

Solar Development in the Philippines 22<sup>nd</sup> September





#### Offerings:

- Strategic, commercial, and regulatory support
- · Ability to connect the dots between fuel markets and power
- Analysis-based recommendations
- Highly relevant international experience
- Accessible experts focussed on the region



## Deeply experienced economic consulting firm to the energy sector based in Asia

# Key assumptions underpinning our analysis

- The analysis was done in early 2016.
- We explore the potential for solar within the Luzon, Visayas, and Mindanao regions

LUZON

ISAYA

MINDANA

- We consider both utility-scale solar, and rooftop solar, using PSPA's current cost of capital for new build. We have also assumed a 10% uplift in costs for Visayas and Mindanao
- We also expect solar to continue to attract favourable local tax regimes
- The analysis used unconstrained solar costs, which do not take account of shortages of land, grid connection costs, or the additional costs of ancillary services needed for stability. This was to be part of the next phase of our work.

# Current fuel price projections

- For our current outlook we have used:
  - Current Brent oil forward prices, to which gas and LNG prices are indexed and correlated
  - The latest World Bank coal price forecasts



#### **Current outlook for fuel prices**

The demand outlook in the Philippines is supported by relatively robust economic fundamentals with the potential for growth to accelerate

• Our assessment of macroeconomic growth and sectoral trends, alongside DOE projections, paints a relatively strong picture for demand growth



Power demand in the Philippines remains relatively low compared to neighbouring nations, yet with potential for demand growth to accelerate given the lower energy intensity per \$ of GDP

Our independent analysis is underpinned by sophisticated modelling of the Philippine market, through which we are able to explore different scenarios

• QUAFU is an integrated generation dispatch modelling tool that incorporates state-of-the-art optimisation theory grounded in proven techniques



# Agenda

## Introduction to The Lantau Group

## Scope of work

- Key assumptions
- Fuel prices and demand outlook
- Analytical approach

## **Current projections**

- Luzon
- Visayas
- Mindanao

The impact of decreasing capital costs

Fuel price scenarios and sensitivity analysis

Re-profiling solar new build and fuel cost savings

Impact on solar when assuming 30 percent gas generation

Summary and questions

# With capital costs for solar remaining at today's levels the new build outlook for **Luzon** is dominated by coal and solar

- In Luzon, an excess of committed generation coming online between 2016-2020 (largely coal and gas) suppresses WESM prices through to around 2022
- We hit a turning point in 2023 following the expiry of ToP gas contracts from Malampaya, which sees existing CCGT plant price off more expensive gas (α LNG) and operate more in a mid-merit / peaking role.
- The resultant increase in prices then begins to incentivise new build, in particular for coal and solar



# However the fundamental outlook in Visayas is markedly different

- In Visayas, the amount of new solar capacity that could enter the market economically is naturally much lower, with around 400 MW projected between 2016 – 2017
- The longer-term outlook for new build (across all fuels) is suppressed by strong capacity margins of between 0.9 GW and 1.5 GW above peak demand through to 2025



# With a similar picture in Mindanao

 Similar to Visayas, prices in Mindanao are not supportive of any new build in the short to medium-term



Regional differences in the attractiveness of solar can be explained by the contrasting outlooks in supply-demand balances...



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... as well as regional differences in the shape of the demand profile and the degree of alignment with the solar generation profile

- In Luzon, peak demand occurs during the middle of the day and is well-aligned to the expected profile of solar generation, allowing it to generate during the typically most profitable hours
- However in Visayas, a higher relative proportion of residential demand means that peak demand occurs later during evening hours, with solar capacity unable to capture higher prices during the evening peak



Source: PEMC; TLG database and analysis

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## In reality the cost of new solar is highly likely to continue to fall

- Solar costs have been on a clear downward trajectory for the last 8 10 years, and are expected to continue to fall, albeit at a more gradual rate
- We have prudently assumed costs fall by 1.5% pa. until 2025, and 0.75% pa. thereafter



#### NREL Open PV Installed Cost

# ... In turn attracting significant amounts of new build solar, albeit largely in Luzon

A gradual decline in the cost of utility-scale solar (to \$1,177 per kW by 2030) attracts an additional • 7.4 GW solar build in Luzon



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Difference in solar build between fixed and decreasing cost of capital

## Regional cost variations for solar are a limiting factor

 If the 10% uplift we have assumed for solar costs in Visayas and Mindanao can be surmounted, then there is some further potential for capacity additions



# Understanding the sensitivity of solar build to future fuel price dynamics is key

• We modelled a set of fuel price scenarios based around different oil price projections to 2020



In **Luzon**, utility-scale solar is well placed to capitalise on increasing fuel prices, whilst also showing a high level of resilience to falling oil prices



#### Cumulative solar build in Luzon (from 2016)

Rising fuel prices significantly benefit solar build, which sees a significant increase in generation almost entirely at the expense of existing gas-fired plant

• Again, the expiry of ToP contracts from Malampaya marks a clear turning point, and thereafter gas plant shifts further up the merit order curve



In Visayas, a bearish supply-demand outlook persists with only small increases



## Whilst in **Mindanao**, solar is sensitive to rising fuel prices over the longer term

• From 2024 rising fuel prices begin to support the economic build of solar, displacing what would otherwise be new oil-fired plant additions



#### **<u>Cumulative</u>** solar build in Mindanao (from 2016)

A recovery in the energy complex over the medium-term would provide a unique window for Philippine industry to capitalise on the present situation

- History has shown oil prices tend to follow strong cyclical patterns, and we appear to have seen a recent bottoming-out of oil prices
- In each of our scenarios where we forecast a rise in oil prices, the new build of solar becomes increasingly attractive as thermal generation spreads are squeezed and new build is deterred



Note: Crude price 1970-1979 Saudi Arabian Light, 1979-present Brent Source: TLG analysis

# Whilst staying ahead of the investment cycle of conventional generation is critical

- When oil prices are juxtaposed with fuel spreads, clear 'windows' exist for conventional new build projects to be developed and come online
- Thus it is vital for solar new build to get ahead of the next window, displacing the next wave of conventional new build that would ultimately subdue future power prices



Note: Crude price 1970-1979 Saudi Arabian Light, 1979-present Brent; Coal price Newcastle Source: World Bank; TLG analysis

There may be opportunities to accelerate the addition of capacity, thereby allowing the industry to scale and avoid future supply bottlenecks

• In practice it may be unrealistic or impractical for industry to install the significant amounts of new solar capacity within such a narrow timeframe





Additionally, accelerating the new build of solar achieves wider benefits by reducing fuel costs and ultimately the burden on consumers

• When taking into account the amount of conventional, fossil fuel generation that is displaced by bringing forward solar new build, fuel cost savings amount to around 5%



# A government target for 30 percent gas in the generation mix, if it were implemented, has the potential to derail future solar capacity additions

- Both additional gas capacity, and an increase in existing gas generation, are necessary for gas to achieve 30% of the generation mix
- This erodes solar new build that would otherwise be required to meet future growth in peak demand



A government target for 30 percent gas in the generation mix, if it were implemented, has the potential to derail future solar capacity additions



## Thank You.

We look forward to continue playing a key role in the development of solar generation in the Philippines.



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