



# Is Gas the Right Fuel for the Philippines

Sarah Fairhurst

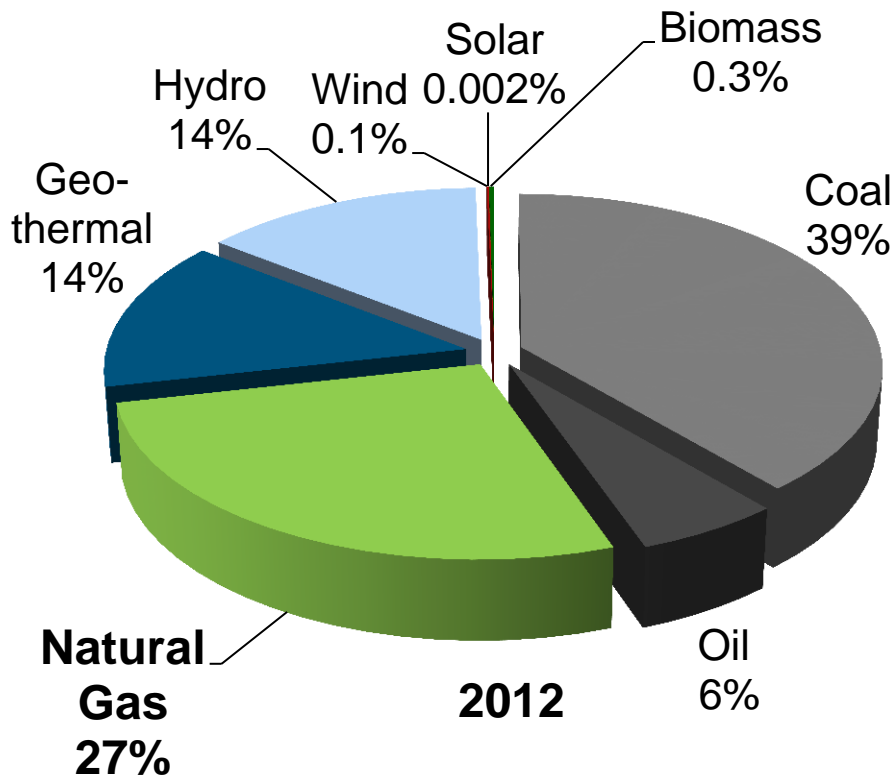
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## Current fuel mix for power generation in the Philippines



Source: Philippine DOE (Power Statistics)

- Fuel mix is currently very diversified with a high proportion of renewable and local sources
- Gas makes up 27% of the fuel for power generation in the country – higher if you just look at Luzon
- Practically all the gas comes from Malampaya – a single gas field offshore Palawan via long (504km) undersea pipeline
- The Malampaya concession expires in 2024 and while it may have enough gas for some further expansion, this is not considered sufficient for more than about 5 years at current levels

After Malampaya – what then?

## Building power stations in the Philippines is more complicated than many places in Asia...

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- There is no national Government owned electricity “utility” in the Philippines
- There are no Government backed long term PPA’s on offer and no Government Guarantees
  - The electricity legislation (EPIRA) prevents the Government from building or contracting for power stations (except in emergency situations)
- There are two electricity markets – the WESM (Luzon and Visayas) and the IMEM (Mindanao)
- There is a degree of open access and retail competition – meaning some loads are contestable
- There remains extensive regulation of electricity contracts between generators and retailers
  - Not all of which is well designed or well implemented

**So an investor in power in Philippines has to manage commercial and regulatory risks through private sector investment and debt. Add to that the costs of building an LNG terminal as well...**

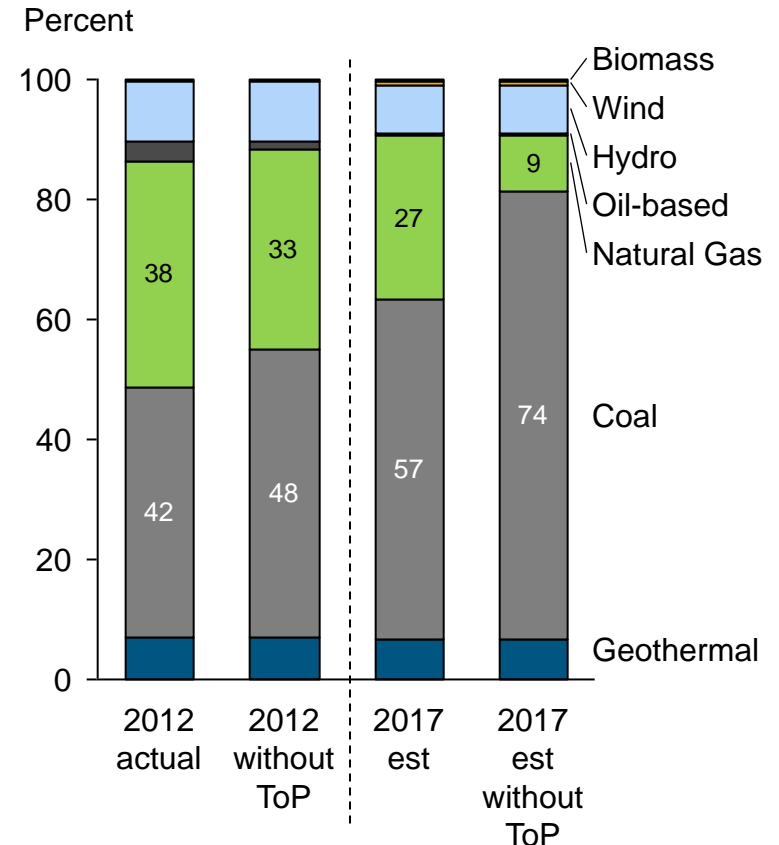
Is it even possible?

## Let's start by dealing with the misconceptions about current use of gas

- The three gas plants all currently run baseload
- However, they ONLY run baseload because of the “take or pay” (ToP) constraints of the contract for the sale of gas
- Without these ToP constraints, economically the gas-fired plants would run less – acting as peaking or mid-merit plants

**Between July 2007 and the end of 2013, Meralco alone spent an extra US\$300m on its gas-fired IPPs compared to the cost saving it could have got from its coal plants**

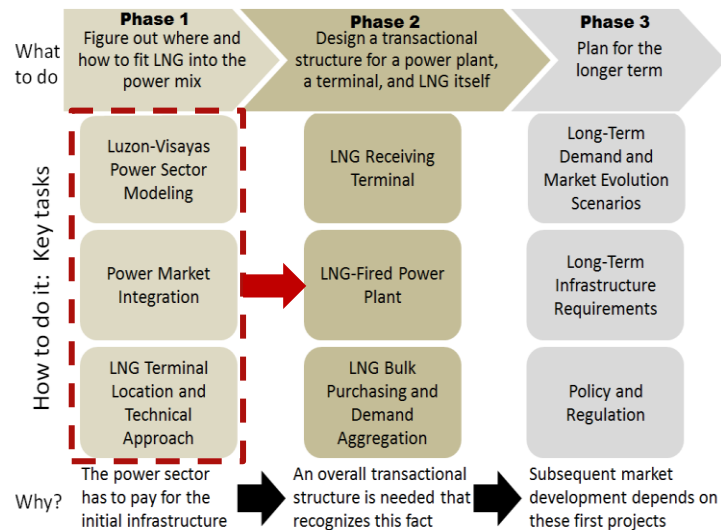
### Luzon generation fuel mix



The Philippines has diverted a lot of money from electricity into other things since the completion of Malampaya.....

# But Philippines has aspirations of having a clean, green, sustainable electricity industry

- They have a Renewable Energy Law
  - But have many roadblocks to the implementation of the various options included in that law
- Gas is perceived as being clean, but gas is more expensive than coal by some margin
- Environmental legislation covers only traditional pollution and there is no carbon legislation
  - Without a boost from carbon pricing, can green sources compete?
- This is the question we were asked to address by the DOE, funded by the World Bank, in the current “Gas Master Plan” being drafted

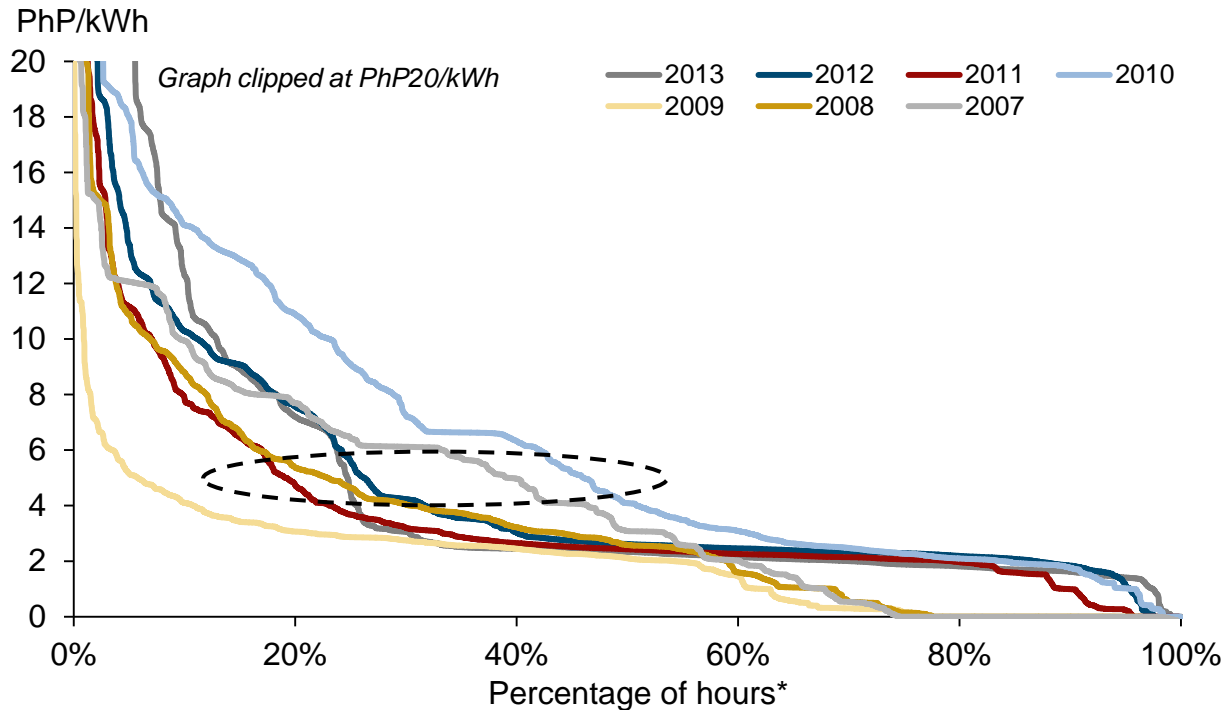


The Master Plan project has looked at the:

- Commercial potential for gas
- Transactional structures that might be necessary for it to enter
- Regulatory and policy requirements necessary for economic entry of LNG into the Philippines

# One way to identify the commercial need is to look at the historical spot prices

## Luzon WESM price-duration curves (2007-2013)



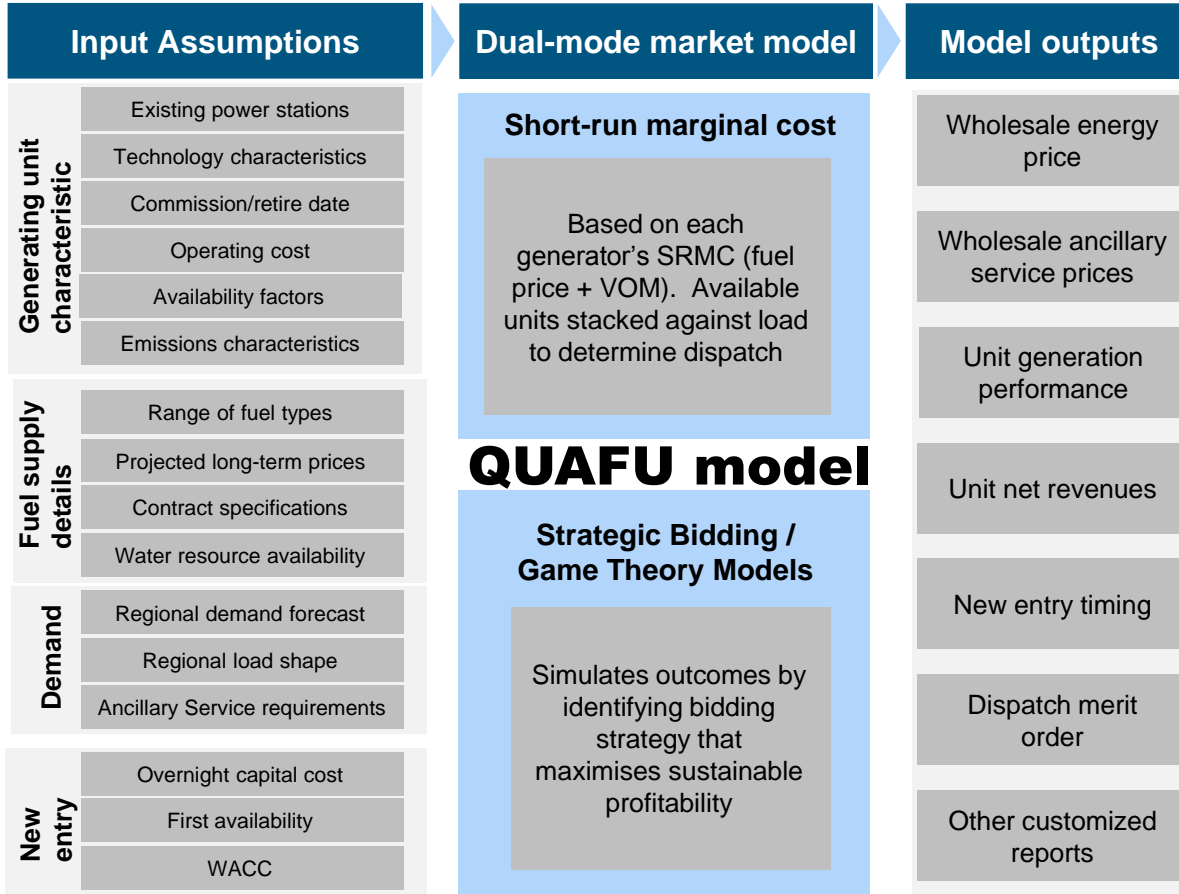
- Historically there has been a great deal of variability, highlighting the need for gas as a flexible fuel exists
- A unit dispatching around 4 – 5 PhP/kWh would have run at between 20-50 percent annual capacity factor

The market data indicates a role exists for flexible, mid-merit plant – but how much?

Note: \* Excludes administered prices; Graph clipped at PhP(5)/kWh and PhP20/kWh; 2013 Nov/Dec prices before regulated prices were imposed.  
Source: PEMC (ex-post); TLG analysis

# In order to identify the amount and timing of plant needed, we ran our market model

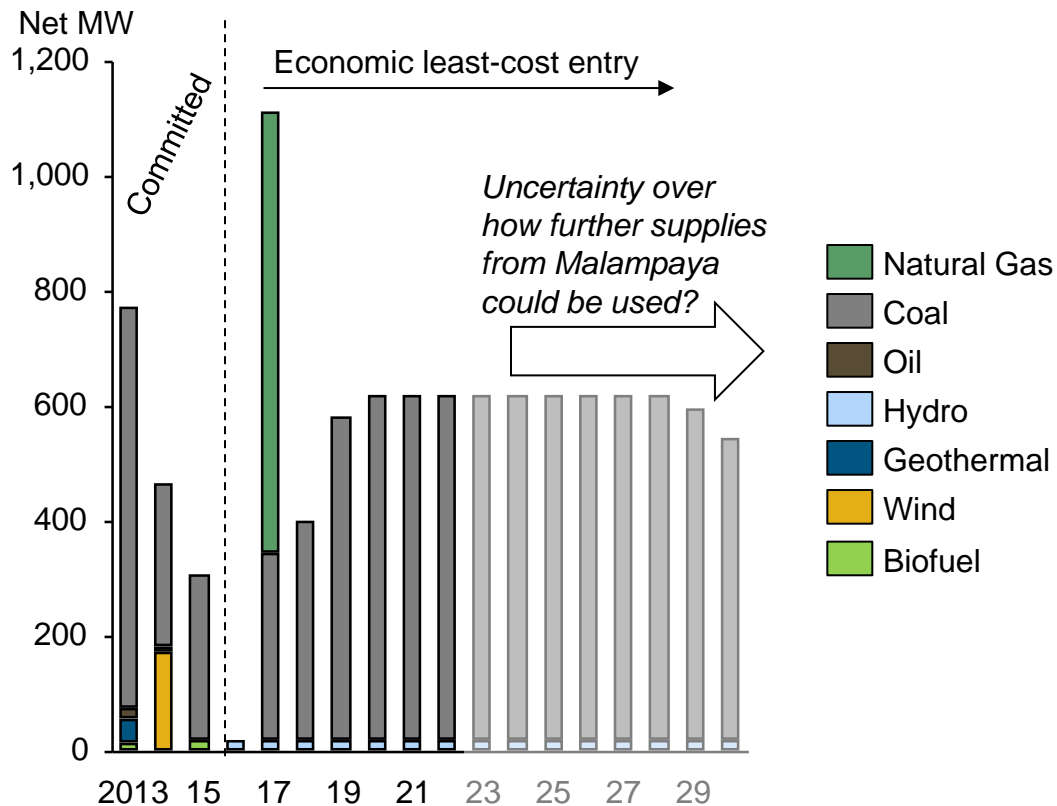
## QUAFU market modelling framework



- Takes into account expected:
  - Demand growth
  - Fuel price evolution
  - Committed projects
  - Technology performance/costs
- Also able to reflect the uncertainty in key drivers and the value of flexibility

# Our market modelling confirmed that there was a case for LNG in the least-cost capacity expansion plan for the WESM and that this ran mid-merit

## Least-cost capacity expansion plan for Luzon under expected assumptions



Note: EWC plant assumed to not be committed  
Source: DOE (committed plants as of Aug 2013); TLG analysis

- Near-term need for more cost effective mid-merit / peaking capacity
- Conservatively, an LNG-fired CCGT of about 600-800 MW and a LNG import terminal appear to be the least-cost option
- They are able to recover reasonable returns on their invested capital (including for terminal)
- The amount of LNG-fired capacity required is relatively robust to near-term committed capacity
- However, at expected coal and LNG prices, coal generation will continue to be least-cost option for most of future capacity requirement



## The modelling highlighted LNG fired capacity was economic in the short term – what about the longer term?

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- As we noted earlier, the Philippines already has 2700MW of gas-fired capacity which runs baseload, out of merit
- Between 2022 and 2024, the gas contracts forcing this plant to run baseload expire
- When that happens, the existing plant will be able to operate economically in a mid-merit role
- This means that no further gas-fired capacity is needed in the WESM

There is a current window of opportunity for some additional mid-merit plant, but LNG fired power does not require investments in large amounts of plant

# In addition to building new power stations, there is also an opportunity to import LNG to back up the existing domestic gas

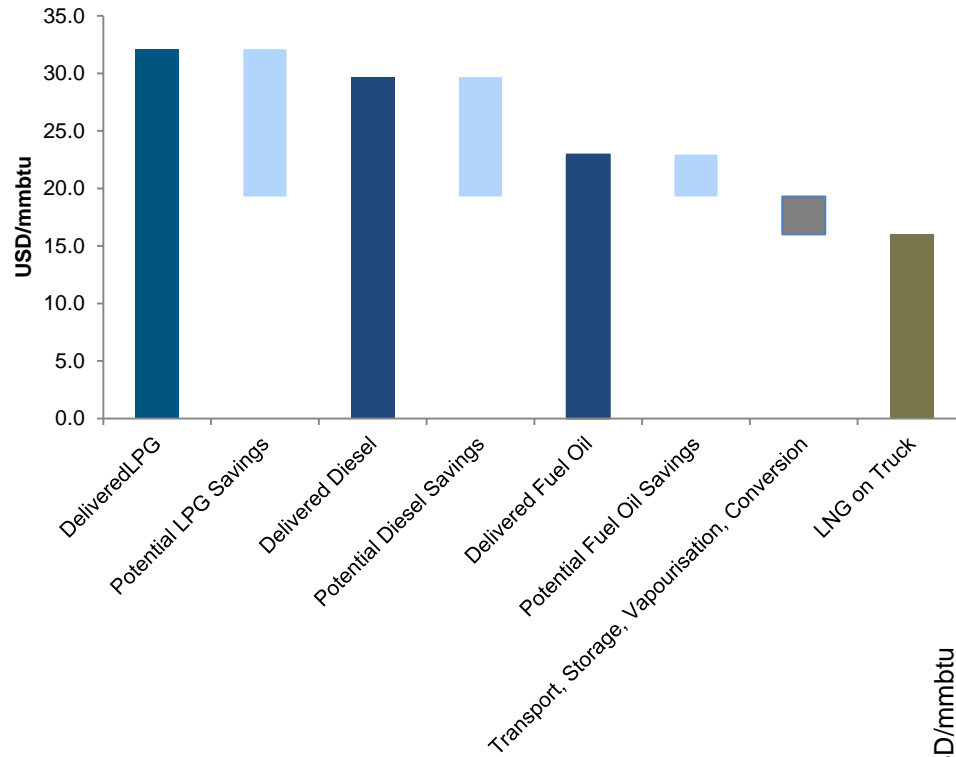
- Imported LNG is more cost effective than liquids, meaning that having the option to back-up Malampaya with LNG is a valuable option
- If LNG is used to replace liquid fuels when Malampaya is on outage, an opportunity to save in the order of USD20-25 million per annum exists
- Reduced availability also means more expensive generation is needed to replace lost capacity

	Start date	Duration	Estimated additional system cost (mPhP)
<b>Scheduled Malampaya maintenance outage</b>	22 Nov 2006	25 days	2,500
	27 Jun 2008	4 days	1,000
	10 Feb 2010	30 days	1,300
	20 Oct 2011	7 days	900
	13 Jul 2012	8 days	600
	11 Nov 2013	30 days	4,000
	<i>Subtotal:</i>		10,300
<b>Unscheduled Malampaya supply outages</b>	Average curtailment of 1,700MW over about 287 hours since 2006		740
	<b>Total:</b>		<b>11,040</b>

Is there a contractual solution that allows consumers to capture this value?

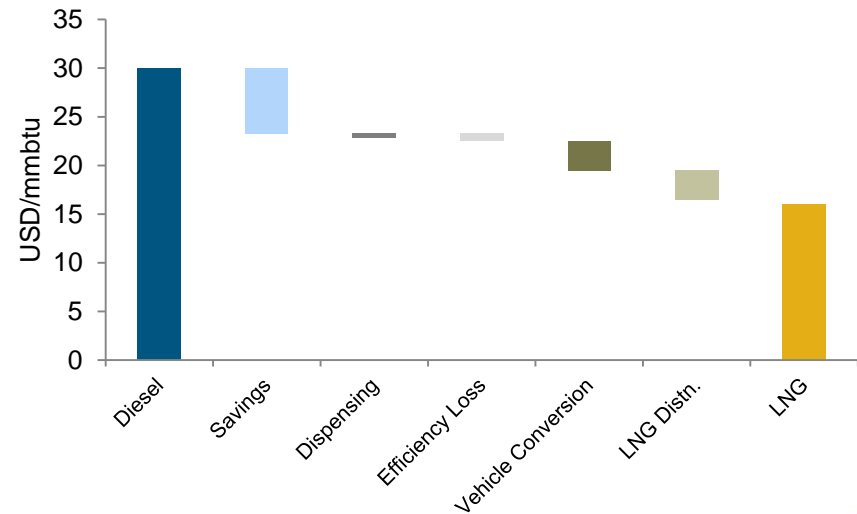
Note: \* Used in scheduled maintenance outages  
Source: DOE; TLG analysis

# And in the longer term, there are additional markets for gas

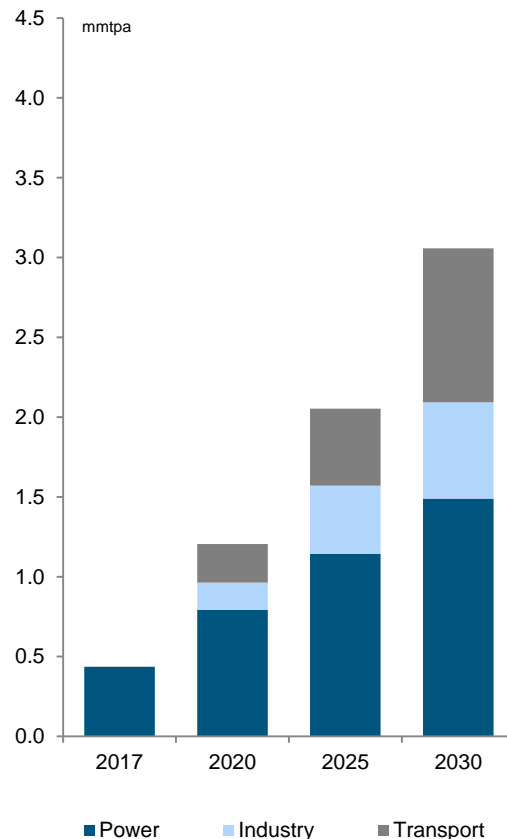


LNG would result in considerable savings over LPG and diesel as a heating fuel

And also as a transport fuel



# Our base case scenario has growing demand from power, industry and transport



- In the short term, we believe it is more economic to move LNG by truck to industry than by pipeline
- There are a number of diesel fired power stations in Visayas and Mindanao that could be converted to run on LNG – most of these are proximate to the coast and could be serviced by small barges on a “milk run” from the main Luzon terminal
- Development of gas pipelines in the Philippines is problematic due to access to land – over time if this is solved and after a base industrial demand has grown, then additional pipelines into Manila make sense

## In summary, there is commercial potential for LNG in the Philippines

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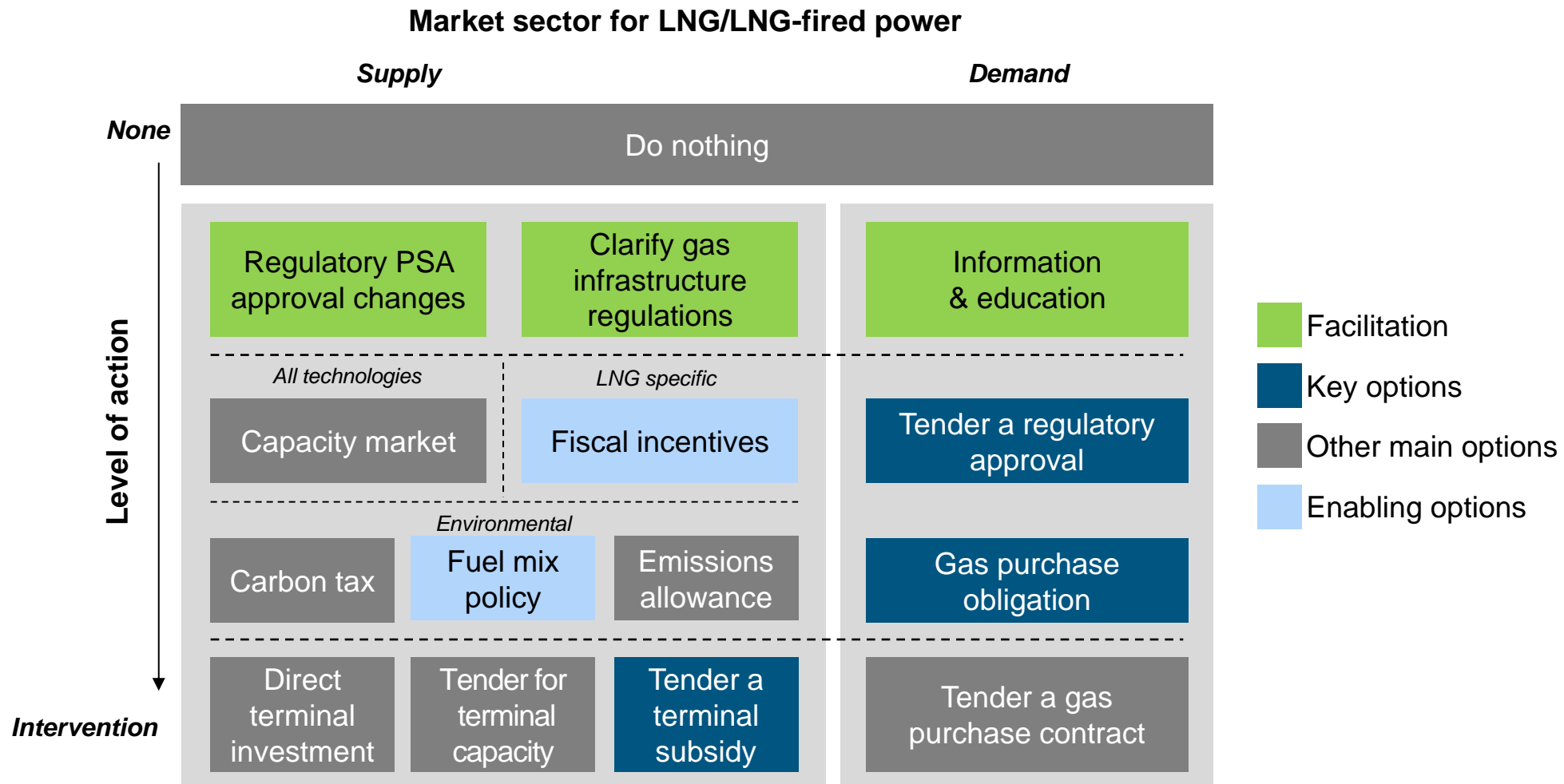
- Most of the potential LNG demand comes from the power sector:
  - To back up existing power stations now; or fuel existing power stations after 2024
  - Fuel for new power stations from 2017 onwards
- Backing up existing power stations is worth about USD 20-25 million per annum until 2024
- There is an economic case for about 600-800 MW of new power stations, running mid-merit
  - Highly variable gas demand due to variations in annual rainfall (hydro), outages, and weather (El Nino)
  - No economic case for new baseload gas fired power stations – coal is always a cheaper option for baseload, even after factoring in possible carbon credits
- Small but potentially growing demand for gas in industry and transport

## The next step was to find ways to encourage gas development ... the first of these being to identify the market failures currently causing difficulties

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- Environmental impacts not internalised in the market
  - Coal can cause higher emissions of SO<sub>x</sub>, NO<sub>x</sub>, particulates and CO<sub>2</sub> than gas but there is currently no mechanism in the Philippines to take into account these impacts on the local and global environment.
- Maturity of market
  - With retail access (RCOA) only recently adopted and no financial derivative contracts available, contract purchasing strategies are not yet mature in the market. Distribution utilities have not yet embraced “portfolio planning” strategies that would favor the incorporation of mid-merit LNG-fired power.
- Regulation of contracts
  - To date, contract regulation has been mainly on a “cost-plus” basis that does not take account of market prices. As such, it makes it harder to highlight how mid-merit and peaking generation options fit into the mix compared to “cheaper” baseload coal.
- Diffuse benefits of gas options
  - There are many benefits of gas, but it is hard to ensure all the beneficiaries pay their share of the costs
- Clarity of rules on NG use and infrastructure
  - Improving clarity of rules for access will give players more certainty on their commercial deals.

We then developed a matrix of options focused on mitigating these market failures and discussed these with DOE



## Our “preferred option” was a transaction that had two components

### Facilitation

- Improve regulation of power sector by creating economic justification for mid-merit plant within a balanced portfolio
- Clarify downstream gas regulations and tax situation
- Clarify LNG terminal regulations (or lack of them) to give terminal certainty
- Education and capacity building for distribution utilities
- Policy statements to support these initiatives



### Transaction Structure

- Securing interest of FSRU developer
- Back-up service for Malampaya (paid for by regulated customers)
- Open Season to allow anyone else to purchase capacity in the terminal (on a competitive basis)
- Flexible LNG purchasing strategy arranged via a voluntary consortium of gas users



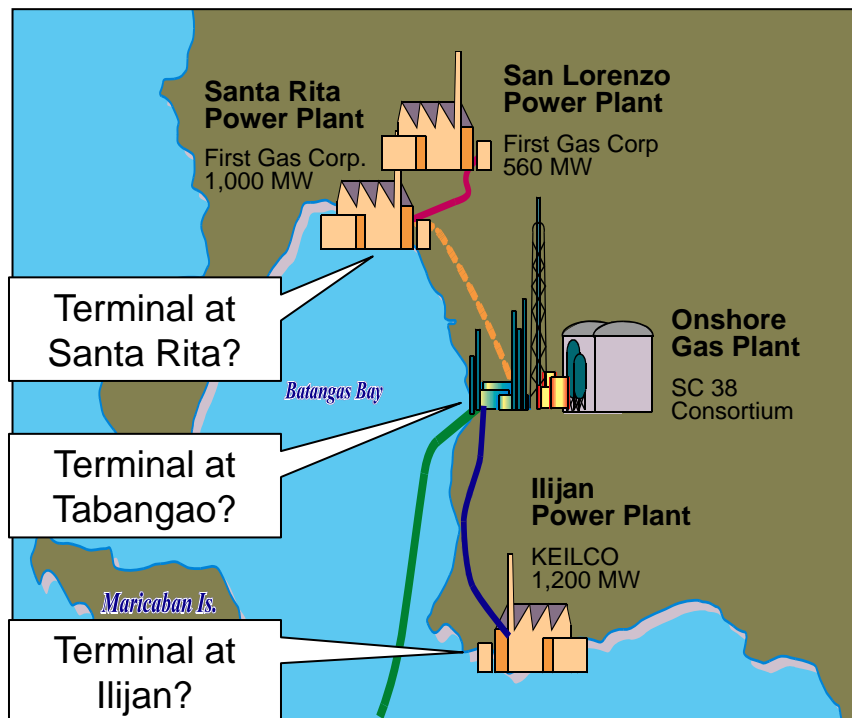
## Our “second-best” option is a gas purchase obligation, focused on gas fired capacity

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- Certificate-based scheme consisting of:
  - accredited generators who build gas-fired capacity
  - ‘liable persons’ (retailers) who sell or use electricity in the Philippines
- Accredited generators create gas capacity certificates (GCCs) for each MW of gas-fired electricity capacity in a given year
- Liable persons must surrender to the regulator each year the number of GCCs that equates to 25% of their peak demand annual demand
- The 25% was been chosen as the number that encourages an economic amount of LNG fired capacity into the Philippines to operate at mid-merit. The scheme could operate from 2017 to 2024
- The scheme works on capacity rather than energy, because having a scheme based on energy would defeat the purpose of having flexibility and optionality. By specifically focussing on gas capacity it should encourage that capacity to be built, without forcing the capacity to burn unnecessary gas if LNG is uneconomic

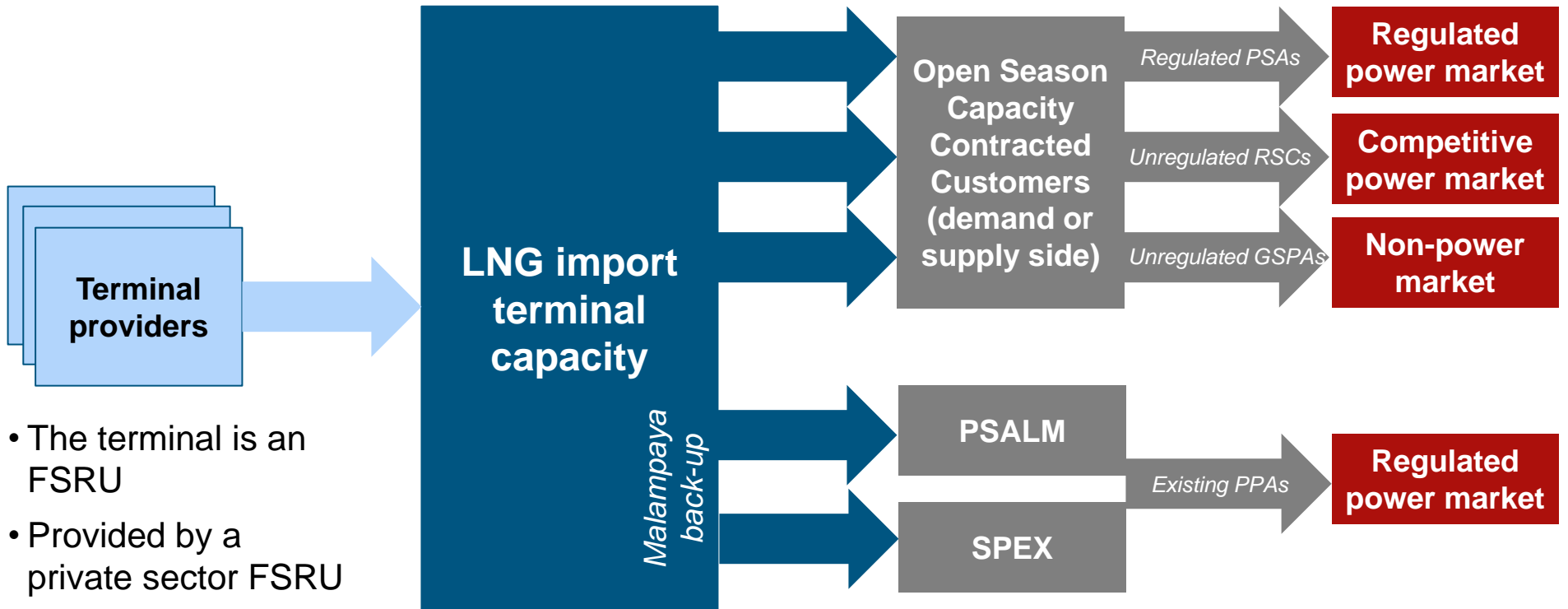
# Near-term vision – an LNG terminal in Batangas to back up Malampaya with balance of capacity for market

## Three possible sites for LNG terminal connecting directly to Malampaya



- Recognised case for Government action to solve market failures in providing Malampaya backup
- Structure transaction around terminal
- Implement in phases
  - Test strength of market demand with indicative open season solicitation
  - Conduct tender for FSRU operator
  - FSRU operator then conducts open season auction process
  - If auction fails, revisit options for integrating LNG import with power sector (e.g., renewables portfolio standard)

# The optimal commercial structure mixes regulated and competitive value streams



- The terminal is an FSRU
- Provided by a private sector FSRU owner
- No Government guarantees

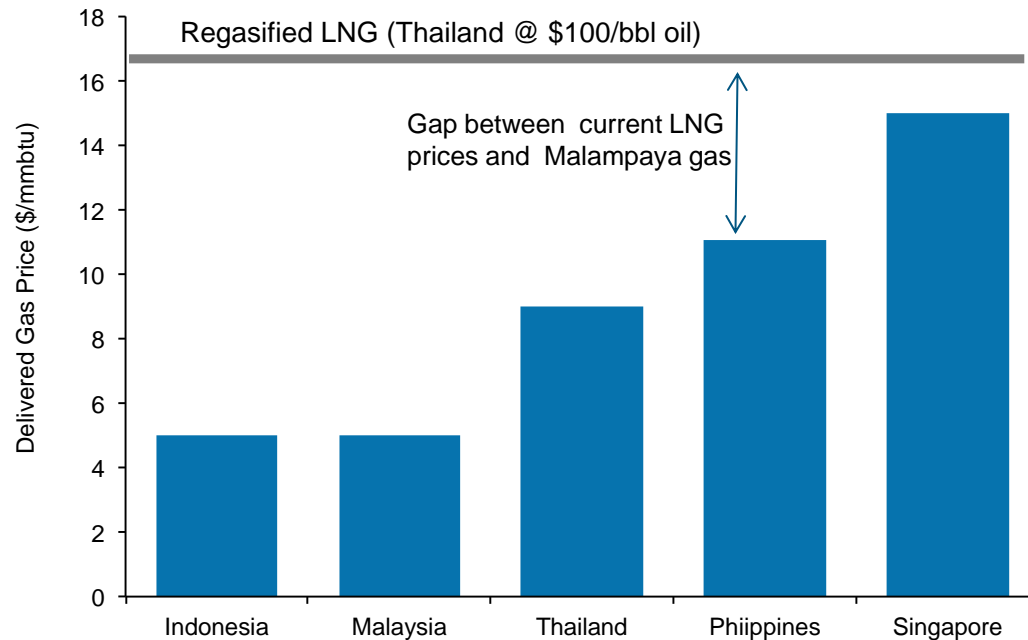
## Gas purchasing would be separate from terminal infrastructure

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- Sellers of gas would be able to purchase terminal capacity in the open season
  - No franchise for any single buyer or seller
- Buyers of gas would be encouraged to aggregate to tender for known gas supplies
  - Aggregation and tendering should prevent less experienced buyers being disadvantaged in the LNG market
  - Tendering should make it easier to demonstrate least-cost purchasing for regulatory approvals
- Gas purchases may be on a mix of long, medium and short-term basis, but must emphasis flexibility
  - Ensure diversion of cargoes to avoid being locked into high take-or-pay levels

## How should the LNG interact with the domestic gas?

- LNG can be used as a backup to Malampaya, but LNG will also compete with domestic gas – particularly after 2024 when the existing concession ends
- Pricing of domestic gas vs LNG is problematic in many Asian countries

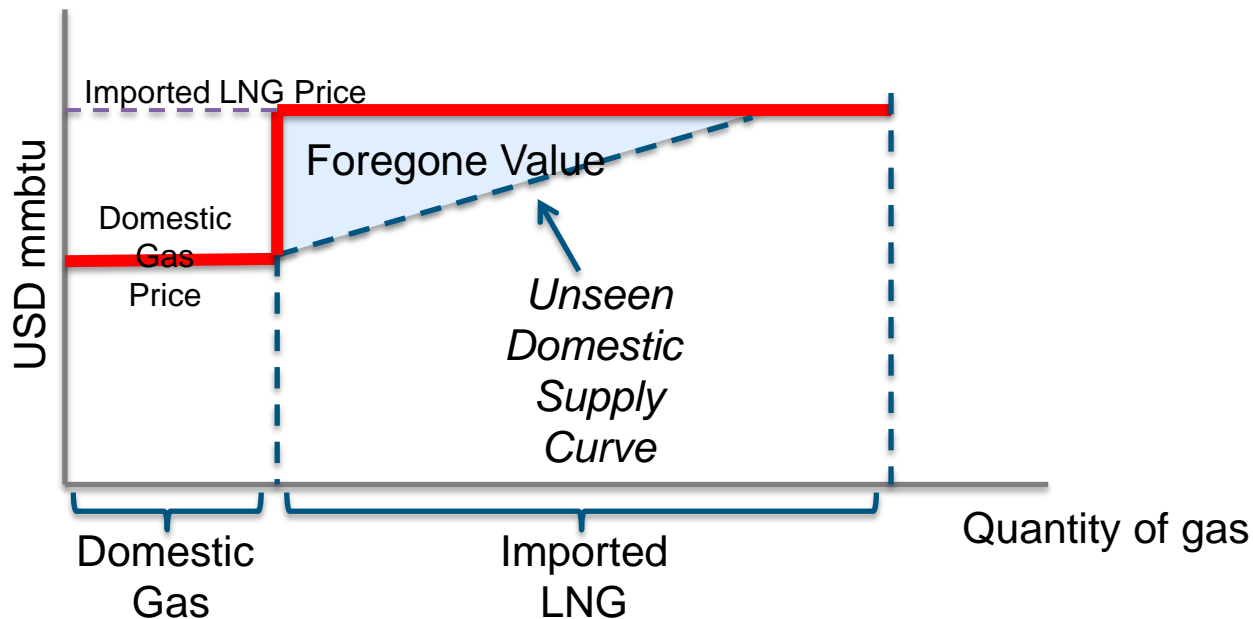


Although the gap is closer in Philippines than many other Asian countries, even here LNG is more expensive than existing domestic gas

## Some countries use a “pooling” mechanism to manage the price differentials

But pooling the price of different commodities results in poor economic signals.

At worst, you get what happens in Thailand, where the gas supply curve is “kinked” and significant value is foregone



More LNG, less domestic gas = lower value to the country

# Why the kinked supply curve is a problem

## Domestic gas pricing creates challenges

- Domestic gas pricing around Asia is problematic. Each market (except Singapore) was relatively isolated from world influences.
- Contract by contract negotiation was the norm, and this helped limit returns on upstream investment. But it also ended up restricting supply.
- Countries are now starting to address this problem by offering higher prices for domestic gas to get more local supply.

## Increasing reliance on LNG...

- Formerly relatively isolated markets are impacted by world prices as they import LNG. What we see is a discontinuous domestic supply curve, with very different (lower) prices offered to domestic resources, as compared to the (higher) prices paid for LNG.

## And slowing development of potential domestic resources...

- Domestic reserves depend on expectations of profitable development. Reserves have lagged consumption growth, at least partly due to uncertain price expectations.
- As a result, development is slow; costs are higher; domestic employment is lower; benefits are foregone

The Philippines is not here yet – ideally it should be able to avoid these problems

## As the Philippines currently does not import LNG, it has time to do the analysis

Allow new domestic gas to access more of the value willingly paid for imported gas

Facilitate more competitive E&P activity

Establish a robust industry regulatory structure to lock-in benefits

- LNG will be contracted by private sector parties so LNG pricing will become the market price in Philippines
- Any new domestic gas fields should be free to price up to the market (i.e. LNG price) or lower if they feel it will maximise profits – this will avoid the kinky gas supply curve and incentivise exploration
- The issue is, how should **Malampaya** be priced post 2024?
- The current pricing is significantly above extraction cost, and results in large profits for SPEX and even larger windfall gains to the Philippine treasury – the so-called “Malampaya Fund” which is now infamous
- As the field is old, extraction is harder and the price needs to reflect the required extraction profile, taking into account available storage
- The price should maximise the Government and consumer benefits of the field, without introducing distortions to the gas market

The actual price will be set by Government in negotiation with the concession holder



## However, nothing is yet decided

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- Phase 2 report was delivered 3<sup>rd</sup> March and public consultation on 20<sup>th</sup> March
- The final Master Plan is being drafted

Keep watching this  
space!



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