



# Energy Transition in the Philippines – a Case Study

19 September 2018

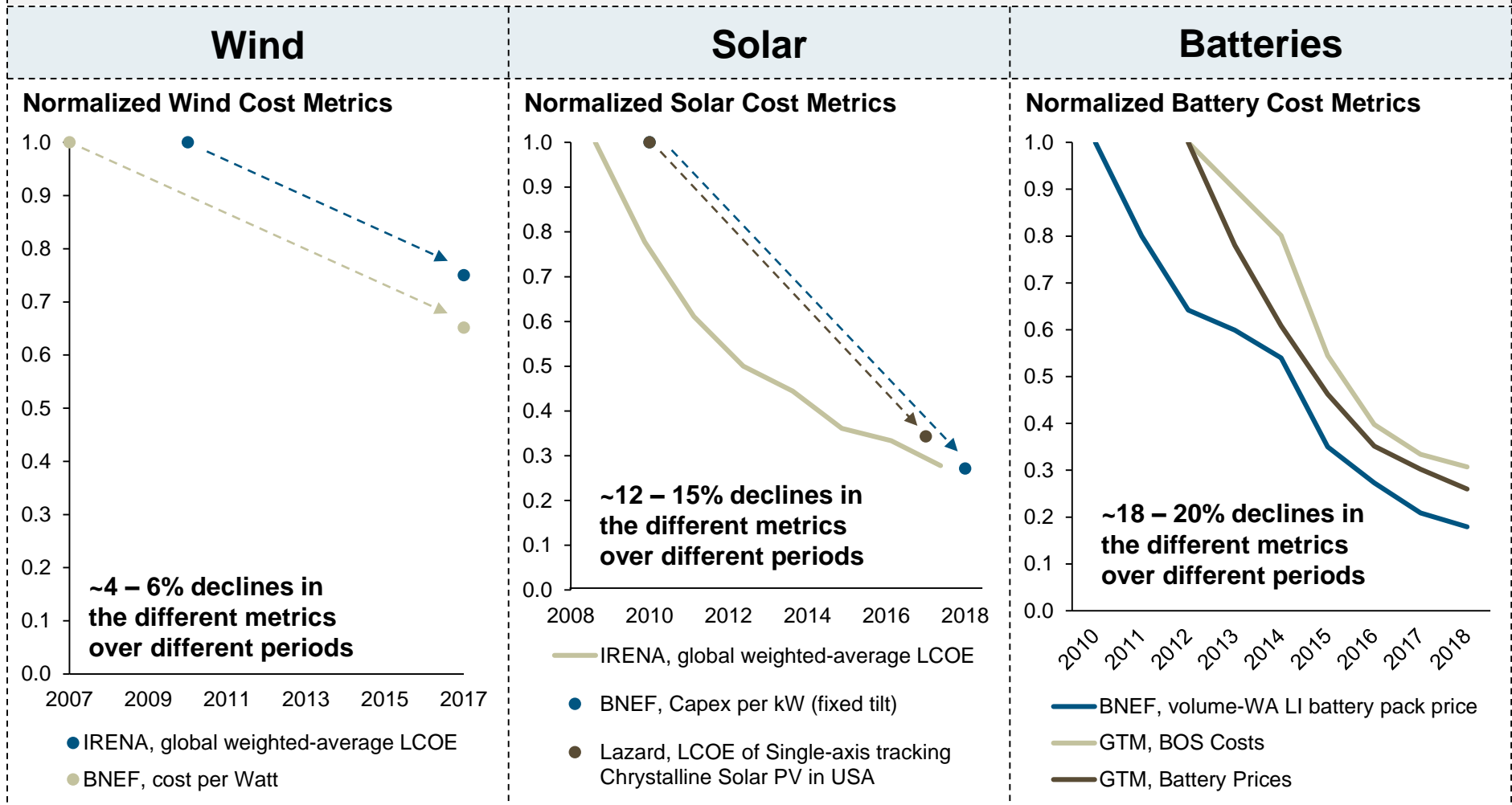
# The Energy Transition is coming, but what does that mean?

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- This Energy Transition will accelerate in the coming years in a non-linear fashion as various ‘tipping points’ are reached, and will continue to build up speed over the coming decades
- The interaction of policy and regulation with commercial realities remains a significant uncertainty, and will be an important factor in how this transition unfolds in various jurisdictions
- Because the Philippines is a merchant market with substantial private sector ownership, we expect it to be particularly active in the coming years, making it a useful case study

# Recent reductions in the costs of new technologies have been stark, ushering in new economic realities that open up the door for an 'Energy Transition'

## Recent Cost Declines in New Technologies



These trends are expected to continue, reaching important tipping points that will result in accelerated adoption rates; we model three cases in this analysis

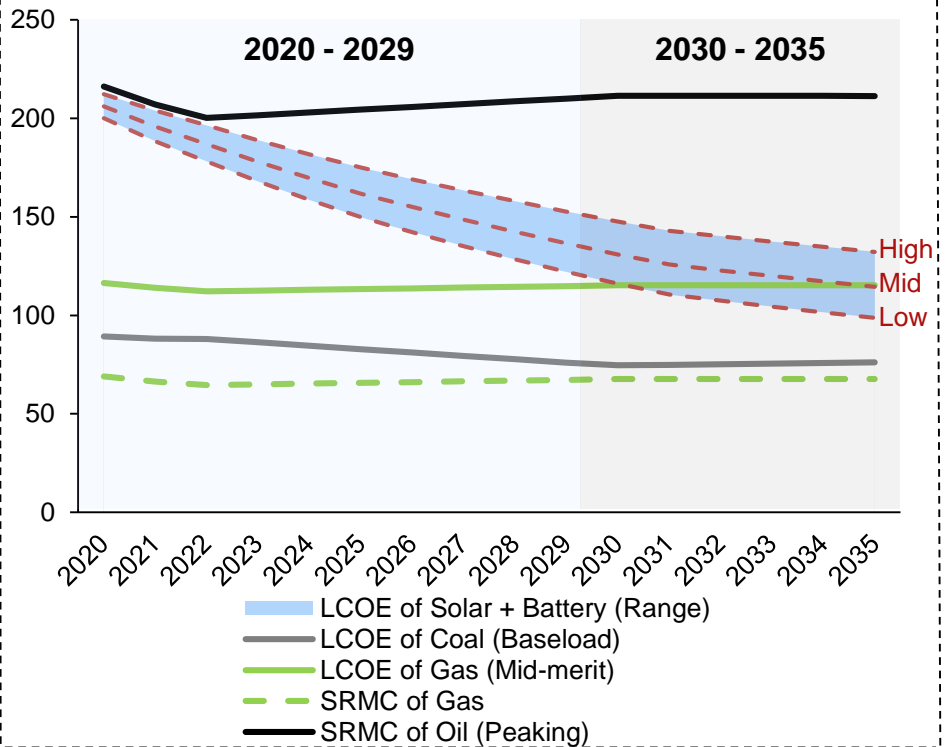
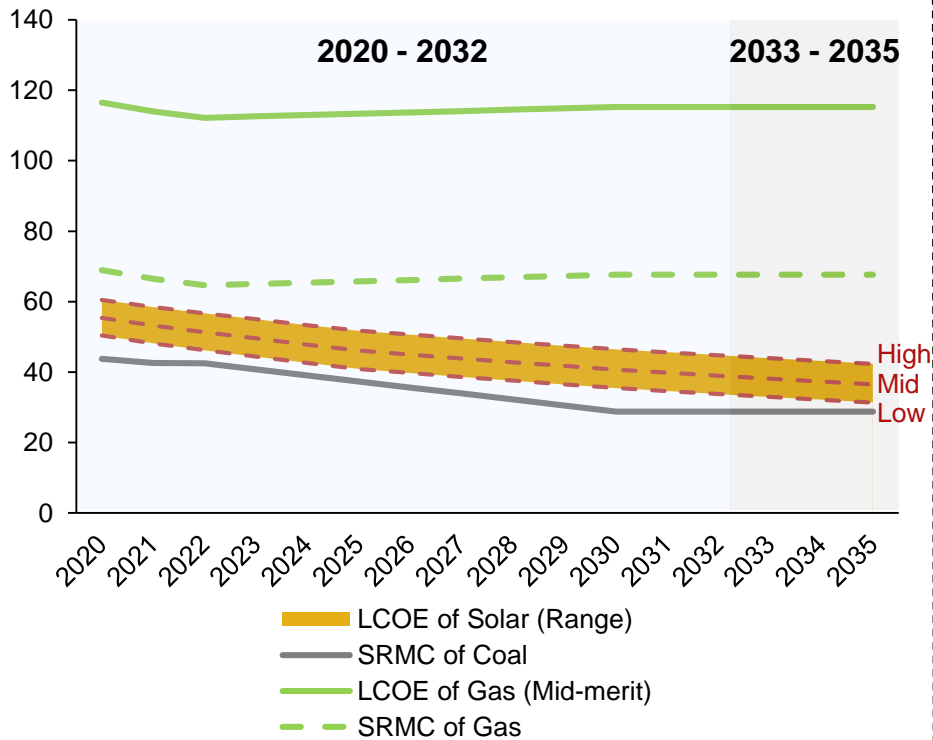
## Comparison of Levelised Technology Costs over Time (Luzon, Philippines)

### Solar

### Li-Ion Battery Storage (charged with new solar)

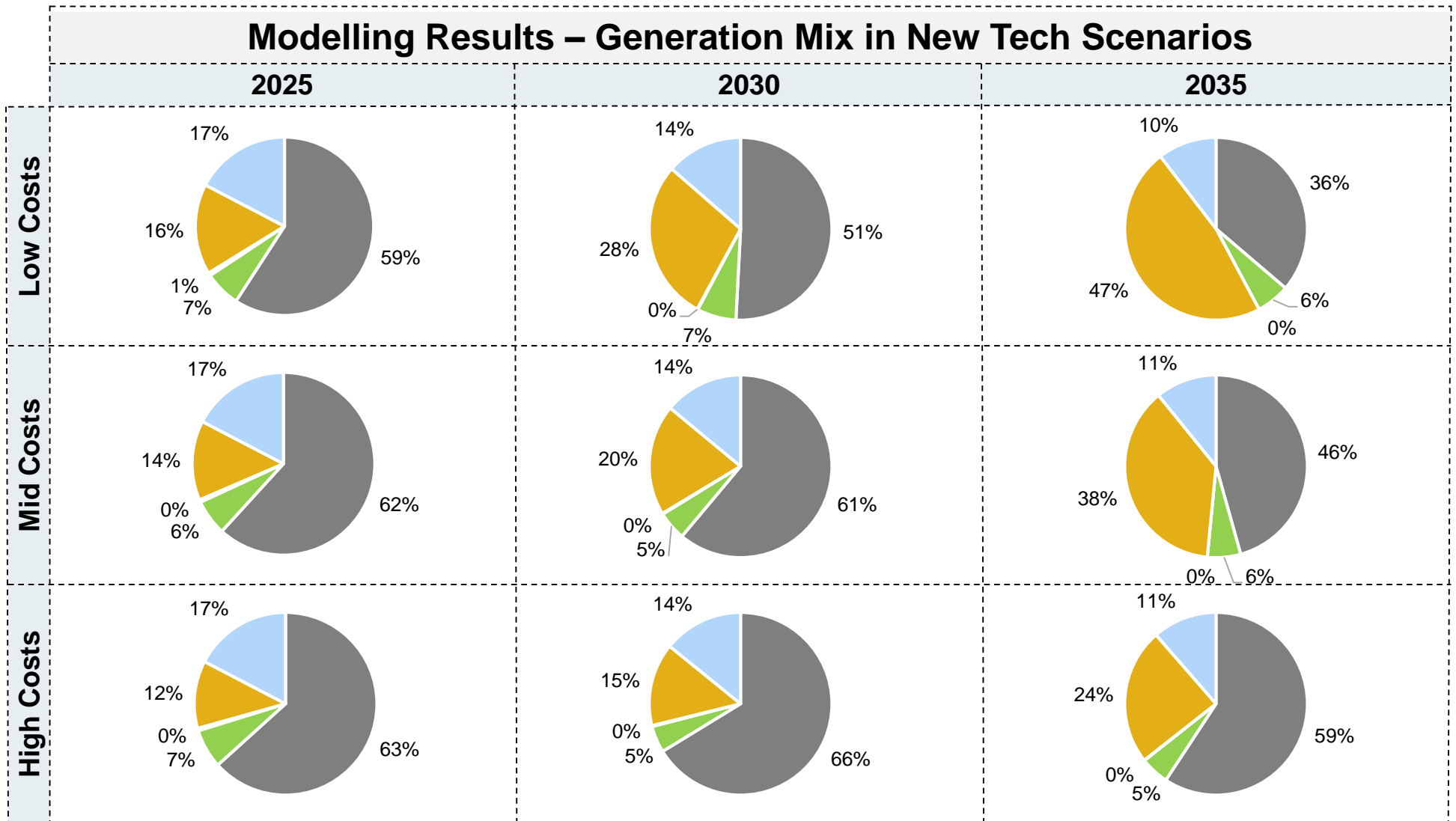
USD/MWh (2018 Real terms)

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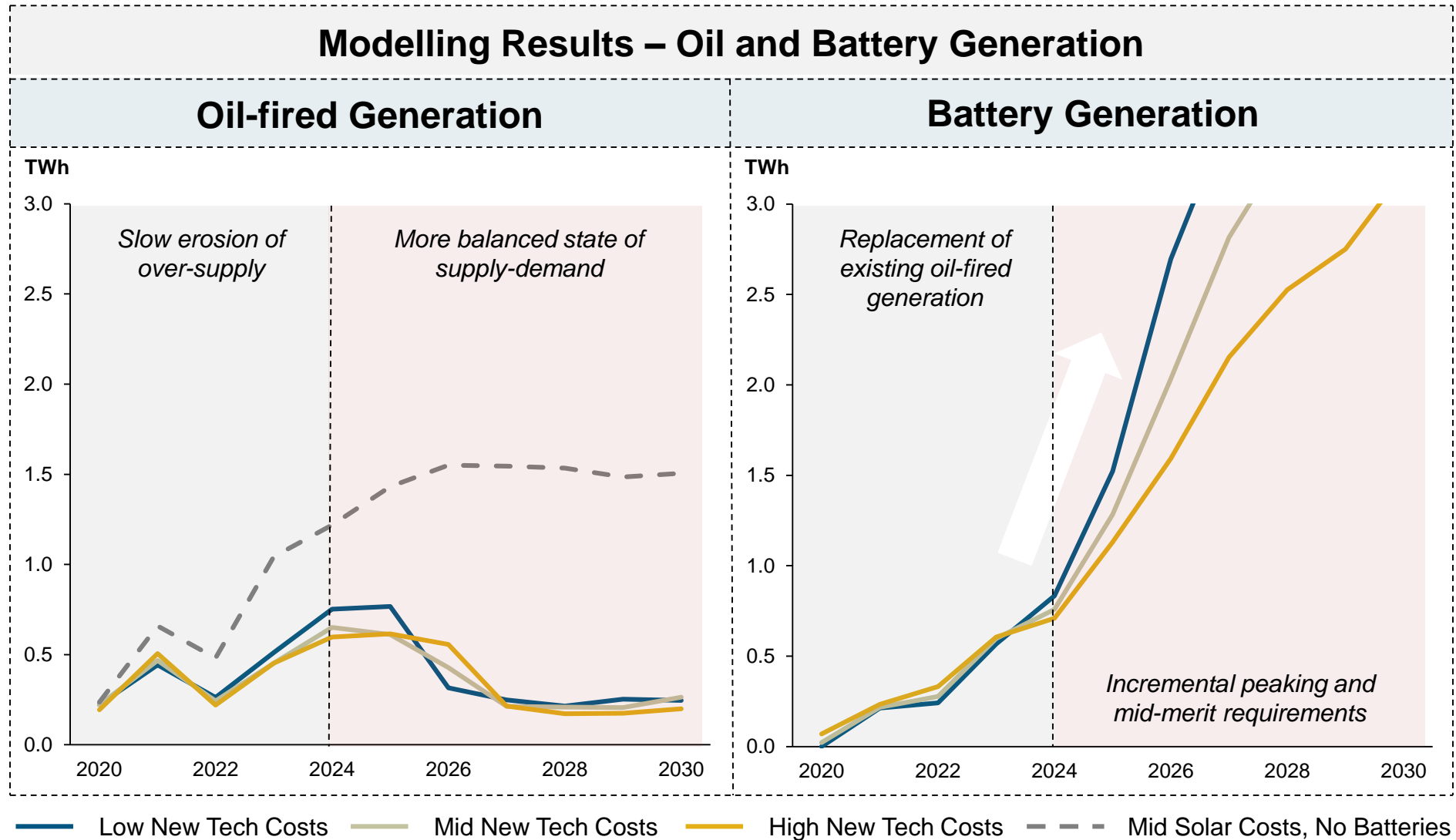
Notes: assumptions include capacity factor of 80% for coal; a capacity factor of 45% for CCGTs; battery autonomy of four hours, cycling once per day with maximum of 80% DoD and 4% p.a. capacity degradation; real FOB coal prices converge on 60 USD/MT; real Brent prices converge on 70 USD/bbl; regasification fee of 1.5 USD/mmbtu; LNG prices based on oil-linked contract with slope of .12 and constant of 0.5

All cases see accelerating adoption of solar and batteries; the timing and rate of adoption depends on when the various tipping points are reached

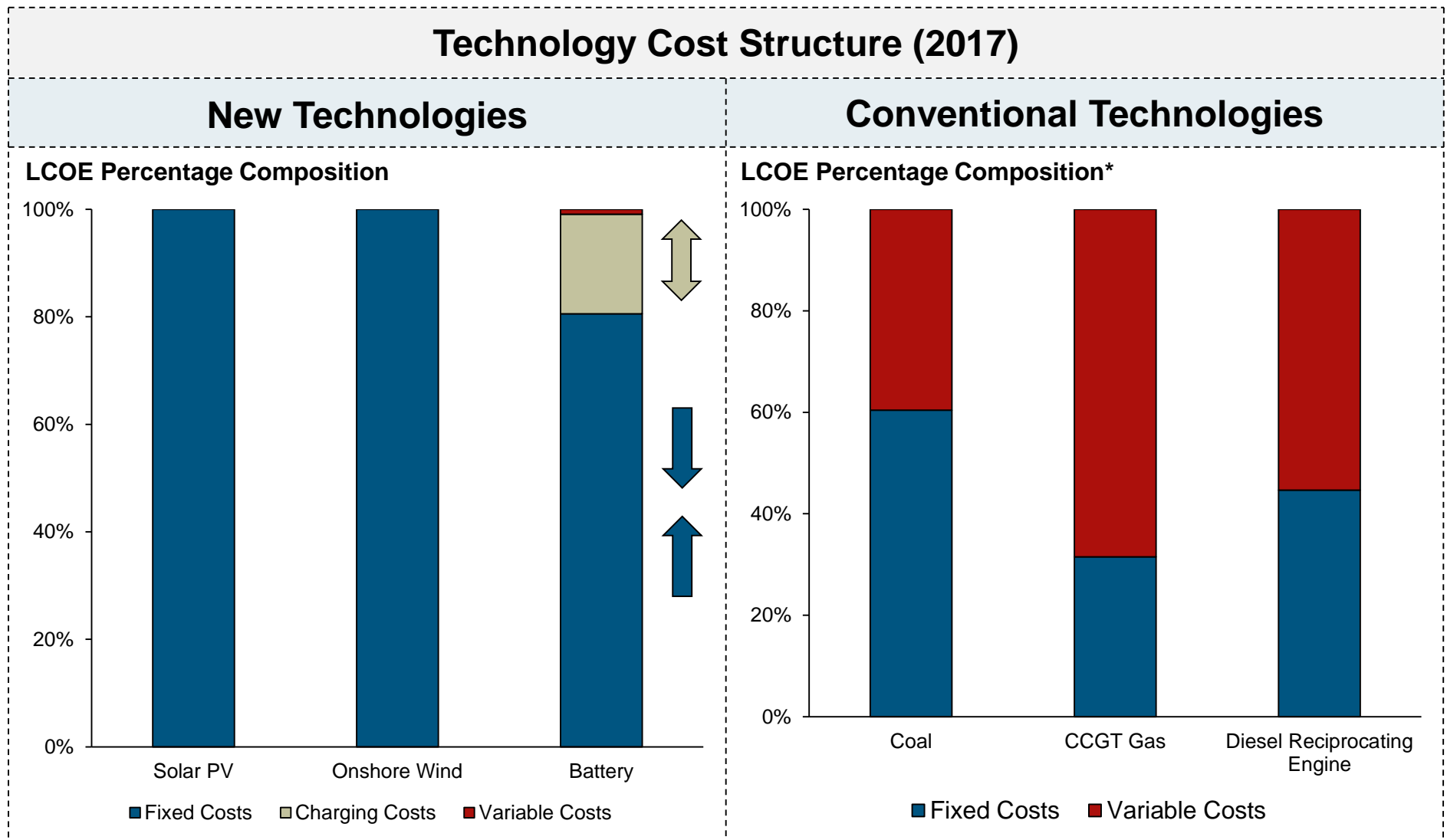


■ Gas   
 ■ Coal   
 ■ Solar & Batteries   
 ■ Oil   
 ■ Other

# Early adoption of batteries is driven by the replacement of existing oil-fired generation, particularly in the Visayas and Mindanao



These new technologies tend to have very different cost structures from 'conventional' generation resources, largely made up of upfront capital costs



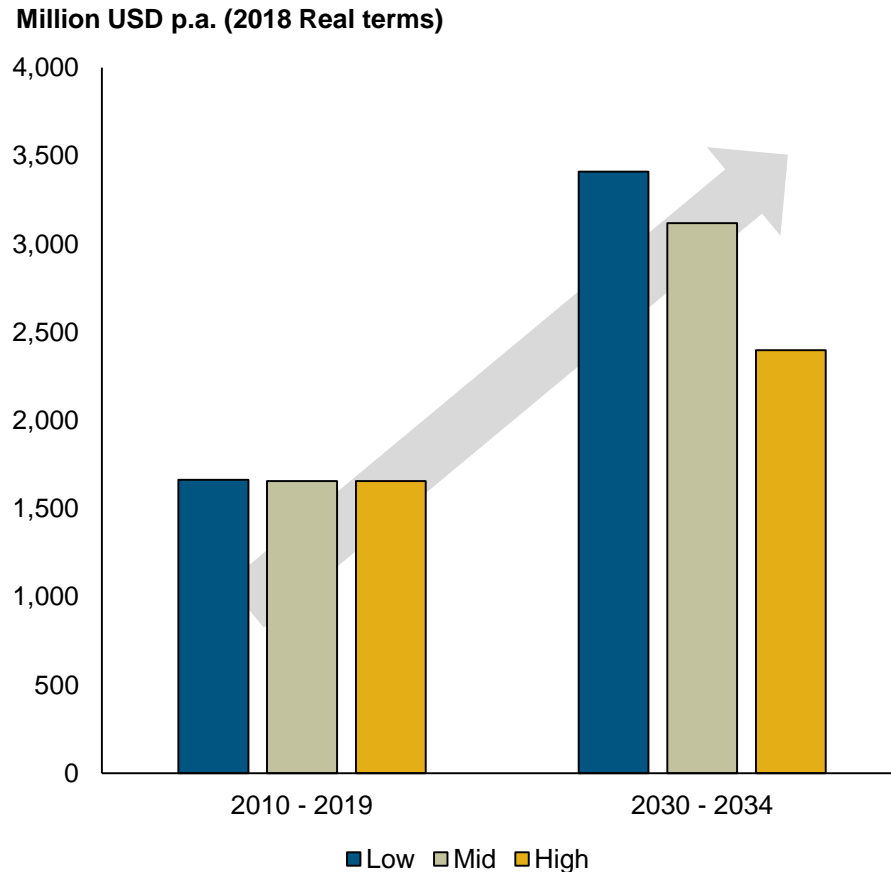
Sources: Lazard Levelized Cost of Energy 2017; TLG Analysis

\* Cost structures shown for varying Capacity Factors: Coal at 80%; Gas at 45%; Diesel at 15%

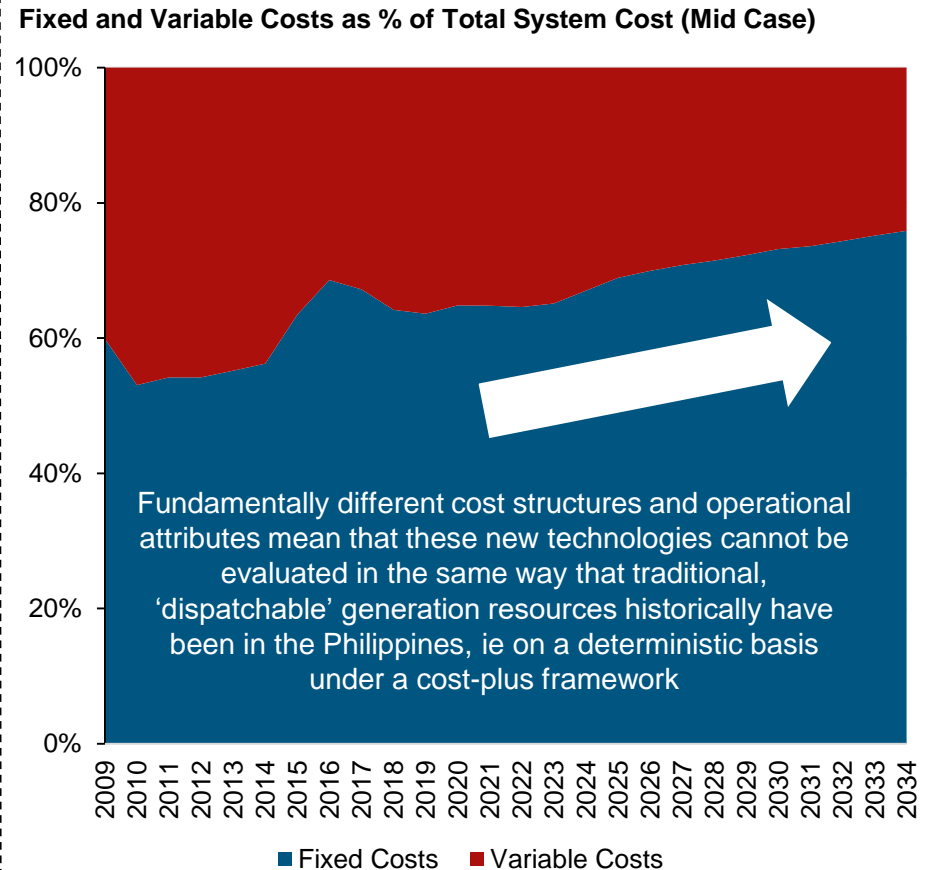
The realisation of this outcome thus requires an acceleration of investment and a forward-thinking methodology for evaluating new procurement

## Reference Case Modelling Results

### Estimated Investment Requirements



### Estimated System Cost Make-up





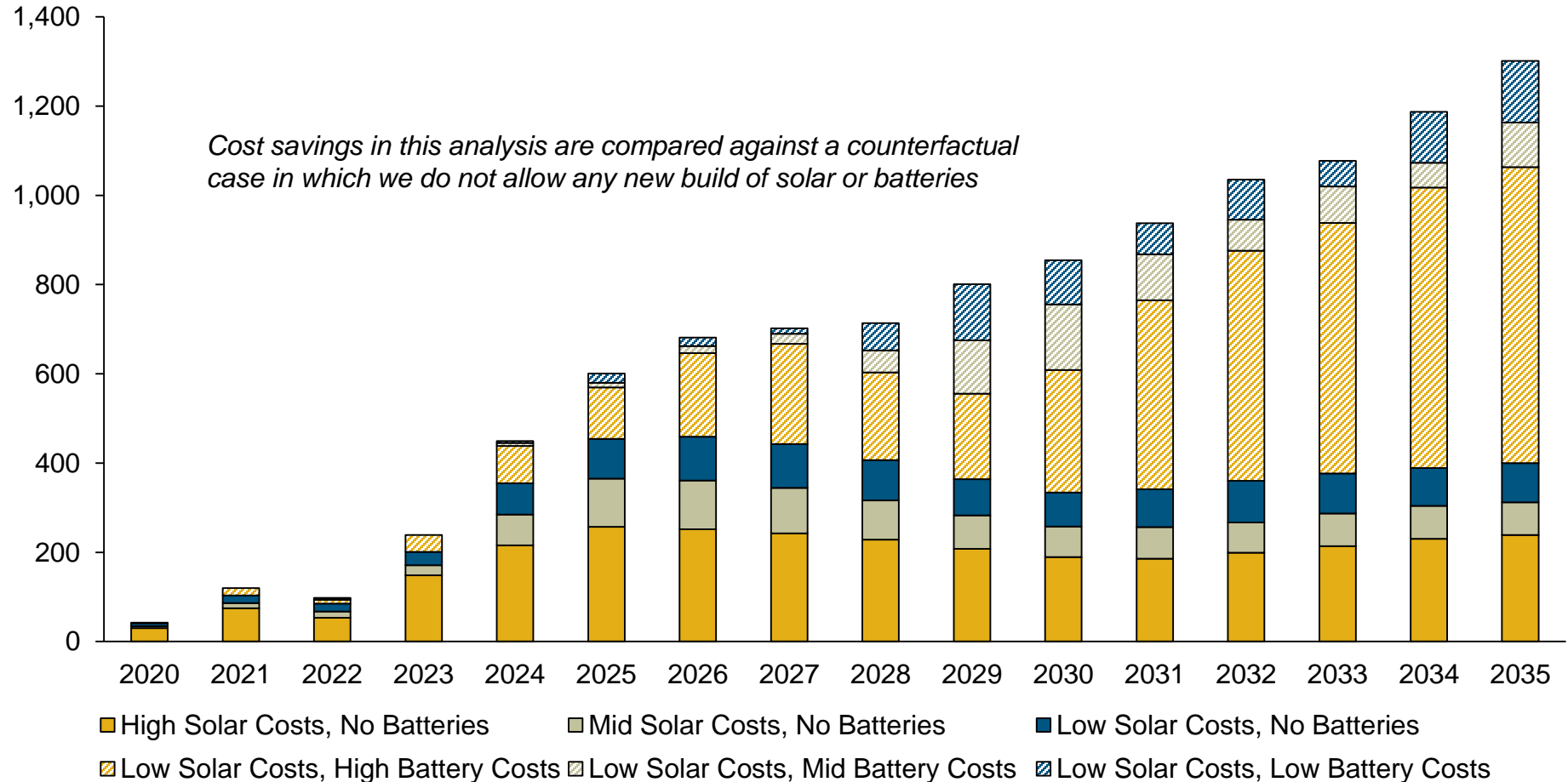
# Changes in regulation and policy will be required to fully realise this transition

Regulatory Risks and Solutions	
Risks	Factors
<b>(1) Execution Risks</b>	<ul style="list-style-type: none"> <li>• Coordinating development of land and grid consistently with projects</li> <li>• Ensuring adequate and timely procurement of ancillary services</li> <li>• Ensuring payment of ancillary services by the appropriate causer/beneficiary</li> </ul>
<b>(2) Competitive Selection Process (“CSP”) Risks</b>	<ul style="list-style-type: none"> <li>• How will CSP really work (operationalisation uncertainty)                             <ul style="list-style-type: none"> <li>• Consistent and unbiased evaluation across fuels and technologies</li> <li>• Who will bear what risks, and how will these risks be quantified in the scheme</li> </ul> </li> </ul>
<b>(3) Investment Risks</b>	<ul style="list-style-type: none"> <li>• Counterparty contracting risks                             <ul style="list-style-type: none"> <li>• Rollout of Retail Competition and Open Access (“RCOA”) and treatment in contracts</li> <li>• What premium/penalty for RCOA clause in PSAs</li> </ul> </li> <li>• Supplements to LT contracting (capacity market; removal or increase of energy market price cap; etc)</li> </ul>

It is important that this transition is enabled, as it has the potential to substantially reduce end-user bills

## Annual Savings for End-User due to Solar and Batteries

Million USD p.a. (2018 Real terms)



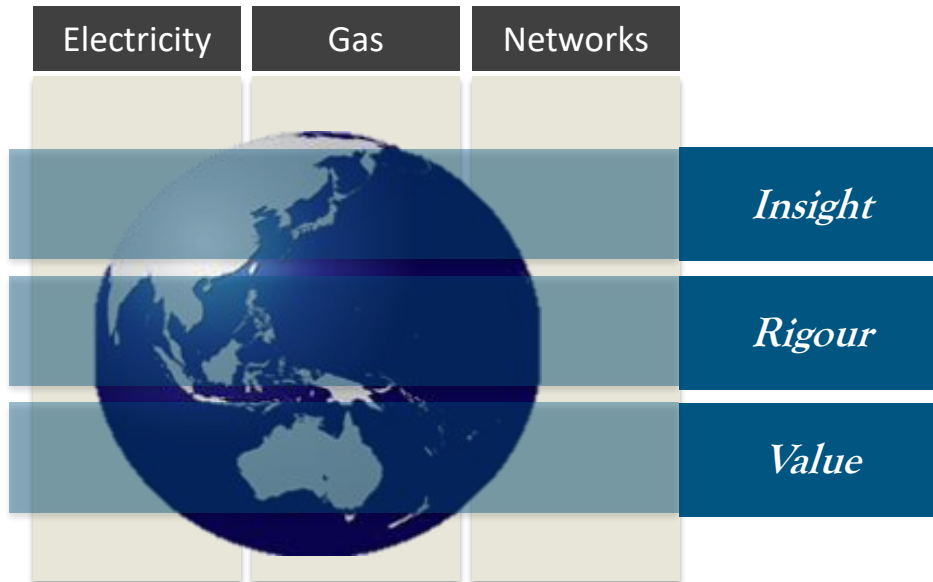
## Concluding Remarks

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- The electricity sector is poised to undergo a fundamental transition in the coming decades
- We expect this transition to accelerate in a non-linear fashion over this timeframe as different relevant tipping points are reached and substantially surpassed
- There are a number of commercial and regulatory hurdles that need to be carefully addressed, which will be important factors in determining the path of this transition in various jurisdictions
- This transition has the potential to substantially benefit the consumer in the form of lower bills, and result in lower CO2 emissions
- This transition will create huge opportunities (risks) for different stakeholders in the sector, which can only be capitalised on (mitigated) to the degree that they are understood and anticipated

# Questions?

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**Thank you!**

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