Philippines Power Market Outlook

Sarah Fairhurst

20th July 2017

THE LANTAU GROUP
strategy & economic consulting

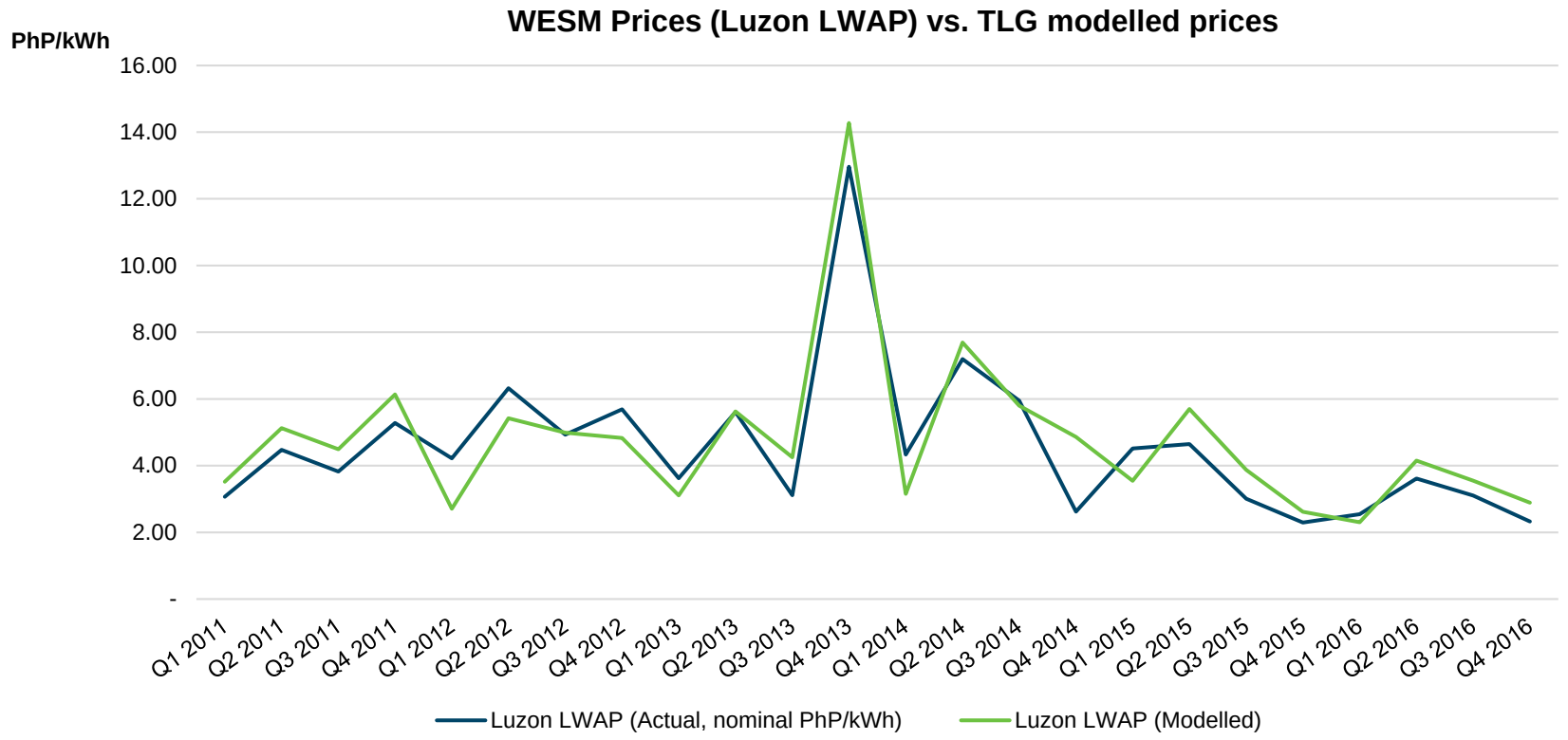
What have we learnt over the last 12 months?

- One of the most dynamic periods of the market history
- Falling WESM prices – mainly due to falling fuel prices but also increasing competition
- Regulatory turmoil – both at the regulator and in the court actions against the ERC
- Changing technology costs and opportunities – falling solar prices are destabilising the "conventional economics" of power

- Where will this take us?
- This presentation focuses on looking at the key drivers of possible futures in the WESM to give insight into where the opportunities lie and what signposts are important to watch

How do you assess the outlook for the electricity market?

- We typically model WESM forecasts based on taking the status quo and projecting forward assuming similar market structures but future generation costs and fuel prices
- To date – when the underlying assumptions are correct this has resulted in a close alignment of our model results with reality



THE LANTAU GROUP
strategy & economic consulting

However, right now the future is hard to predict

There are many more unknowns than normal

"Normal" unknowns include:

- Fuel prices, which always fluctuate in an unpredictable manner – we use the forward curves and World Bank forecasts
- Capital costs typically vary within a range and thus a flat prediction of capital costs is reasonable
- New technology typically gets more efficient over time, so we include increasing efficiency for future thermal projects

But in addition we have:

- Solar costs – will they continue to fall at the very high rate of the last few years?
- Battery prices – will they fall like solar has done?
- Regulation… or should I say regulator? What is going on over there and how will it affect the market? When will RCOA really bite? Will a real CSP be implemented? And what about those Meralco PSA's – will they get approved?
- Policy – will COP21 actually result in policy changes? What about the Procurement Act?

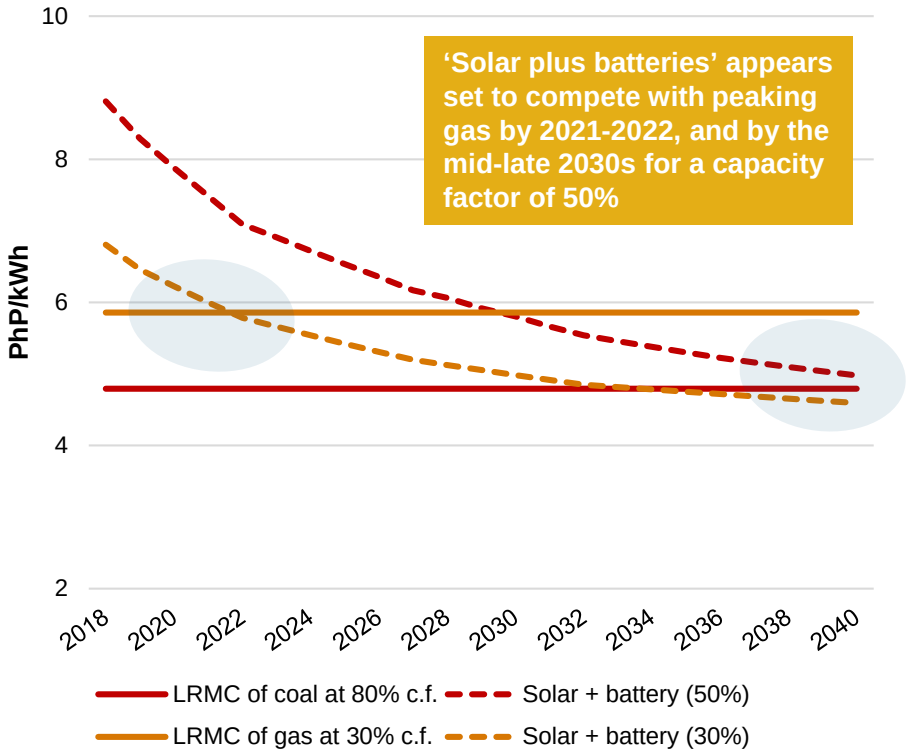
Why are changing solar and battery costs important?

- Solar is already cheap – able to compete with gas for peaking operation
- Falling solar prices into the future allow more solar to enter on an economic basis – eventually displacing coal
- Falling battery prices allow this displacement to occur outside typical ”solar” hours – first at the edges and later even overnight

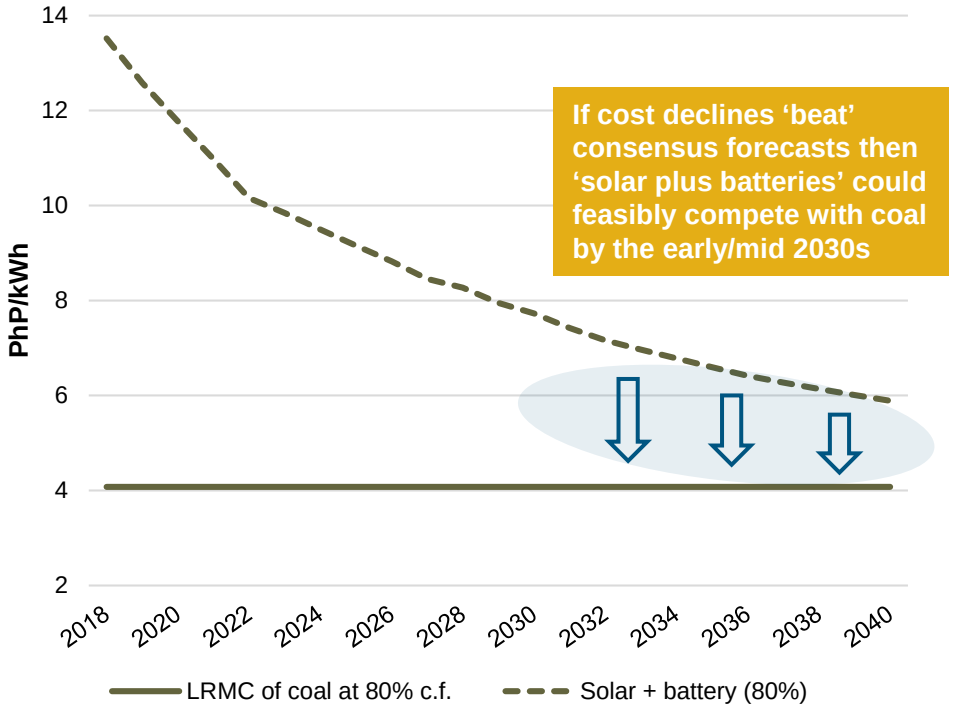
Leandro told us yesterday that solar and batteries will strand coal plant that are under construction – is this true?

Our LRMC analysis is not quite so aggressive but there is considerable uncertainty as to actual solar prices when the reality changes so fast

Comparison of LRMC for 'solar plus batteries' vs. gas



Comparison of LRMC for 'solar plus batteries' vs. baseload coal



^ For 30% and 50% cases, solar+battery generation aligns around the diurnal irradiance peak
* Assumes long-run 1.8% pa. fall in solar costs, and 7% pa. for batteries
Source: California EPA Air Resources Board; TLG analysis

THE LANTAU GROUP
strategy & economic consulting

But even if the coal is not stranded now, it influences decisions now

- Coal are long lived assets
- They need to generate a return for perhaps 30-40 years to become good investments
- So if solar plus batteries is economic in 2030 – that is less than 10 years of economic life for a plant that starts to build today
- So a key question is “should that plant invest”?

If it gains a PSA, much of this risk is mitigated… or is it?

And pure economics may not be enough to destabilise the market

Can solar compete with contracted coal in practise?

- Who is going to build merchant solar / batteries when building these will lower WESM prices?

There are two ways more solar/batteries will enter the market:

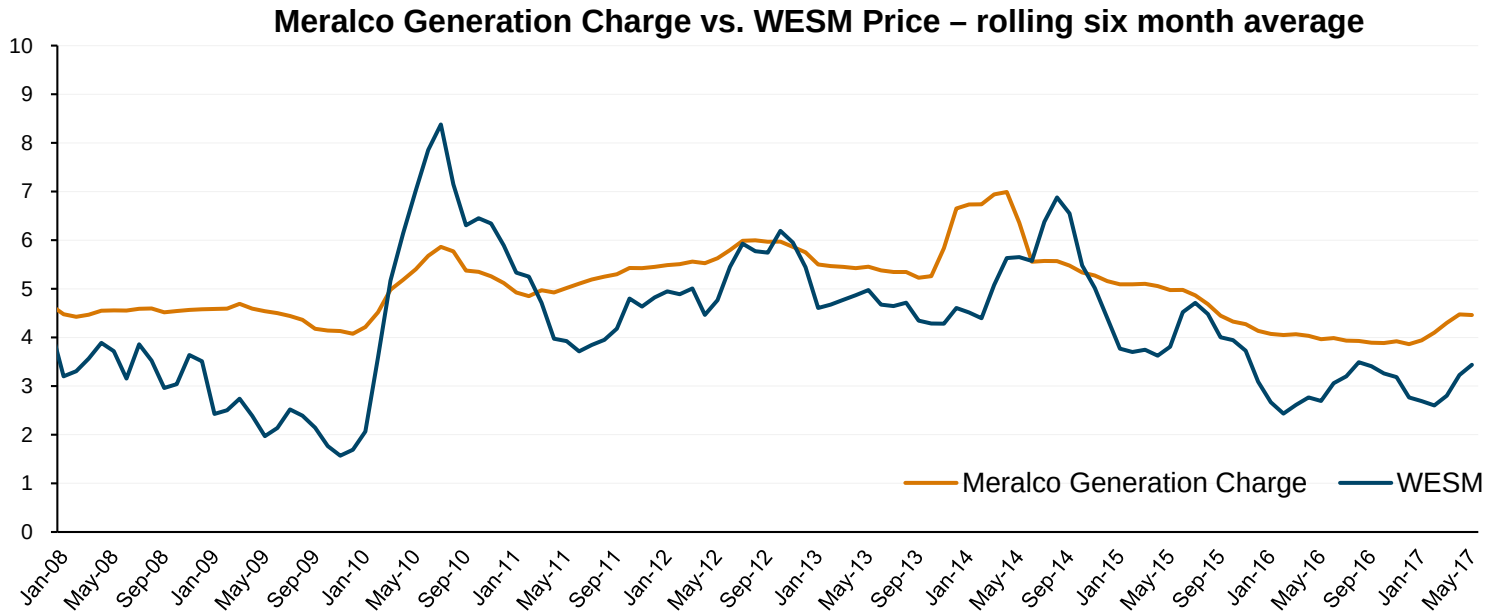
- If they can gain contracts with DU's and EC's – like every other generator
- If they can gain contracts with contestable customers
- If there are policy measures put in place to encourage renewables

PSA's are long lived…But they have a demand carve out clause if demand is lost due to RCOA

So understanding RCOA is important

RCOA is the fastest way to an efficient market – with caveats

- The current TRO on RCOA is mis-guided
- The only person who benefits is Meralco



WESM prices have averaged ~ 15% lower since the beginning of the market

Well implemented RCOA gives customers choice and allows the benefits of the EPIRA to flow through to customers

THE LANTAU GROUP
strategy & economic consulting

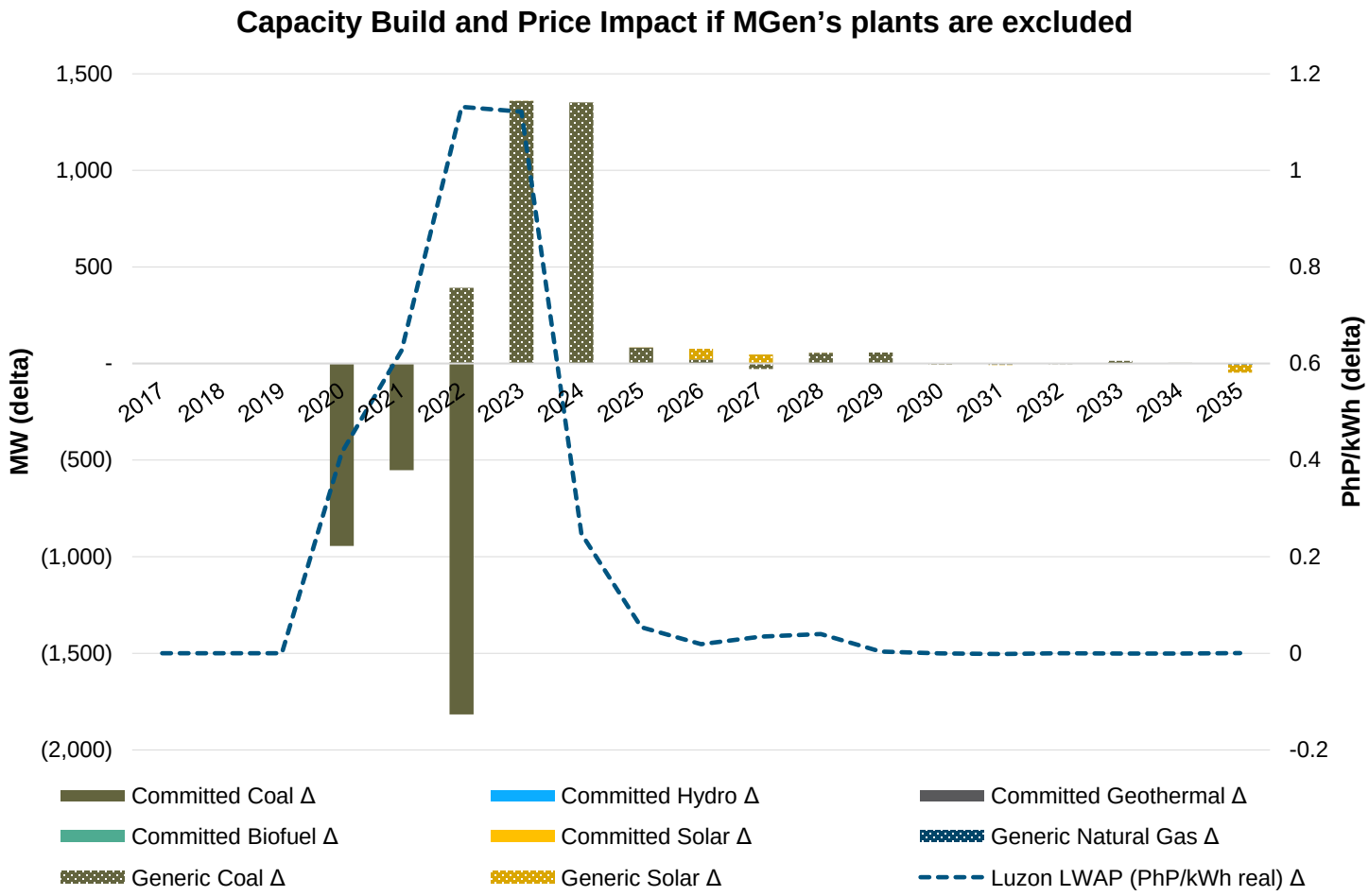
This is why the regulatory framework and policy framework is important

- Things that create contracting gaps allow for cheaper options to creep into those gaps
  - Non-approval of Meralco PSA's re-opens the competition for this opportunity
  - Advance of RCOA opens up the market to new supply-side opportunities as well as giving customers more choice
  - A real CSP process allows the cheapest option to win and thus enhances economic options

- Things that constrain the market prevent the most economic outcomes
  - Policies to import LNG without ensuring the commercial arrangements are flexible
  - Pro-renewable policies which do not take into account economics
  - The current PSA approval process – which does not result in the least cost procurement

So there are some near term decisions to watch….

Non-approval of the Meralco PSA's will leave a contracting gap



THE LANTAU GROUP
strategy & economic consulting

The current CSP is utterly ineffective

- The delay in implementation has allowed thousands of MW of contracts to bypass any need for competition
- The current operation using “Swiss challenge” is easily gamed and ineffective
  - Forcing the same fuels to compete against each other limits real competition
  - Very short bidding windows and poor advertising of opportunities mean almost nobody can compete
- The better solution is to incentivise players to WANT to procure competitively, rather than regulating them to do so
  - Accelerating RCOA so that real customers with an incentive to buy at least cost have the opportunity to do so
  - Changing the way PSA’s are regulated to regulating the generation cost component of the retail price instead and not allowing cost pass throughs
- The proposed Energy Procurement bill is a second best solution to incentives, but it would certainly be better than the current CSP.

Since the future is uncertain, we need to consider scenarios of future outlook

- A range of “status quo” WESM possibilities
  - Meralco PSA’s gain approval
  - RCOA is delayed by several years
  - No new pro-renewable policies other than the 30 percent target
  - Solar and battery prices fall on consensus forecasts

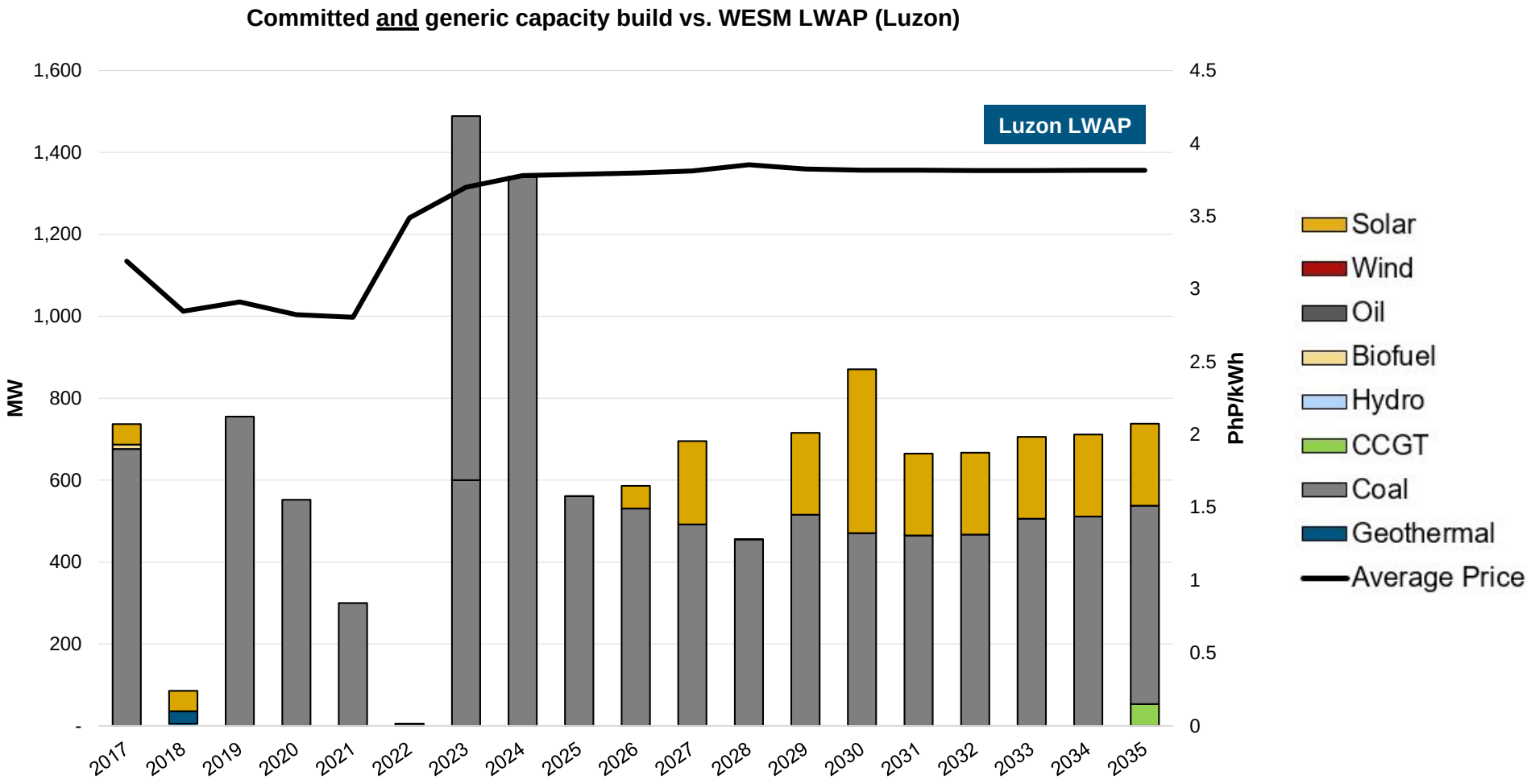
Exact input details can vary – we show two options here:

A – slightly higher CCGT costs and Atimonan goes ahead

B – slightly lower CCGT costs and no Atimonan

- Alternative commercial overlay where regulatory policy changes
  - Meralco PSA’s denied and the coal plants are delayed
  - TRO on mandatory contestability is overturned; RCOA back on track and new retailers enter the market
  - Generation costs track WESM prices

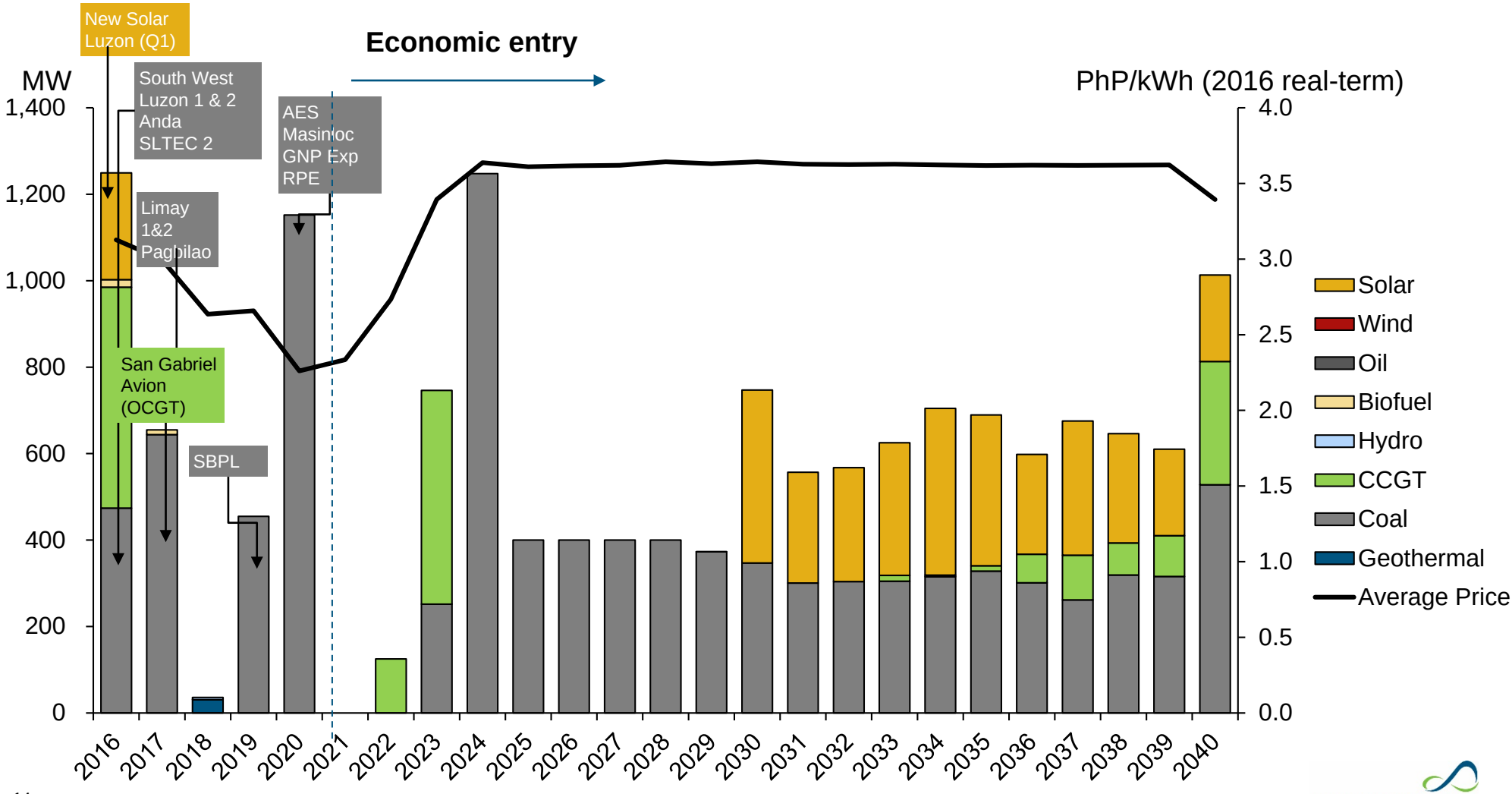
Status Quo A: Lots of coal, some solar



THE LANTAU GROUP
strategy & economic consulting

Status Quo B: A mix of coal, gas and solar

Luzon Capacity Additions and Average Prices (TWAP)



THE LANTAU GROUP
strategy & economic consulting

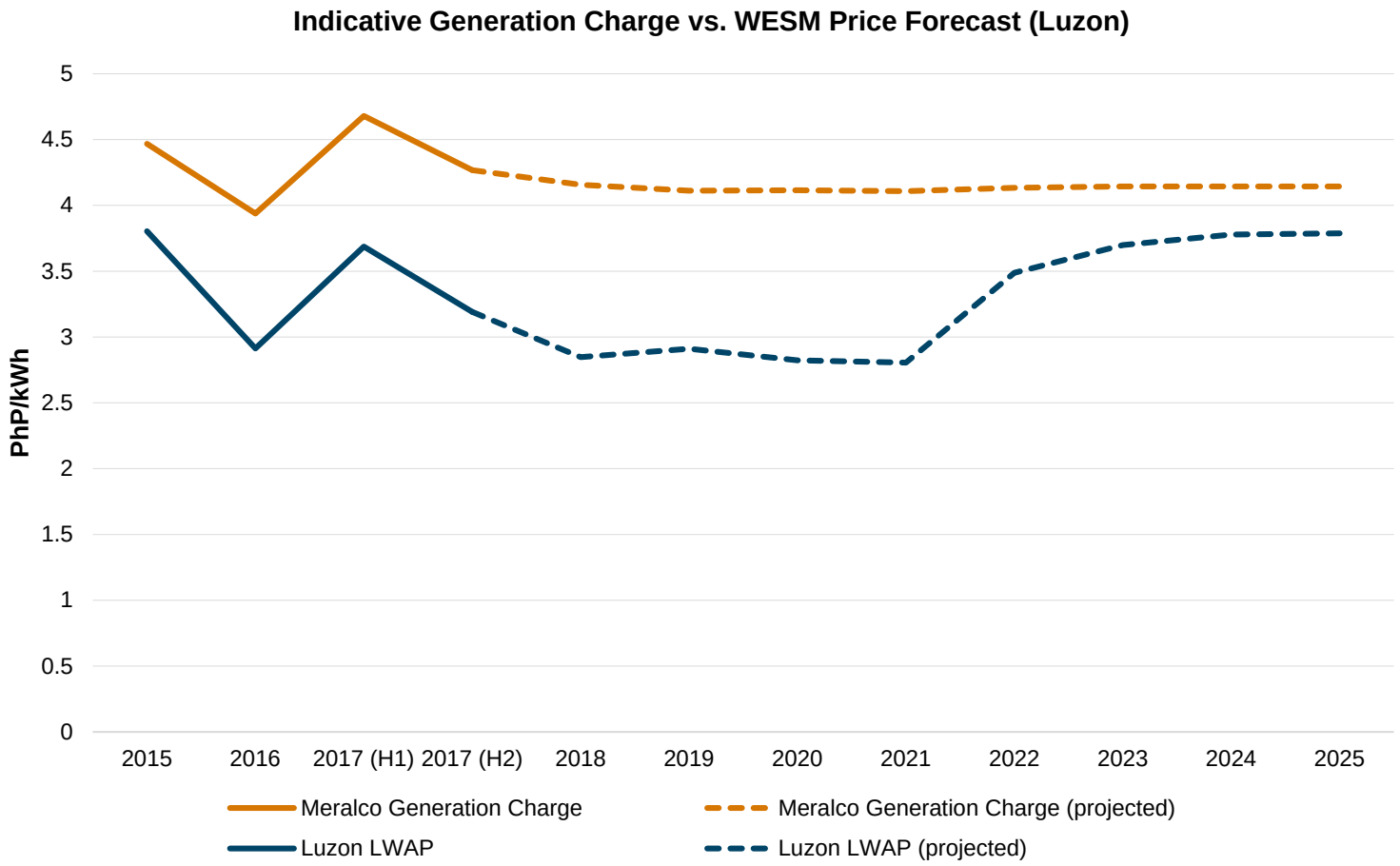
Key takeaways

- Future new build capacity is mainly coal (baseload) and solar (peaking) under a range of input assumptions
- CCGT new build is very sensitive to assumptions – small changes can make it attractive or not

- Generation is mainly coal (baseload); solar (peaking) and gas filling in the gaps (mid-merit) – this is robust to a range of assumptions although exact quantities vary

- Demand for LNG
  - There is a market for LNG but it is not a large market
  - In the order of 1 – 1.5mt pa on average over the long term
- Solar is economic alone (without batteries) and thus no subsidies are needed to meet the 30% target
- No chance of meeting COP21 commitments even with some CCGT

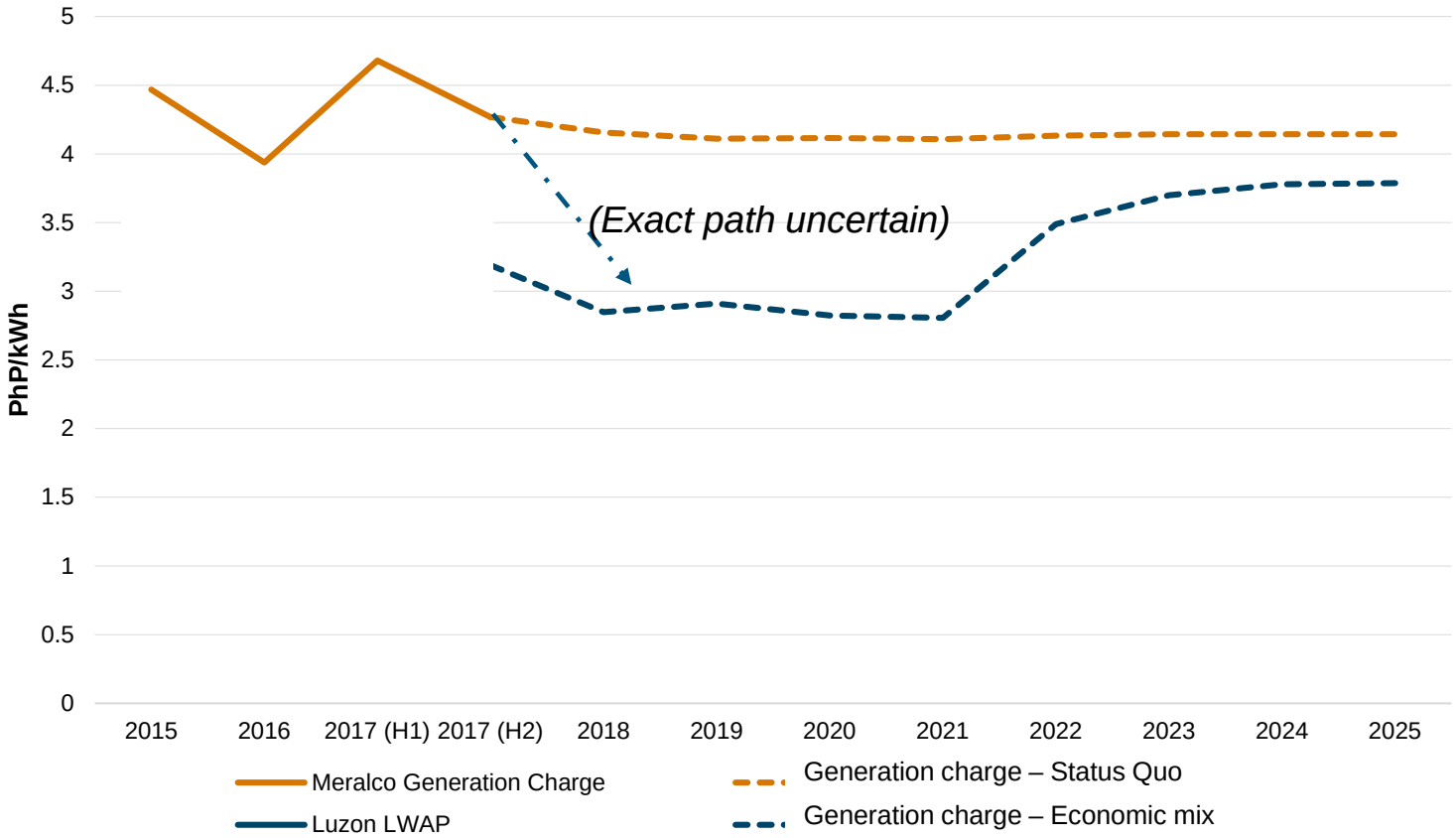
Example of customer impacts (Status Quo A) – WESM prices fall a lot but the customer does not see the benefits



THE LANTAU GROUP
strategy & economic consulting

Alternative scenario: Benefits flow to customers (although the path is uncertain)

- In this analysis we assume that RCOA and changes to regulatory frameworks incentive a change to retailer procurement that results in generation costs more closely matching efficient WESM prices



THE LANTAU GROUP
strategy & economic consulting

Final thoughts

There are opportunities for all kinds of investments

The WESM is robust to a range of input assumptions

- Some gas might come in on an economic basis – or it might not
- More or less coal may be built in the near term
- More or less solar might be built in the long term

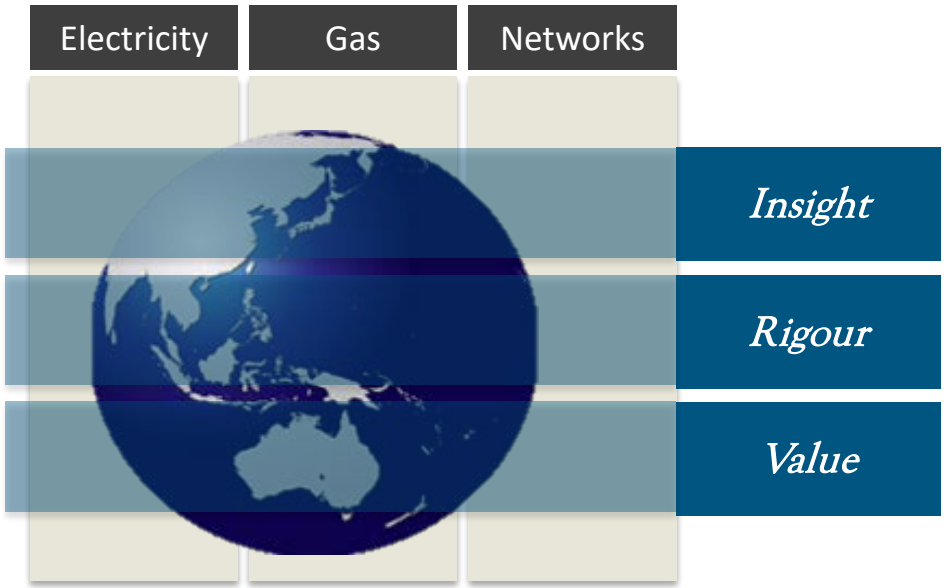
These various input assumptions generate various slightly different WESM price paths and slightly different fuel mixes in the long term

But for consumers, this is not the issue

The commercial overlay – that is – how plants are contracted and how costs flow through to consumers – are much more important for actual final prices to consumers

Changes to the commercial overlay change the basis for investments

Contact Us



For more information please contact us:

By email
General Capabilities Inquiries
projects@lantaugroup.com

Direct Communications
mthomas@lantaugroup.com
sfairhurst@lantaugroup.com

By phone
+852 2521 5501 (office)

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

Online
www.lantaugroup.com

THE LANTAU GROUP
strategy & economic consulting