Possible Unexpected Growth Opportunities: finding value at the end of the… PPA

Mike Thomas (mthomas@lantaugroup.com)
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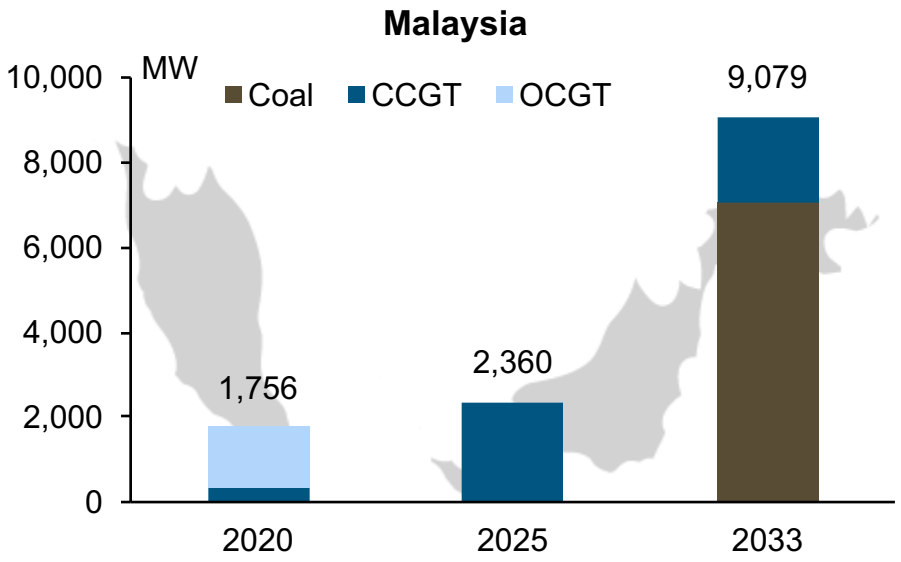
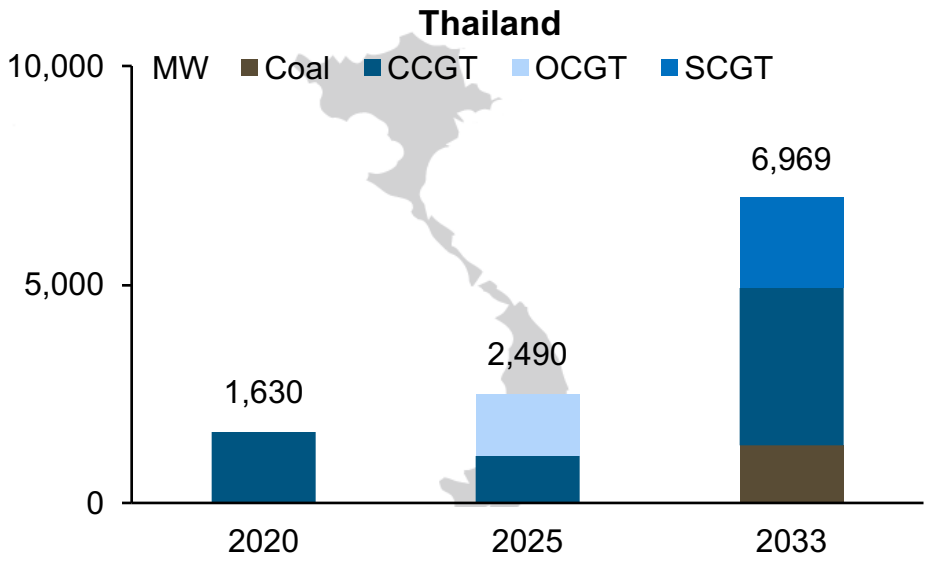
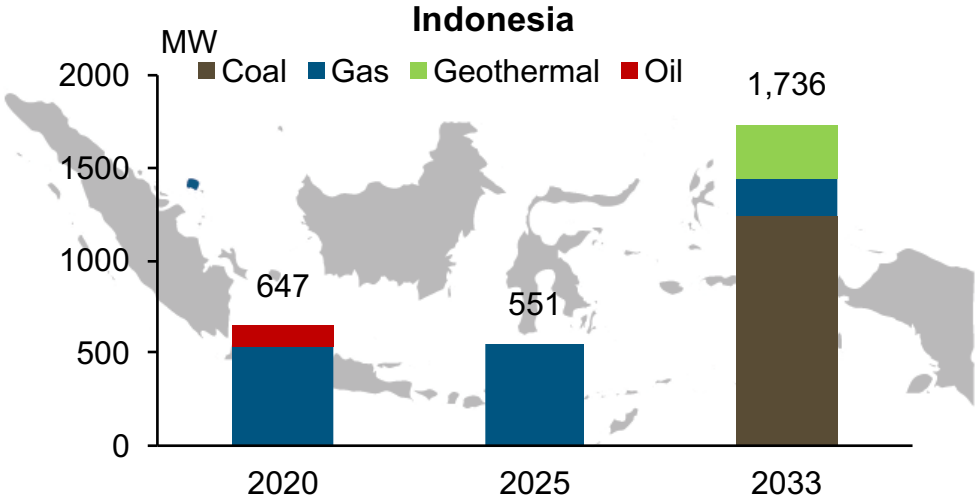
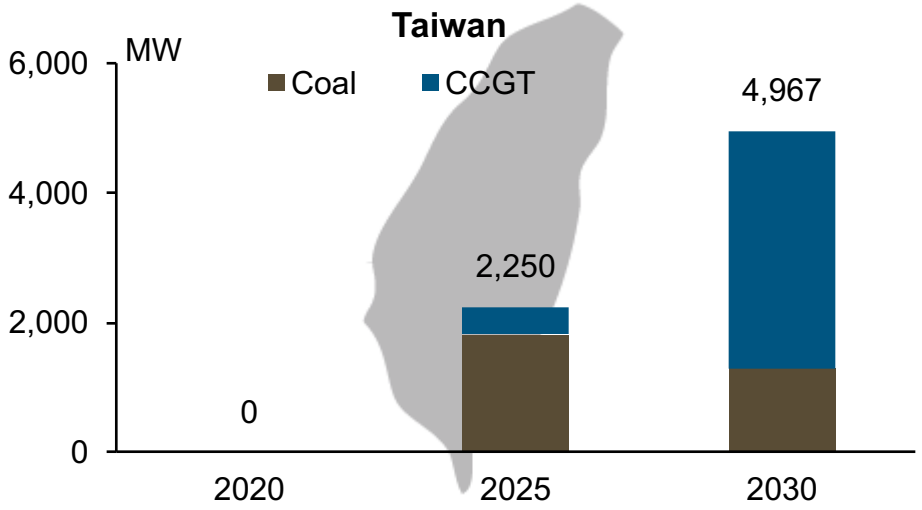
THE LANTAU GROUP
strategy & economic consulting

SE Asian IPPs developed in 1990s are starting to approach PPA expiry









If you buy or sell (all or part) of an IPP, what value lurks beyond these PPAs?

Dispatch Forecast

- How much would the asset or a portfolio of assets be dispatched at:
  - ✓ Within PPA contract period
  - ✓ Post PPA until the end of economic life(s)

PPA Extension Prospects

- Whether or not current IPP contract would be extended?
- If so for how long
- Under what terms?
  - ✓ Capacity payment for specified extension period
  - ✓ Energy payment
  - ✓ Cost recovery for VOM and FOM

Market Background

- Power industry structure: generation companies, transmission and distribution provider and retail
- Regulatory framework and energy policies
- Supply and Demand Balance and Forecast
- Fuel sources and prices

Risk Assessment Issues

- How would dispatch and extension prospects be affected by
  - ✓ Change in demand growth
  - ✓ Change in new entries: renewable, nuclear, coal and gas
  - ✓ Change in fuel prices: coal vs gas
  - ✓ Change in regulation

Methodology and Approach

Dispatch with and without extension

- Dispatch to meet short-term demand on a least-cost basis, subject to operational constraints
- Incorporate fuel price and availability assumptions
- Incorporate planned and/or optimised long-term generation capacity additions and policy settings

Value to System (difference with and without extension)

- System cost includes all cost (fuel cost, fixed and variable operating costs, capital expenditure for new capacities) incurred by the entire power system to meet demand
- The value of extension (if any) would be captured by system cost savings as a result of extending PPA versus not expending

Optimising Extension Period

- PPA is extended for as long as system cost saving is positive until the end of its economic life

Translating to Accessible Value

- Scenarios and sensitivities as needed

Taking all relevant factors into account: what is the BATNA (Best Alternative to a Negotiated Agreement)

We tailor our various regional and country-specific models to incorporate pre- and post- PPA expiry operations

Input Assumptions

Plant characteristic
- Existing power stations
- Technology characteristics
- Commission/retire date
- Operating cost – VOM/FOM
- Availability factor

Fuel supply details
- Range of fuel types
- Projected long-term prices
- Fuel availability constraints
- Contract specifications

Demand and peak load
- Load Profile
- Reserve margin

New build characteristic
- Capital cost and WACC
- First availability

Pre and Post Simulation

Regulated and cost-based arrangements

Least cost dispatch and planning

Based on each generator's SRMC (fuel price + VOM). Available units stacked against load to determine dispatch

QUAFU

TLG's Proprietary Market Modelling Framework

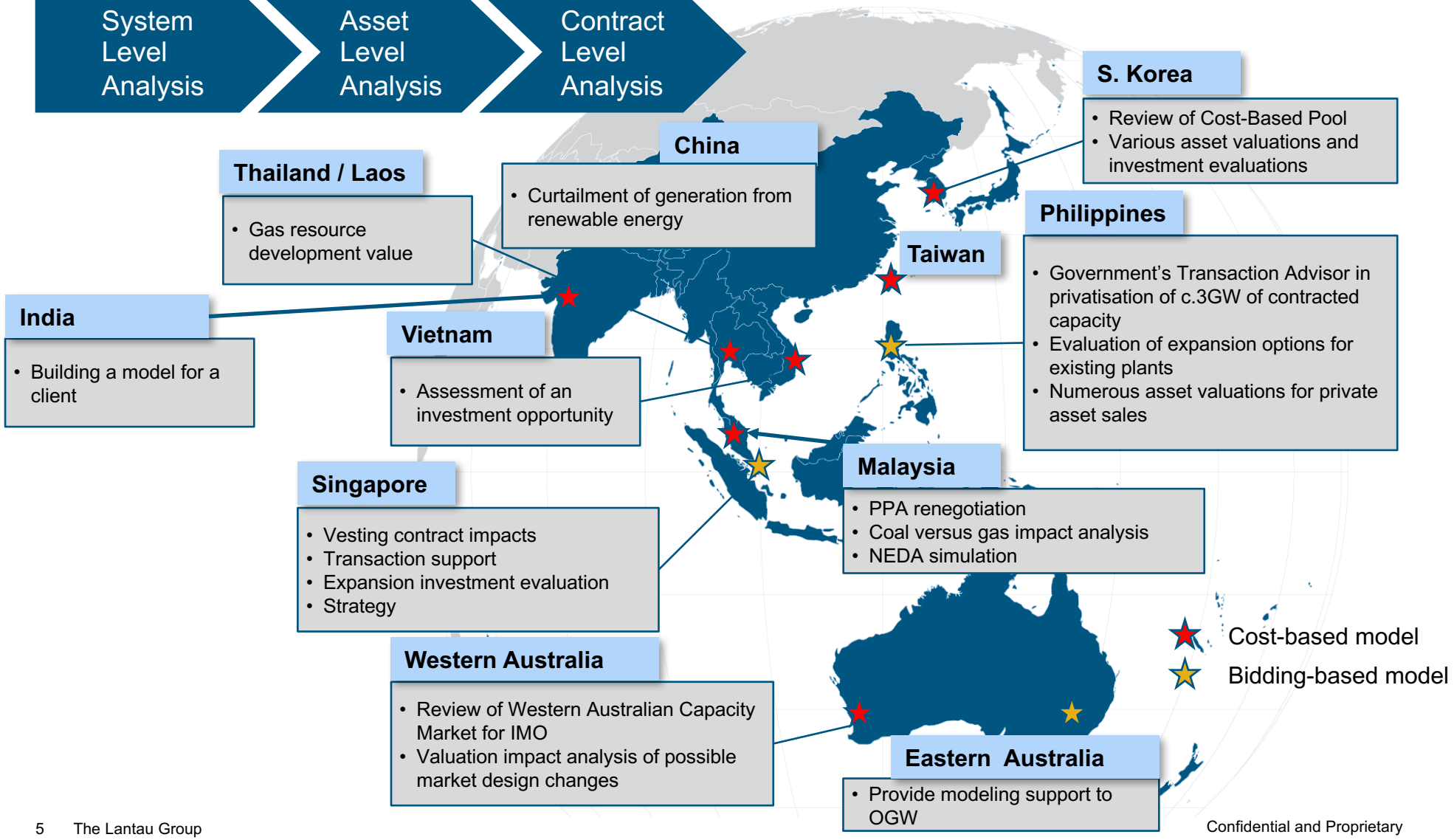
Typical Outputs

- Capacity and Generation Mix
- System clearing price
- New entry by type, amount, and timing
- Merit order
- Dispatch Factor
- Total System Cost

We are always using and updating our market models across a range of commercial, regulatory, and strategy projects

TLG has used QUAFU or other specialised models extensively across the region supporting investment analysis and asset valuation

System Level Analysis → Asset Level Analysis → Contract Level Analysis



China
- Curtailment of generation from renewable energy

Thailand / Laos
- Gas resource development value

India
- Building a model for a client

Vietnam
- Assessment of an investment opportunity

Singapore
- Vesting contract impacts
- Transaction support
- Expansion investment evaluation
- Strategy

Western Australia
- Review of Western Australian Capacity Market for IMO
- Valuation impact analysis of possible market design changes

S. Korea
- Review of Cost-Based Pool
- Various asset valuations and investment evaluations

Taiwan

Philippines
- Government's Transaction Advisor in privatisation of c.3GW of contracted capacity
- Evaluation of expansion options for existing plants
- Numerous asset valuations for private asset sales

Malaysia
- PPA renegotiation
- Coal versus gas impact analysis
- NEDA simulation

Eastern Australia
- Provide modeling support to OGW

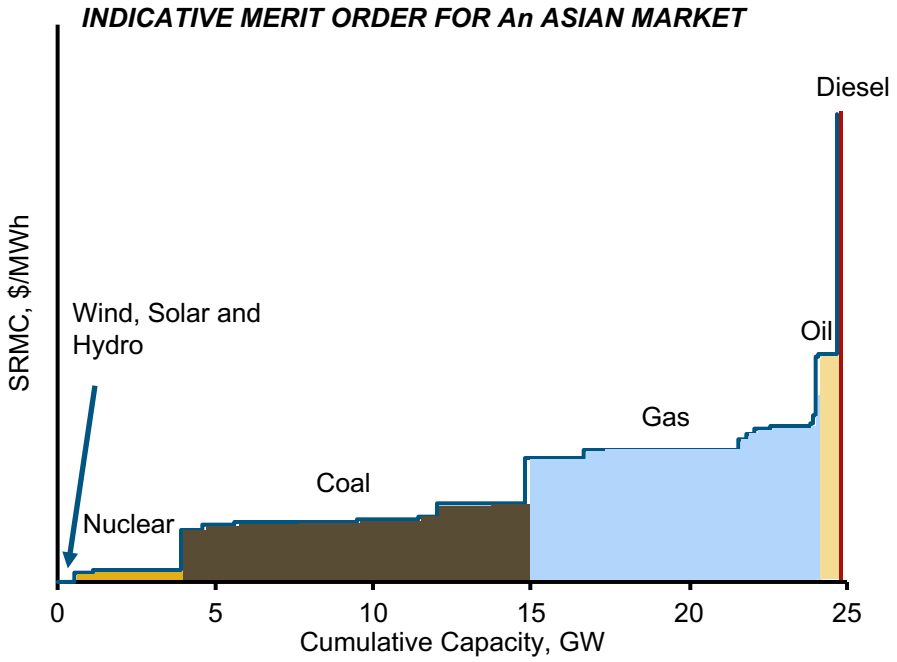
★ Cost-based model

☆ Bidding-based model

Extension value depends on the next best alternative (or the most likely alternative, if not "best") – this requires a short- and longer-term perspective

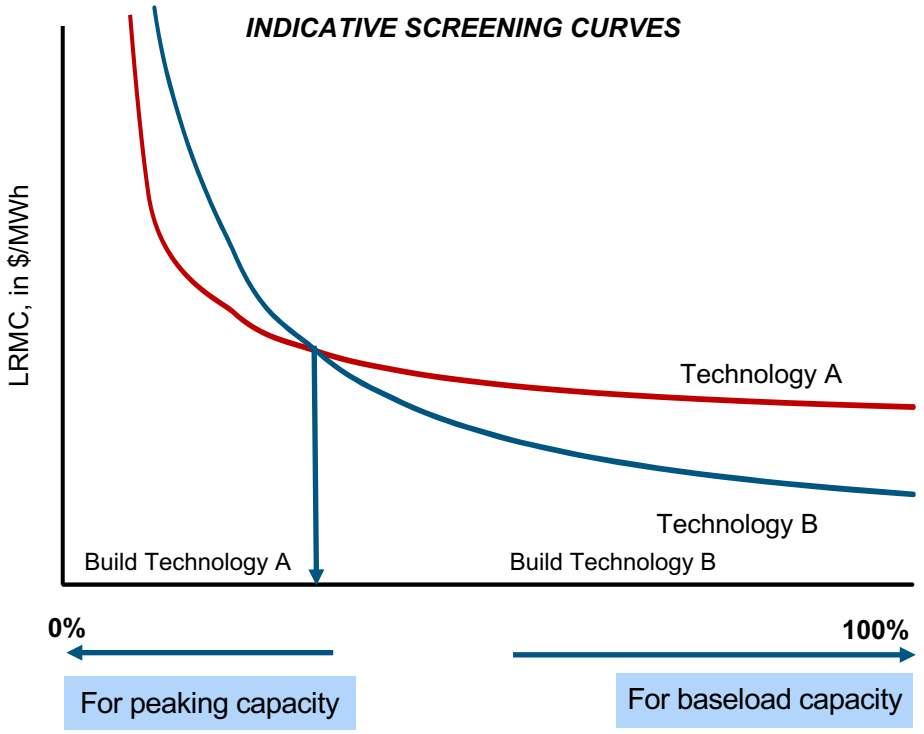
Merit Order and Dispatch Analysis

- Dispatching plants to meet the short-term demand on a least-cost basis or profit-maximizing basis, subject to the operational constraints
- Mainly driven by relative fuel prices and efficiencies



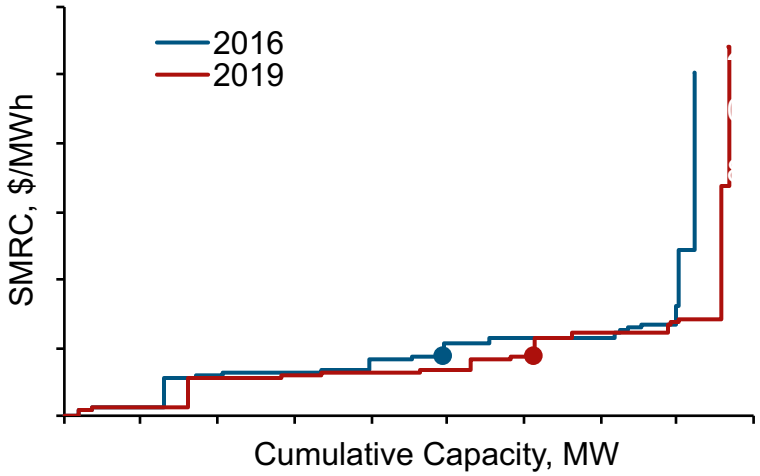
Future Investment Type, Timing, and Impact

- Least cost system configuration – replace expired PPAs or extend them
- What is the least cost generation mix over time
- Add new capacity only if it is commercially viable

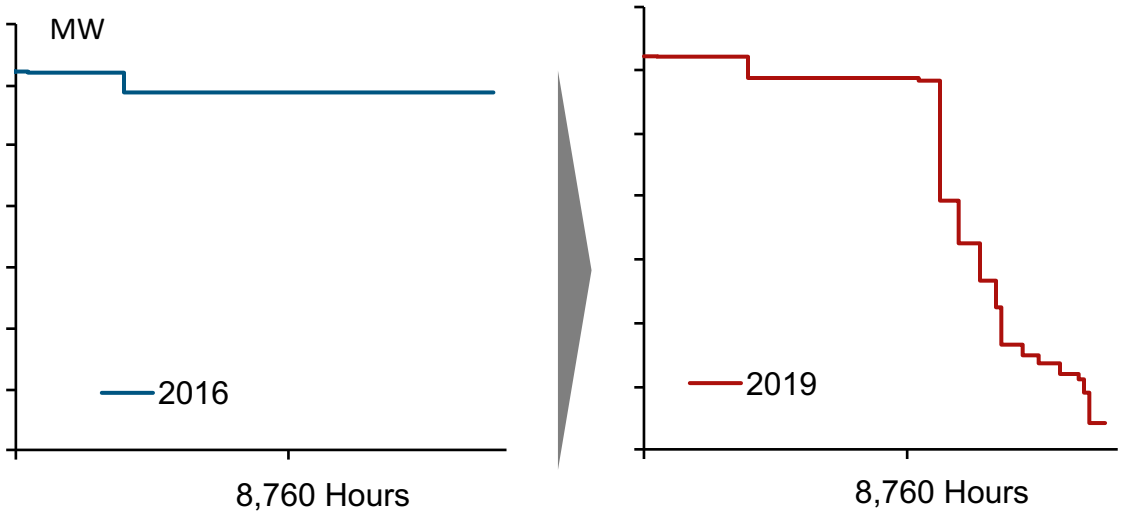


A variety of outputs are needed to frame useful discussions with the client and bankers – everyone has their own ideas….

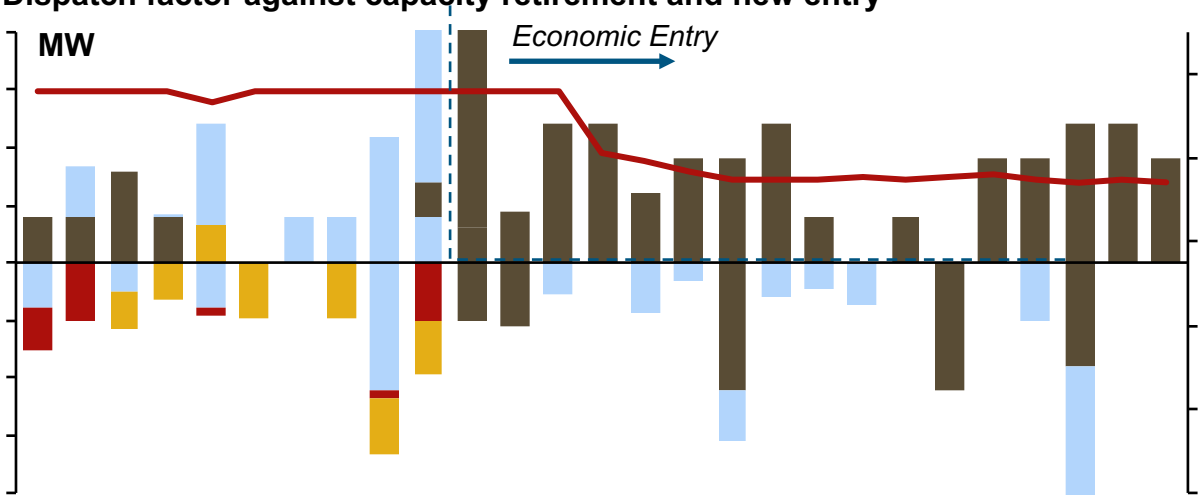
Merit order Comparison for selected years



Load Duration comparison for selected years



Dispatch factor against capacity retirement and new entry



You have to follow a systematic approach to reconcile everyone's prior expectations within a consistent realistic framework

Dispatch

- TLG model to optimize supply and demand over time
- Economic dispatch to meet the short-term demand on a least-cost basis, subject to the operational constraints
- Mainly driven by relative fuel prices, heat rate and other variable costs
- Add commercially viable capacities to meet future demand
- Least cost generation mix overtime

System cost comparison (with vs without extension)

- System cost includes all cost (fuel cost, fixed and variable operating costs, capital expenditure for new capacities) incurred by the entire power system to meet demand
- The value of extension (if any) would be captured by positive system cost saving of extending an asset vs not extending it. What is the Single Buyer's "best alternative" to negotiated agreement

Determining Extension Period

- Plant is extended for as long as system cost saving is positive until the end of its economic life

Contract Valuation

- Capacity payment (CP) is calculated by levelising system cost saving over extension period
- All value is fully captured in proposed capacity payment – other parameter costs are treated as pass-through for simplification – value can be rearranged between CP, VOM, and FOM parameters as appropriate
- Comparison of economic dispatch during extension to guaranteed hours under current contract
- Subject to various reasonableness checks

Idiosyncratic features of existing PPA need to be understood and questioned

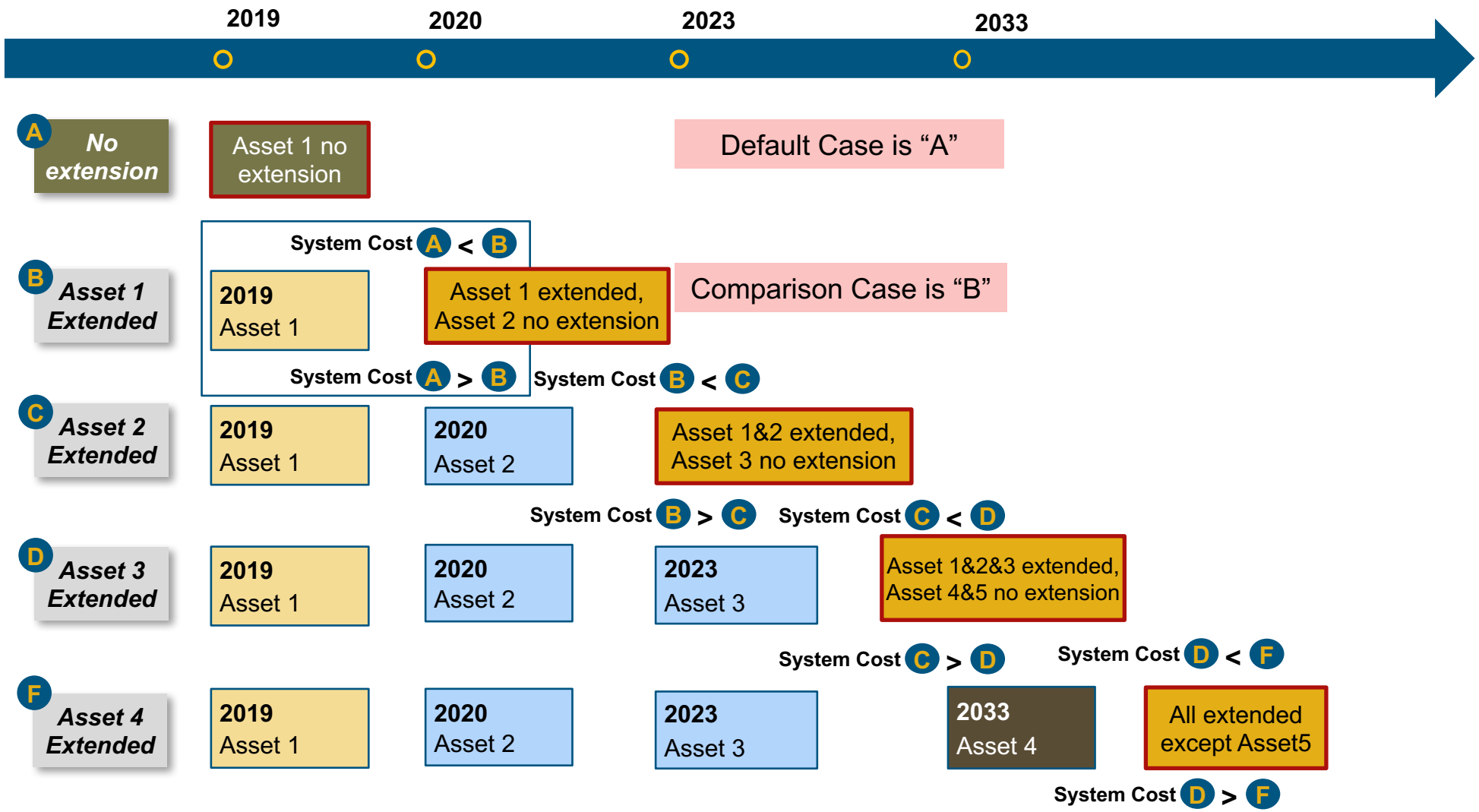
- Is the heat rate in the PPA the right heat rate for negotiating an extension?
  - Contract heat rate may be quite high (a source of value in the current PPA, and a source of risk in an extension, if competing against more efficient units)

- Do the FOM and VOM assumptions align with actual costs

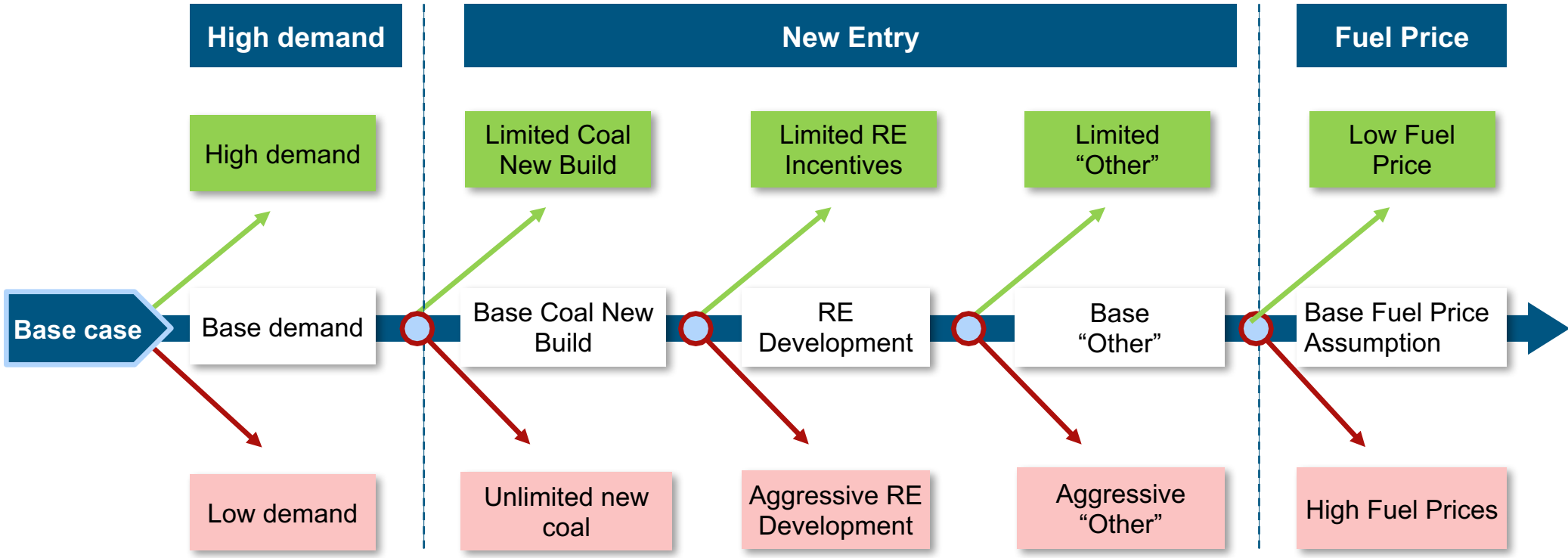
- Are any contractual minimum generation or take-or-pay obligations still necessary – do they align with physical constraints?
  - If not, then are they creating or destroying value if continued in an extension?

- Is there a looming threat?
  - Are you at risk of being rendered less valuable by other proposed units for which an extension could profitably delay

An owner may have a portfolio of assets with expiring PPAs – do we extend all or just some of the PPAs – and at what values for each…



Risks and uncertainties can be represented by a range of scenarios relevant to each market under evaluation

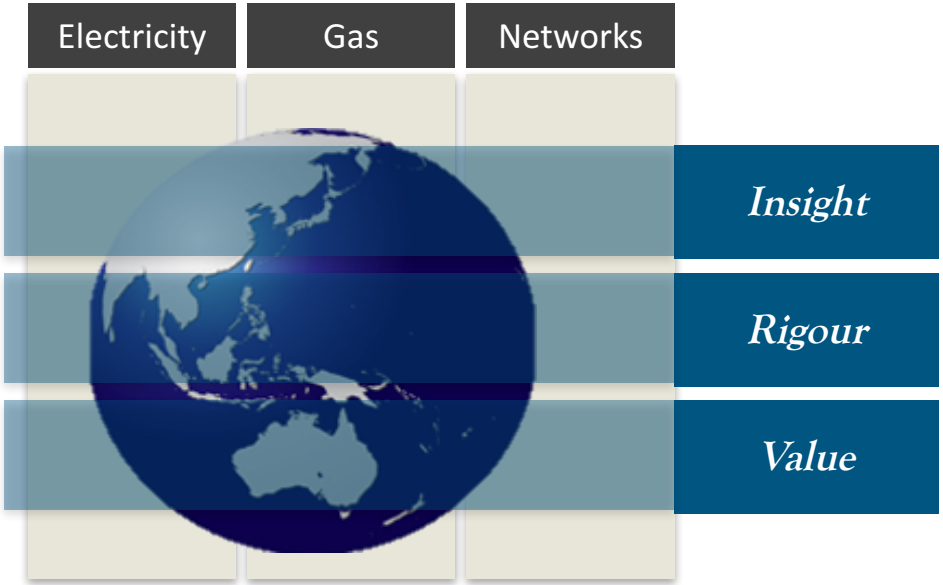


So as to develop a view as to the likely value in negotiation or renewing a PPA

Summary

- As companies become open to being acquired, their underlying assets must be valued
- Often these will include options to acquire one or more PPAs that is likely to expire in the next ten years or so – within the material valuation window
- Many longer-term PPAs involving coal plants are much shorter than the technical and likely economic life of the underlying asset as well
- These post PPA values are basically exposed to merchant valuation risk and need to be considered in a coherent framework
- There is no difference between valuing such opportunities and any other green or brownfield opportunity – except that you must also judge the prospect that renegotiation or extension will be allowed. This is typically a question of incentive, regulatory regime, and market/regulatory design.

Thank you



For more information please contact us:

Mike THOMAS, Partner
mthomas@lantaugroup.com

Stefan ROBERTSSON, Partner
srobertsson@lantaugroup.com

Xiao YUE, Manager
xyue@lantaugroup.com

By phone
+852 9226 2513 (Thomas Mobile)

By mail
4602-4606 Tower 1, Metroplaza
223 Hing Fong Road,
Kwai Fong, Hong Kong

Online
www.lantaugroup.com