



How to address structural imbalances that result in skewed baseload/peaking capacity plant build

Power & Electricity World Philippines 2015

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Prepared by:


THE LANTAU GROUP
strategy & economic consulting

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Asset valuation / M&A

Disputes

Policy / regulation

Strategy

Price projections & advanced analytics

Offerings:

- **Deep, critical, and useful insights**
- **Ability to connect the dots across the energy sector**
- **Analysis-based recommendations**
- **Highly relevant international experience**
- **Accessible experts focussed on the region**



TLG is a deeply-experienced economic consulting firm to the energy sector based in Asia

Our partners and principals have consulted for leaders throughout the region

Oil & Gas companies

- PACE GLOBAL (A Siemens Business)
- TDRi
- KPX KOREA POWER EXCHANGE
- semcorp
- SITHE GLOBAL
- PETROVIETNAM

Large Users

- CLP 中電
- Santos (We have the energy.)
- Marubeni CORPORATION
- KPOWER
- EGCO GROUP

International Aid Agencies

- WORLD BANK GROUP
- WFP
- SAUDI ARAMCO (ارامكو السعودية)
- meridian
- TENAGA NASIONAL BERHAD (2002-W)
- Morgan Stanley
- Shell
- BG GROUP
- ROTHSCHILD
- kdb (Korea Development Bank)

Leading Utilities

- ENERGY MARKET AUTHORITY
- PremierOil
- EWP
- SALAMANDER ENERGY
- COVANTA ENERGY (for a cleaner world)
- Standard Chartered
- ING

Financial Institutions

- WARTSILÄ
- PSALM
- KHAZANAH NASIONAL
- imo (Independent Market Operator)
- INTERGEN
- UBS

Market and System Operators

- KEPCO (KOREAN ELECTRIC POWER CORPORATION)
- POWER GAS (A member of Enbridge's Power1)
- ERC (ENERGY REGULATORY COMMISSION - PHILIPPINES)
- Economic Regulation Authority
- MΣ
- MEDCOENERGI

Regulatory Agencies

- AES (the power of being global)
- PETRONAS
- KOGAS (KOREA GAS CORPORATION)
- Chevron
- Statoil
- HESS

Government Ministries

- MACQUARIE

Independent Power Producers

- HALLIBURTON
- JAPAN BANK FOR INTERNATIONAL COOPERATION (JBIC)
- ConocoPhillips

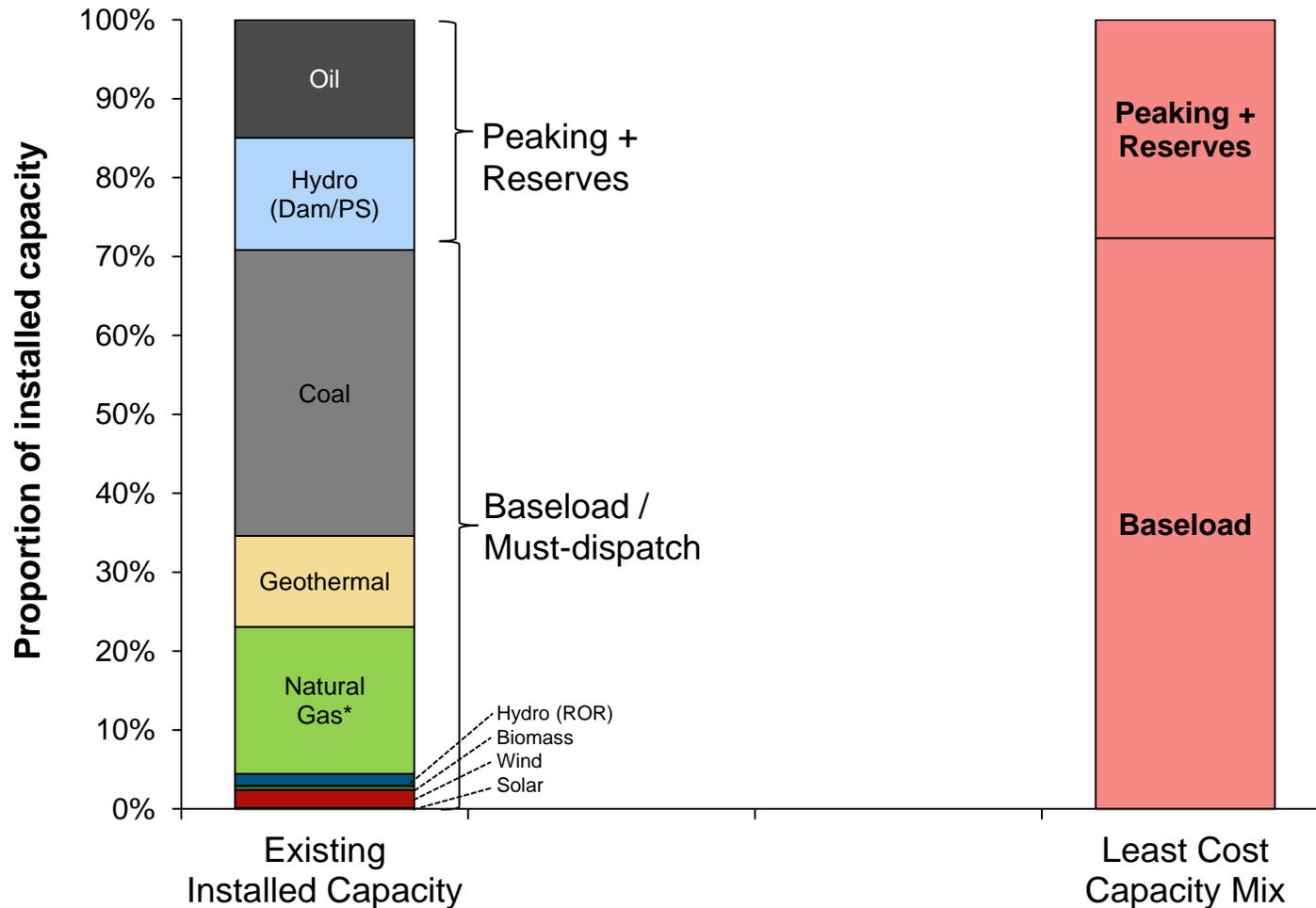
Other Partners:

- THE Brattle GROUP
- THE LANTAU GROUP (strategy & economic consulting)

Overview

- 1 Plant Mix in the Philippines**
- 2 Impact of Power Supply Agreement Regulation
- 3 WESM spot market regulation
- 4 Conclusions

A cursory view suggests that the current installed mix of peaking vs. baseload in the WESM is relatively well aligned to the 'least cost' ideal.....



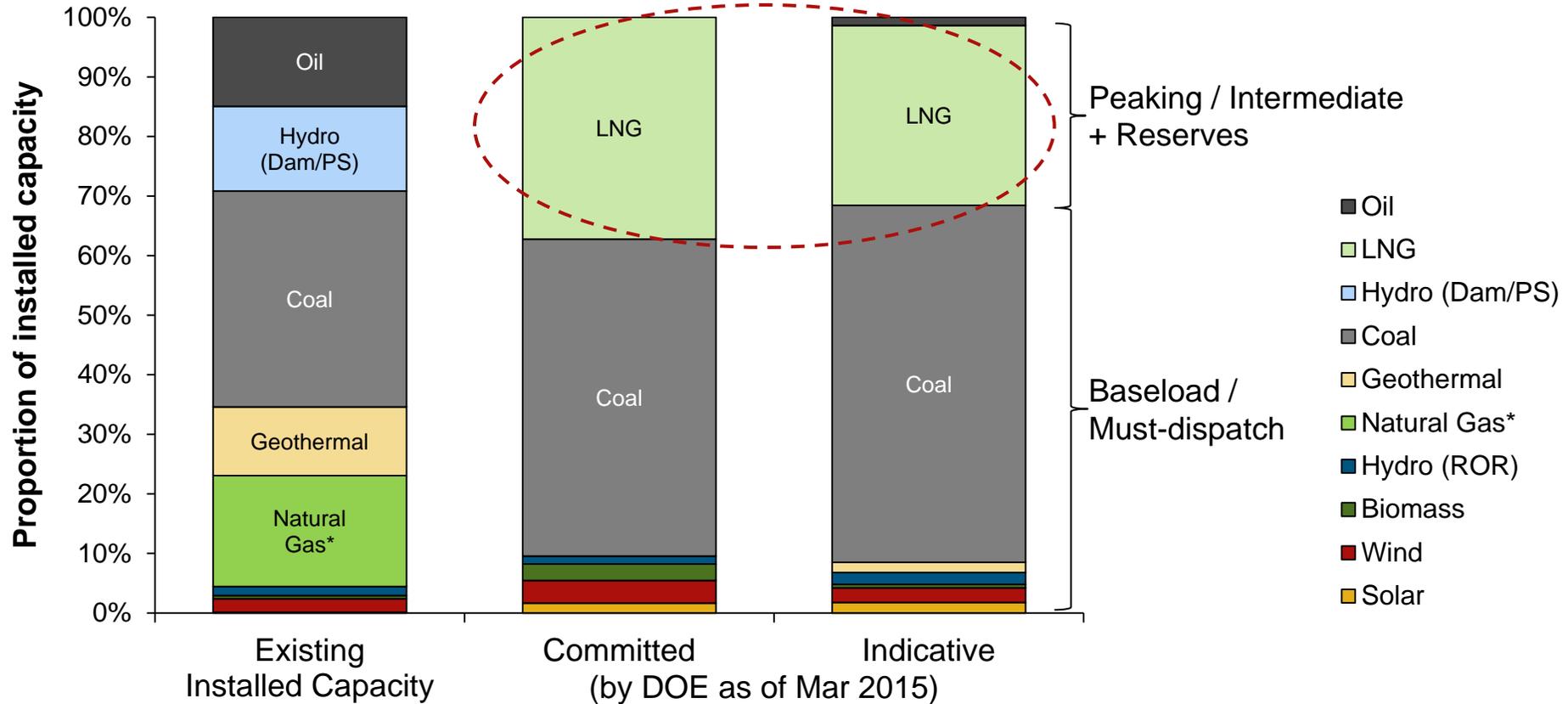
Note: * Natural Gas in the Philippines is almost entirely supplied by Malampaya field under very high take-or-pay arrangements
 Source: ERC (res. 3 of 2015); TLG analysis

....but digging deeper highlights some issues.....

- The mix is very much baseload vs peaking ... there is almost no flexible “mid-merit” capacity
 - This is because the gas plant, which would be mid-merit economically, is must-run because of the take-or-pay in the contracts
 - It means coal plants have for a number of years run less than baseload, ramping up and down, a type of operation that is less efficient and less economic than pure baseload use
- The peaking/reserves are supplied by oil or hydro, but:
 - Oil is very expensive – much more expensive than flexible gas or LNG – meaning peak generation costs may be above the market price cap
 - Hydro is seasonal – meaning at some times of the year it is not available and at some times of the year (rainy season) it becomes baseload/must run due to flooding risks

What does the future hold?

Nominally, investors' plans for new capacity are fairly balanced ... but new flexible capacity appears reliant upon LNG being successfully introduced



No contracts for LNG-fired power have been approved – so are there suitable regulations for power and gas to permit appropriate amounts of LNG-fired capacity to be successfully developed?

Note: * Natural Gas in the Philippines is almost entirely supplied by Malampaya field under very high take-or-pay arrangements
 Source: ERC (res. 3 of 2015); DOE; TLG analysis

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2 Impact of Power Supply Agreement Regulation

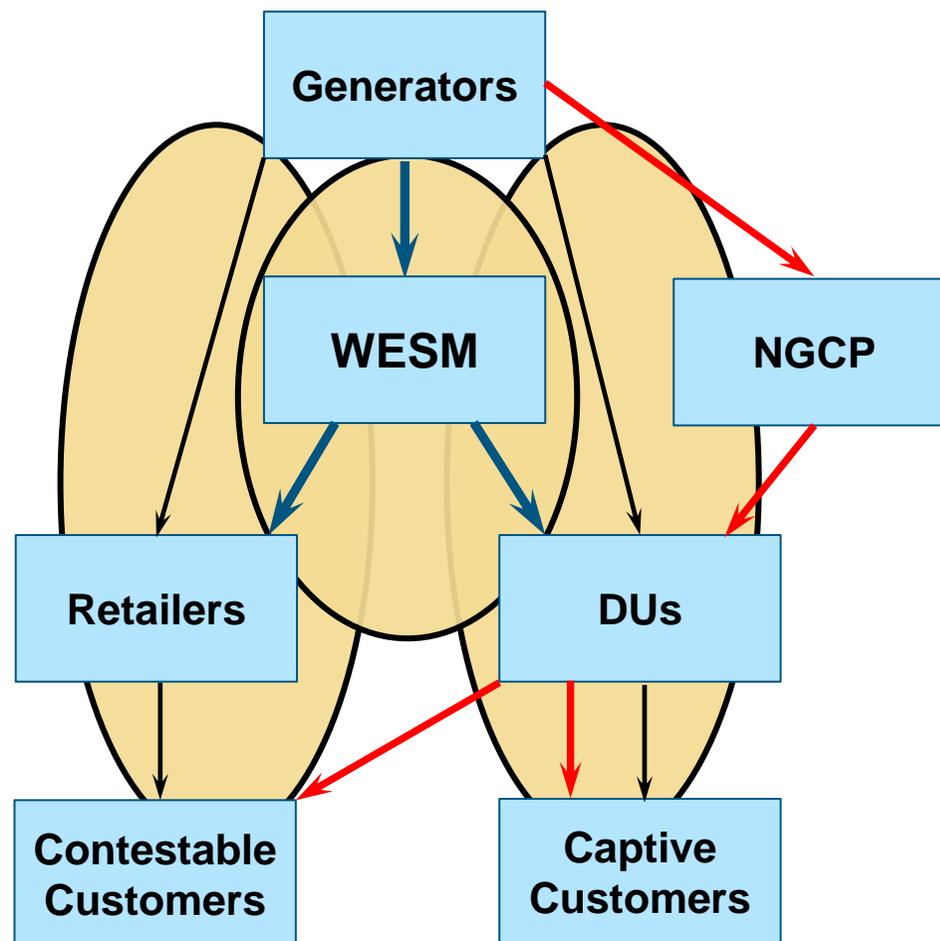
3 WESM spot market regulation

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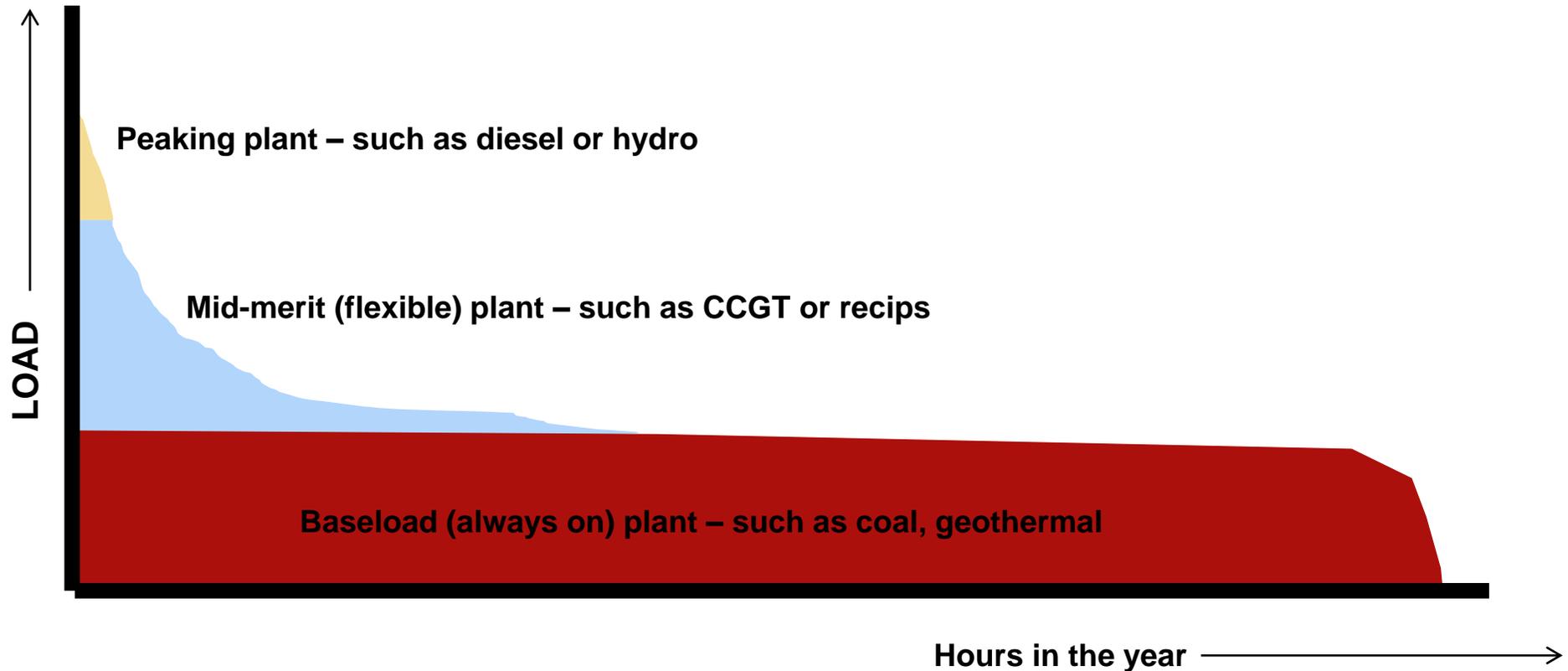
In the WESM, there are three primary regulatory interfaces

- **Captive retail market** – generators/DUs/captive customers
- **WESM spot market**
- **Contestable retail market** – generators/retailers/contestable customers

I will focus today on the first two of these regulatory interfaces



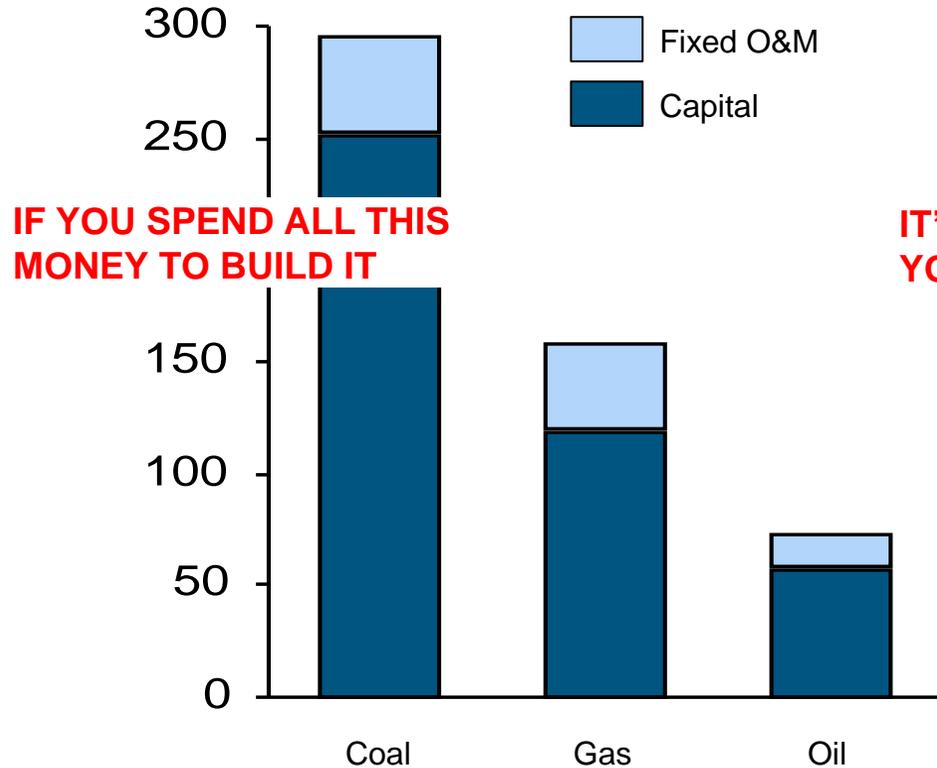
DUs, as retail aggregators, must purchase a mix of peak, baseload and mid-merit resources to meet their needs



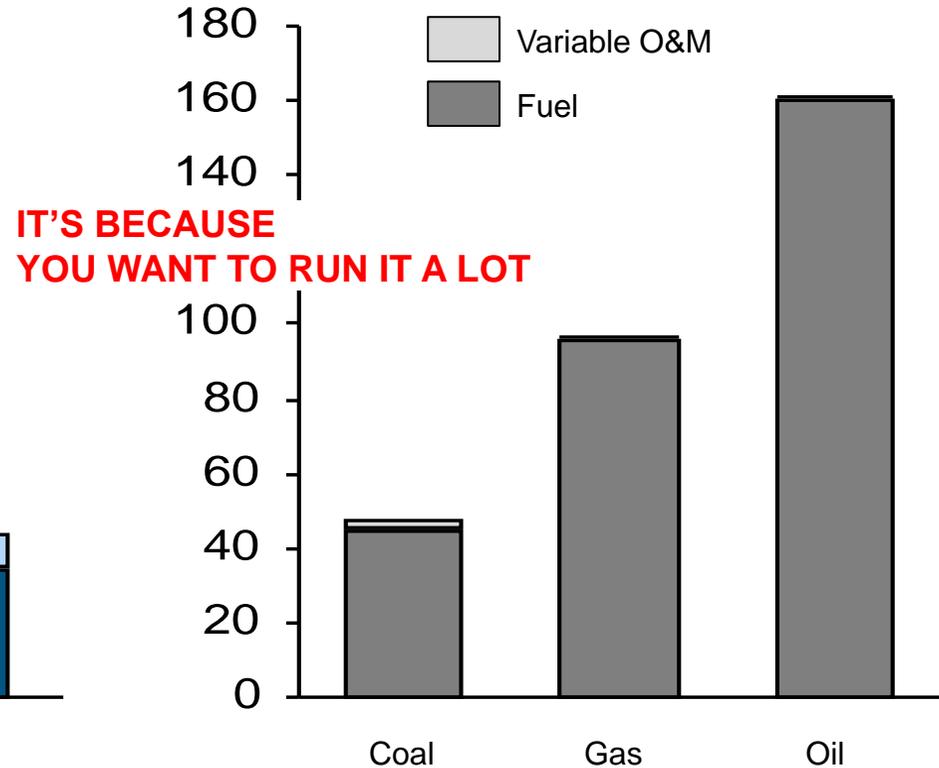
**Retailers contracting for resources ultimately determine what new generation gets built
– so their incentives are important**

In any market, to meet any load shape of electricity demand, there is a mix of plants that is cheapest

Fixed costs - \$/kW per year



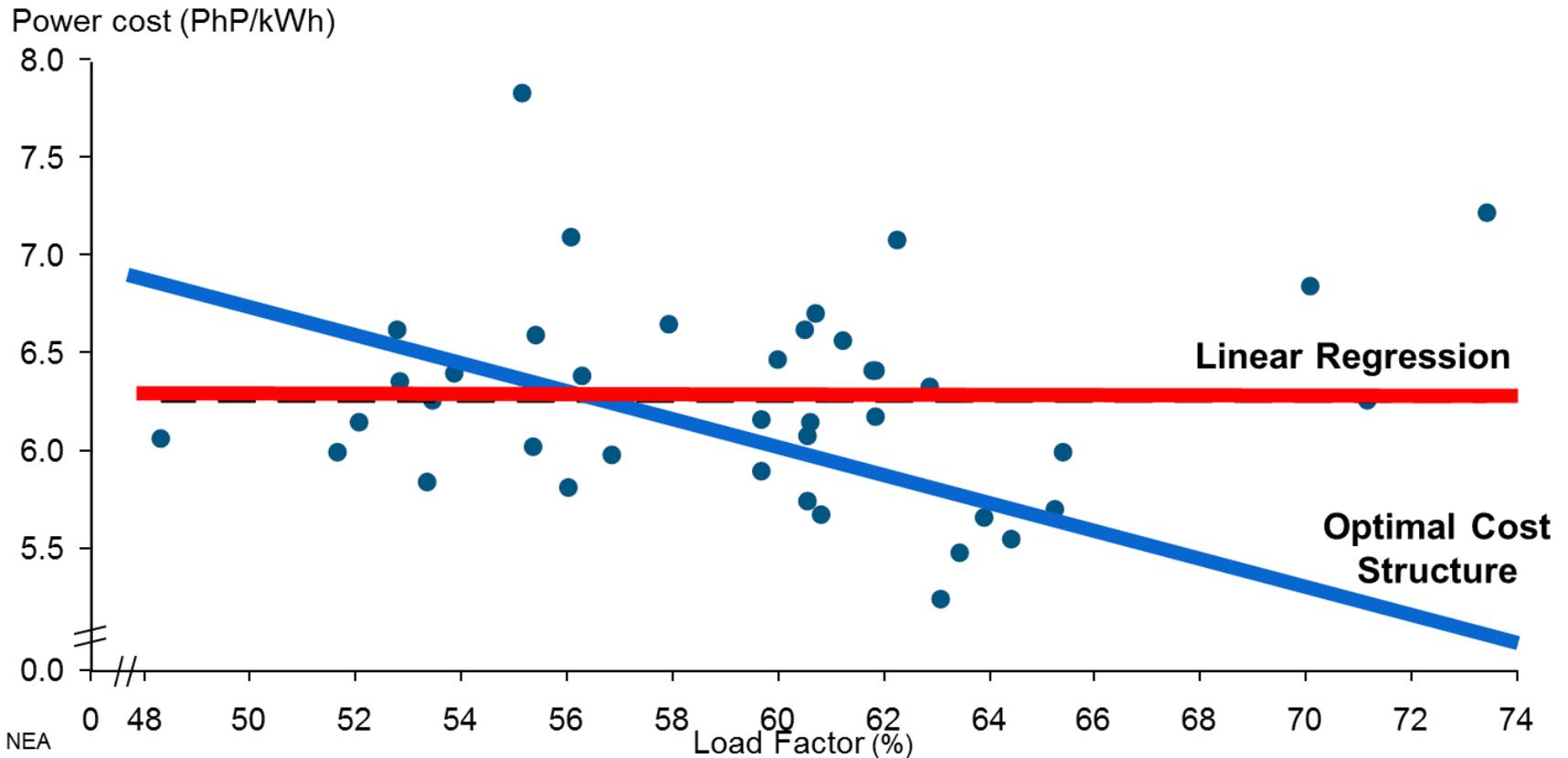
Variable costs - \$/MWh



No single technology is inherently “better” than the other – it is the way they are mixed that makes the optimal solution

Retailers with higher load factors should be able to form lower-cost portfolios – but this does not seem to happen in the Philippines

Average power cost vs. load factor for Luzon grid ECs (2012)



Source: NEA

Regulation of the DUs does not provide incentives for least-cost contracting

Lack of regulatory incentives for retailers to contract efficiently distorts incentives for new generation entry

- The ERC regulates the DUs' generation purchases
- The form of this regulation focuses solely on individual contracts
 - It does no analysis of whether the contract is actually NEEDED, only the cost of the contract
 - It does not take account overall purchases by the retailer
 - It does not take into account alternatives available
 - And nobody regulates what is not contracted (that is, purchases from the spot market)
- Regulation attempts to ensure that each contract is a “least cost” option – but the analysis is biased in favour of baseload resources
- This regulatory review is a time-consuming process – in some case, the ERC has issued retroactive rate adjustments years into a contract
- Once approved, all the costs of these contracts are passed directly through to the consumer, even if they later change, even if the contract is not needed

As a result, retailers focus on what is easy to get approved, not on what is actually needed – they have no incentives to contract efficiently

In addition, retailers do not necessarily bear the merchant market risks that would encourage them to contract (and to contract efficiently)

- Since WESM purchases are not subject to regulation, all WESM costs are passed through to consumers
- Consequently, DUs as retailers bear no market risk – customers bear the risk!
 - We note that there is some chance the ERC would review and not allow costs to pass through, but no procedure is not clearly specified
- In other markets, customers have fixed tariffs, and if spot prices are high, it is RETAILERS, not the customers, who bear this risk
- In Philippines this is backwards.
- Since customers bear the risk, the regulator and the DOE worry about high WESM prices

This regulatory focus on WESM spot prices creates other investment issues

Suggestions for improving the economic regulation of purchases for captive retail consumers

- Trust competition
 - The perfect is the serious enemy of the good
 - Move away from regulatory review of every contract
 - Make it easier for DUs to secure a range of different contracts to cover entire demand curve
 - Regulate portfolio costs against market benchmarks
- Structure contracts to support economic fundamentals and facilitate portfolio planning
 - Financial contracts not physical delivery
 - Prices vary by time of use and level of responsiveness required
- Expose stakeholders to WESM risk so they support prudent contracting

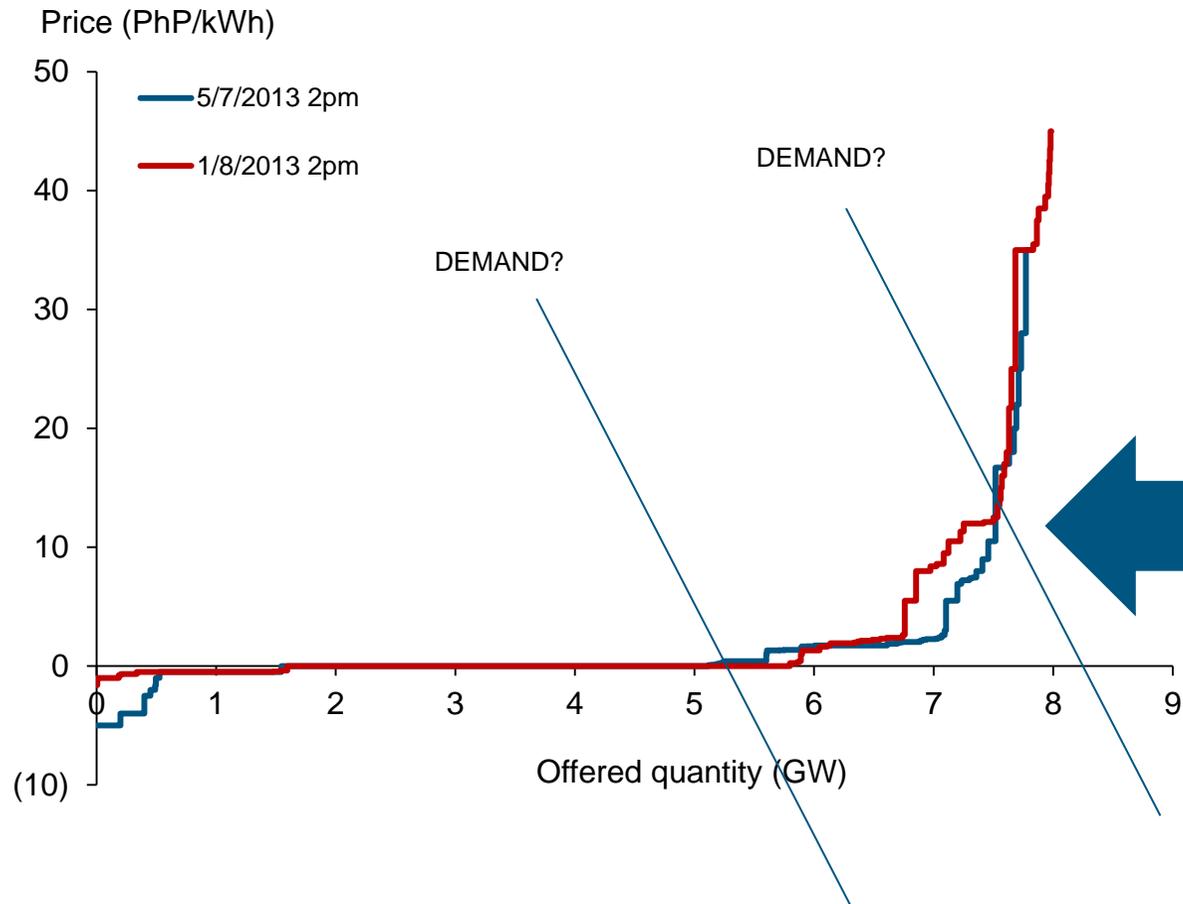
Economic regulation is about achieving reasonable value, not adhering to precedent

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As the system gets tighter, offers increase, which is the logical and normal situation → how else to signal the need for new capacity?

Luzon generator offers for two illustrative peak hours



Very steep slope is an indicator of lack of flexible mid-merit capacity

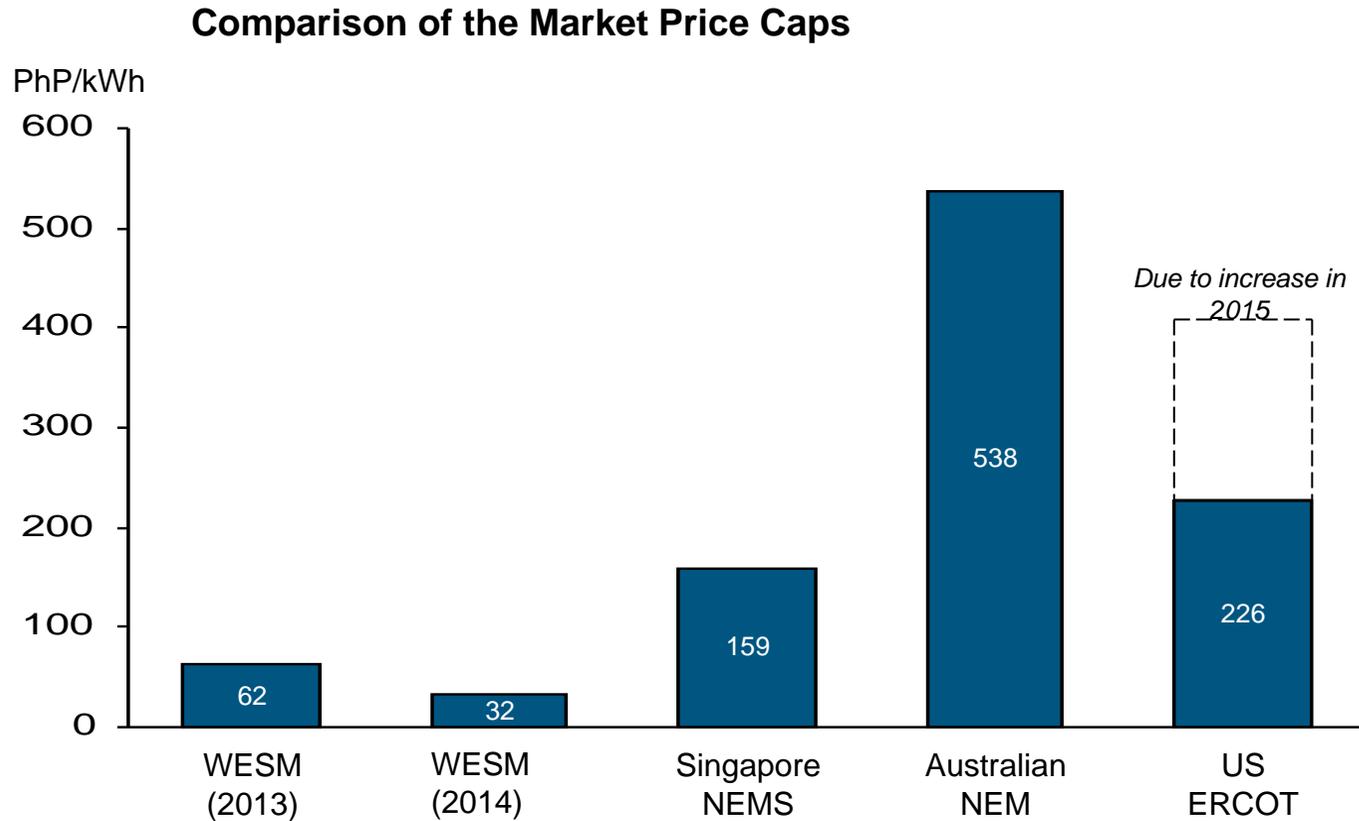
WESM spot prices play a key role in inducing generation investment

- Load growth causes reserve margins to fall
- As reserve margins fall, spot prices – and expectations of future spot prices – increase
- Contract prices should be set with reference to spot price expectations – (but are not because of the PSA regulations discussed previously)
- Sufficiently high price expectations induce new investment
- New investment raises reserve margins again
- As reserve margins rise, spot prices fall



Predictably high spot prices are needed to ensure timely entry

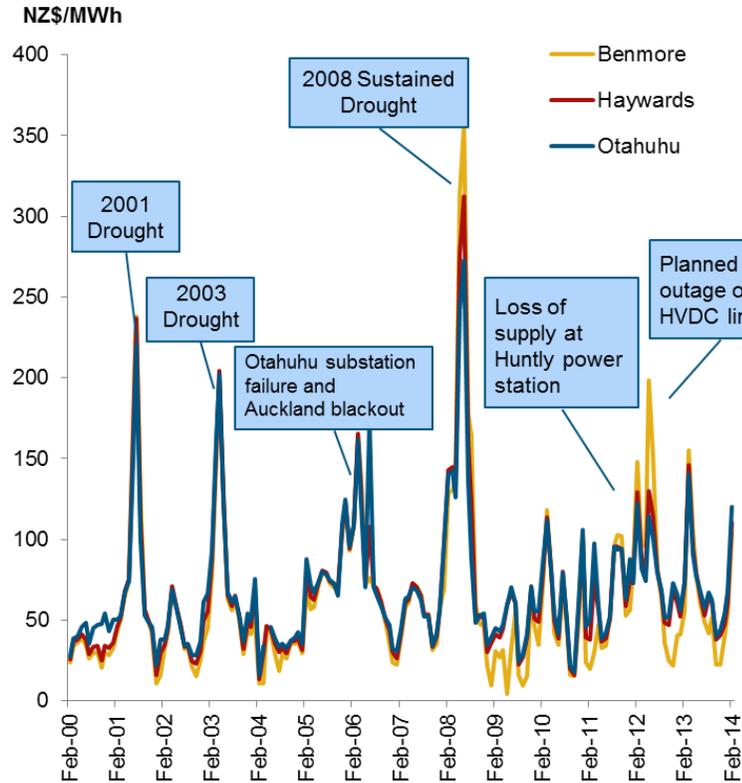
The market cap price in the Philippines is much lower than other markets – and was recently lowered further



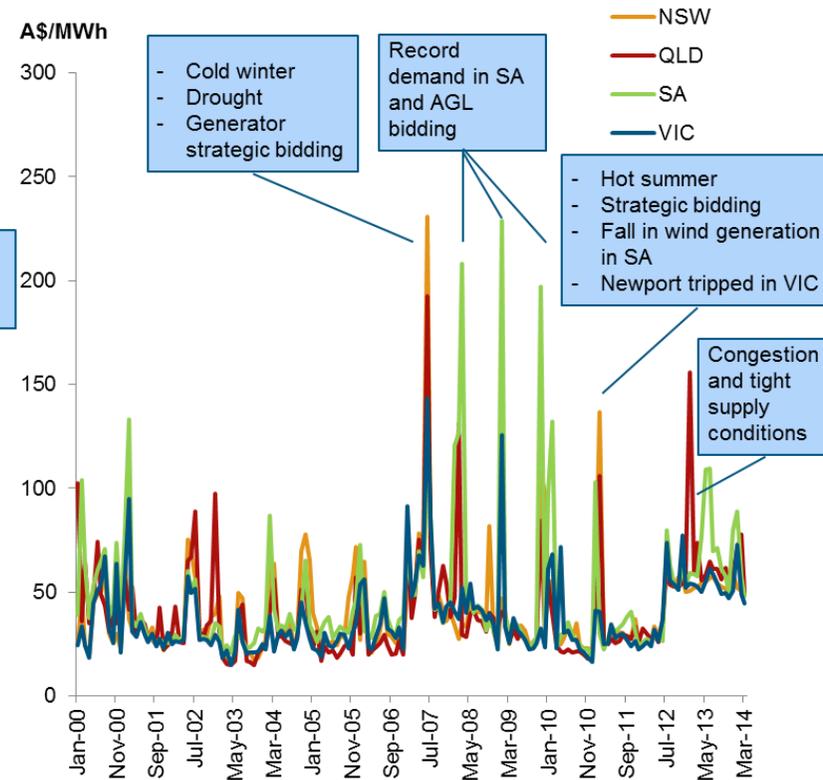
Because the regulatory framework does not incentivise retailers to manage price risk for consumers, the ERC is distorting the market to reduce customer risk

In similar markets, prices spike to much higher levels than ever seen in the WESM – and these price spikes support investment

New Zealand historical monthly average final prices 2000-Current at 3 major nodes

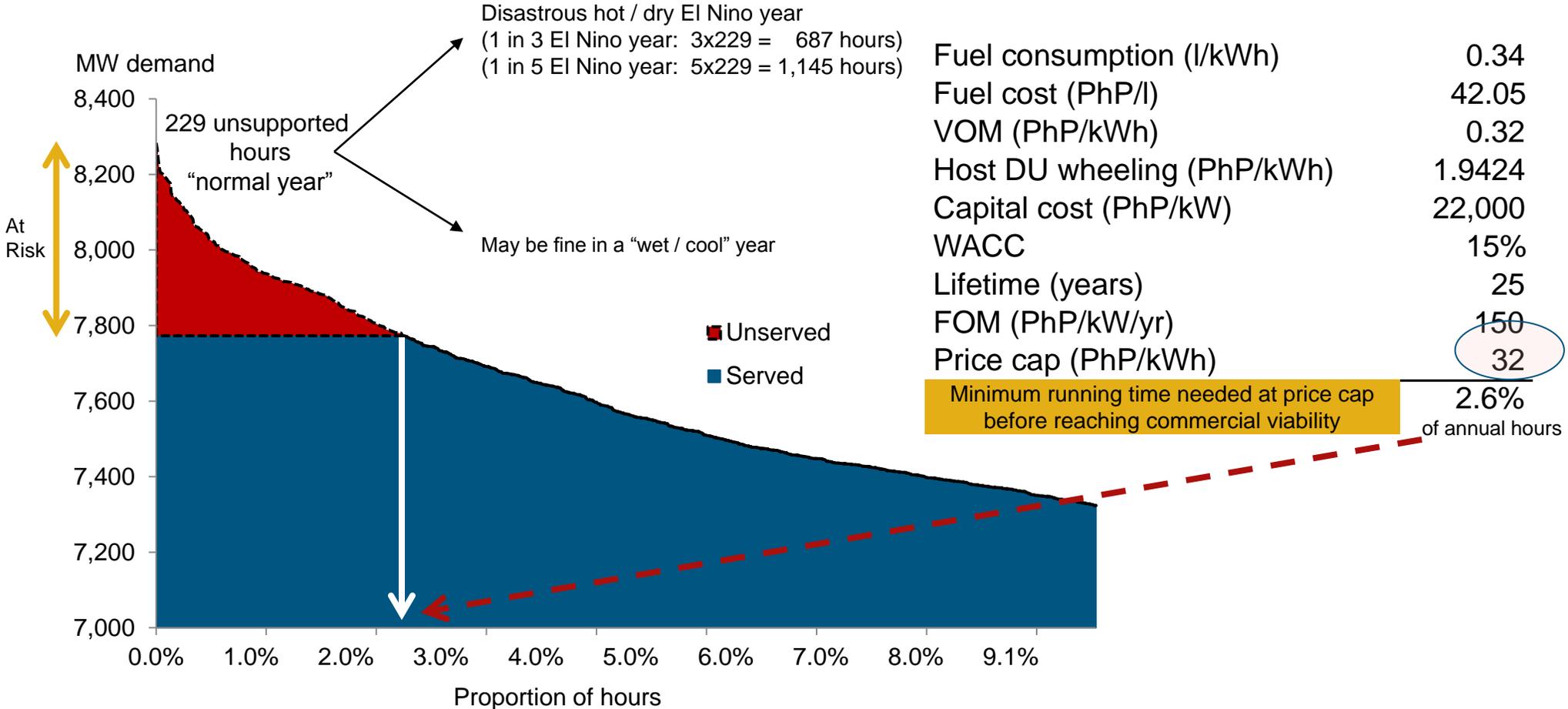


Eastern Australia historical monthly average final prices 2000-Current at 3 major nodes



Without investment, price spikes get worse, the market fails, and value is destroyed

The lower the price cap, the greater the risk of future unserved load



Source: DOE; PEMC; TLG analysis

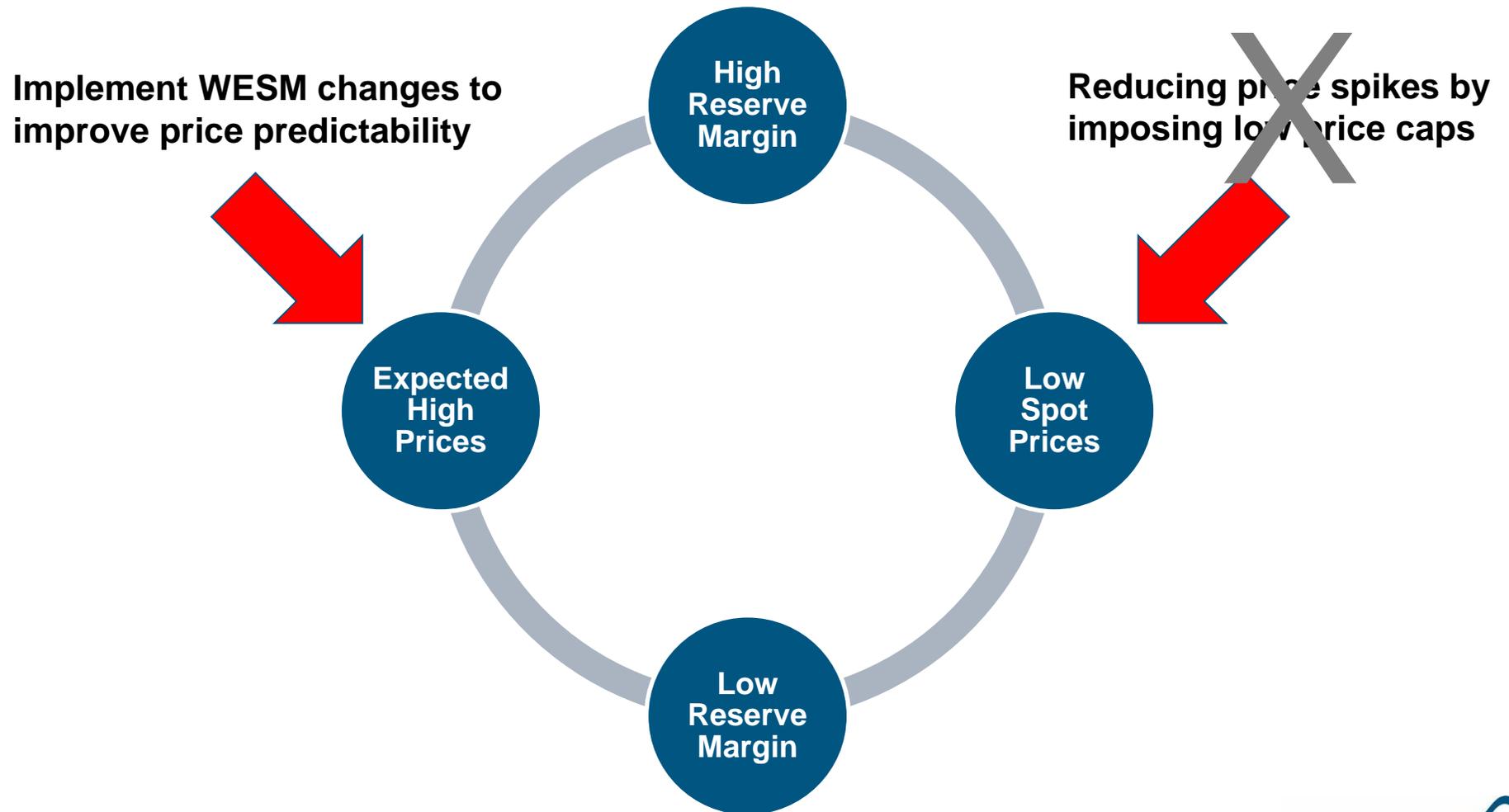
A price cap of 32 PhP/kWh will, in time, guarantee shortage

But with a more appropriate regulatory framework and a higher price cap...

- More attention would be paid to effective contracting strategies – especially contracts to cover disruptions, outages and peak demand
- Flexible and responsive capacity (such as that provided by LNG) would become more commercially attractive, leading to earlier replacement of older, expensive, and less responsive capacity
- However risks to retailers would increase, as they would be more exposed to uncovered (spot) price risk....
- ... but the tools to manage these risks would also appear, as flexible plants will need flexible contracting strategies
- And changes to the regulatory environment would be required to support this outcome

Undermining market mechanisms is a bad solution to regulatory failings

WESM regulation is really focused on the wrong part of the investment cycle



Fix simple, basic, and long-standing WESM issues

- Stop distorting economic outcomes
 - Eliminate Pmin
 - Eliminate the must-offer rule
- Provide proper signals with offer caps that align with desired reliability of supply targets
 - Raise the price caps
 - Don't use price caps for consumer protection unless you also plan to hand out flashlights when the power does not come on
- Introduce trading of Ancillary Services in the WESM
 - Price signals for the value of flexible capacity
 - Potentially not fully compensated under current regulatory regime
- Invest in market software / processes to minimise pricing errors

If it is necessary to manage consumer / transitional exposure, there are temporary value management mechanisms available

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In summary

- Regulatory oversight should focus on the total portfolio, not individual generation contracts
- Review of portfolio cost should be conducted with reference to market benchmarks
- As retail aggregators to the captive franchise load, DUs should bear at least some spot market risk
- WESM spot price cap is too low, exacerbating the risk of power shortage
- WESM rule changes and operational improvements would enhance spot price predictability, thereby facilitating generation entry
- Until these changes take effect, it is likely that new investment will focus on baseload plant meaning that the supply curve will get ever steeper and risks even harder to manage in the market

We will continue to watch, wait and push for improvements



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