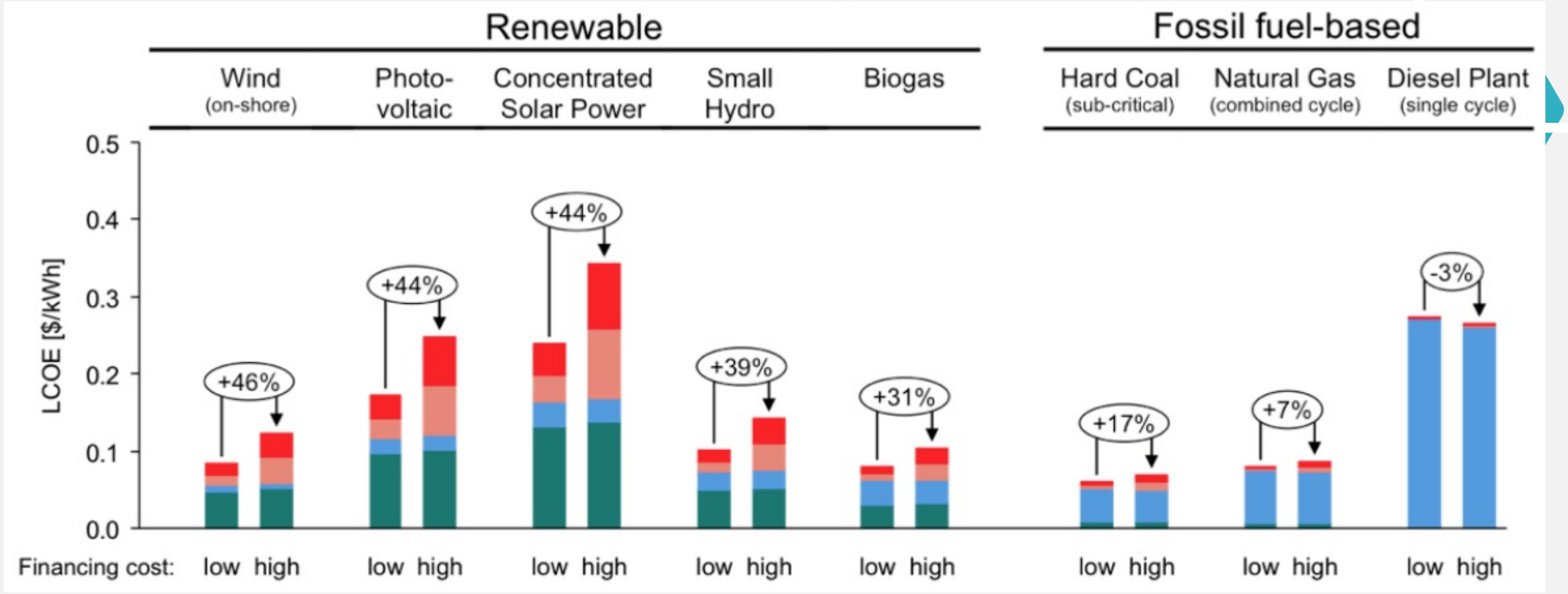
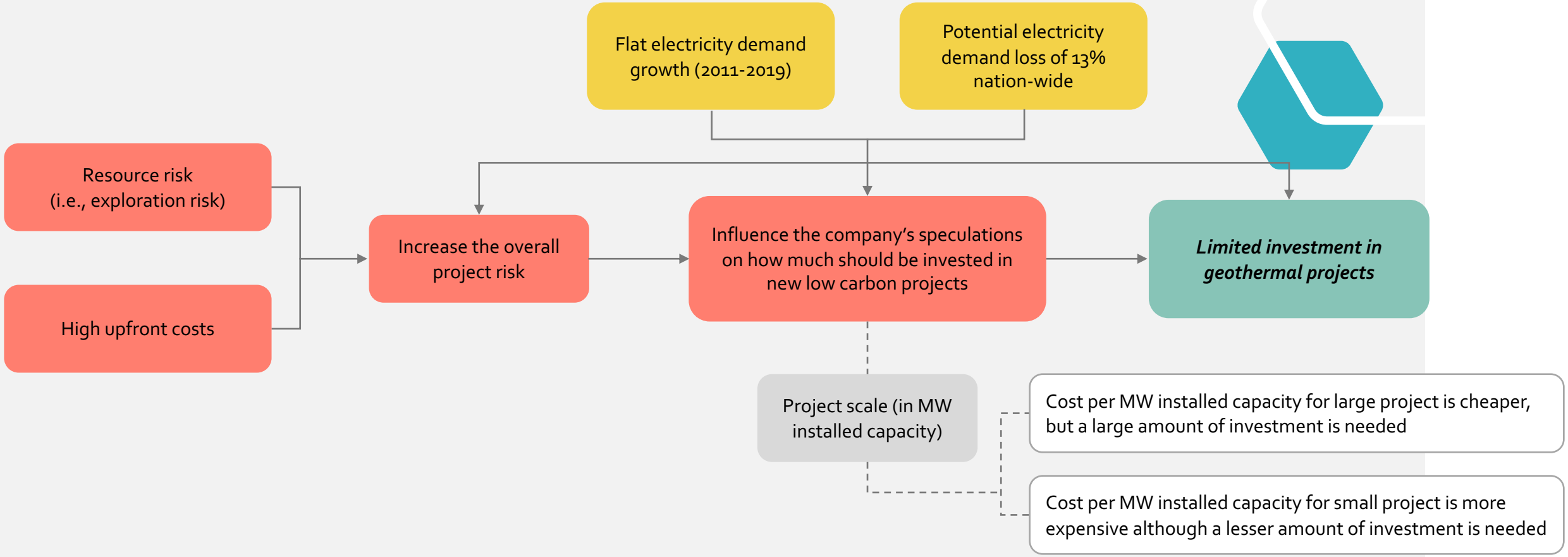
# Power generation costs across different energy sources




Source: Schmidt, 2014

# The relationship of various barriers for geothermal project development in New Zealand




Market-specific barrier

Project developer-specific barrier

A possible outcome

Source: Author

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# Common financial sources for geothermal projects

## 1. Corporate finance

- Lenders rely on company's asset and cashflows to repay the debt, rather than relying on the project cashflow
- Major power companies >> Genesis, Meridien, Trust Power, Contact Energy
- Due diligence:
  - The quality of company (e.g., costumer base, power generation sites, portfolio of assets)
  - Strength of its balance sheet
  - Cashflows
- Interest rates for corporate finance are generally lower than for project finance as the risk is lower > rely on portfolio assets rather than on one asset

# Common financial sources for geothermal projects

## 2. Project finance (mostly limited-recourse)

- Occasionally, banks lend directly via SPV (i.e., project developer) established by project sponsors
  - SPV is set up specifically to invest in a single project
- Lenders are concerned about the project itself (as oppose to corporate finance) because lenders primarily rely on the project's expected cashflow to repay the debt.
  - Non limited recourse: lenders have no claim on the assets of project sponsors or project developers
  - **Limited recourse:** revenue stream is partially guaranteed (e.g., through PPA, government guarantee-BVGL, project sponsors as a loan guarantor)
- Cash flow types:
  - Merchant generation: power sold to wholesale spot market

    Could be volatile > high risk > less debt > equity proportion should be higher (project sponsor)
  - Contracted generation: PPA (e.g., wind farm assets +20 years, PPA >10 years)

    This is preferable: easier to finance because cashflow streams are more predictable
- Due diligence: civil constructor, equipment providers, project site, resource quality, EPC (engineering, procurement, construction) companies

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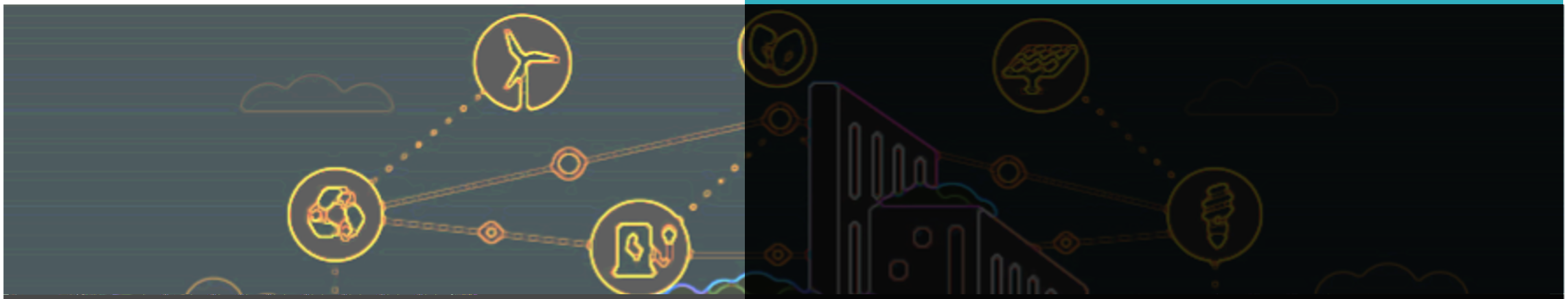

# Thank you

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