

# CEMENT & QUICKLIME MANUFACTURE IN PNG

A new, strategic, high value vertically integrated industry for PNG



This presentation has been prepared by Mayur Resources Limited ARBN 619 770 277 (“Mayur” or the “Company”). The information contained in this presentation is for information purposes only and has been prepared for use in conjunction with a verbal presentation and should be read in that context.

The information contained in this presentation is not investment or financial product advice and is not intended to be used as the basis for making an investment decision. Please note that, in providing this presentation, Mayur has not considered the objectives, financial position or needs of any particular recipient. Mayur strongly suggests that investors consult a financial advisor prior to making an investment decision. It may not be reproduced, disseminated, quoted or referred to, in whole or in part, without the express consent of Mayur.

No representation or warranty, express or implied, is made as to the fairness, accuracy, completeness or correctness of the information, opinions and conclusions contained in this presentation. To the maximum extent permitted by law, none of Mayur, its related bodies corporate, shareholders or respective directors, officers, employees, agents or advisors, nor any other person accepts any liability, including, without limitation, any liability arising out of fault or negligence for any loss arising from the use of information contained in this presentation.

This presentation includes “forward looking statements” within the meaning of securities laws of applicable jurisdictions. Forward looking statements can generally be identified by the use of the words “anticipate”, “believe”, “expect”, “project”, “forecast”, “estimate”, “likely”, “intend”, “should”, “could”, “may”, “target”, “plan” “guidance” and other similar expressions. Indications of, and guidance on, future earning or dividends and financial position and performance are also forward-looking statements. Such forward-looking statements are not guarantees of future performance and involve known and unknown risks, uncertainties and other factors, many of which are beyond the control of Mayur and its officers, employees, agents or associates, that may cause actual results to differ materially from those expressed or implied in such statement. Actual results, performance or achievements may vary materially from any projections and forward looking statements and the assumptions on which those statements are based. Readers are cautioned not to place undue reliance on forward looking statements and Mayur assumes no obligation to update such information. Specific regard (amongst other things) should be given to the risk factors outlined in this presentation.

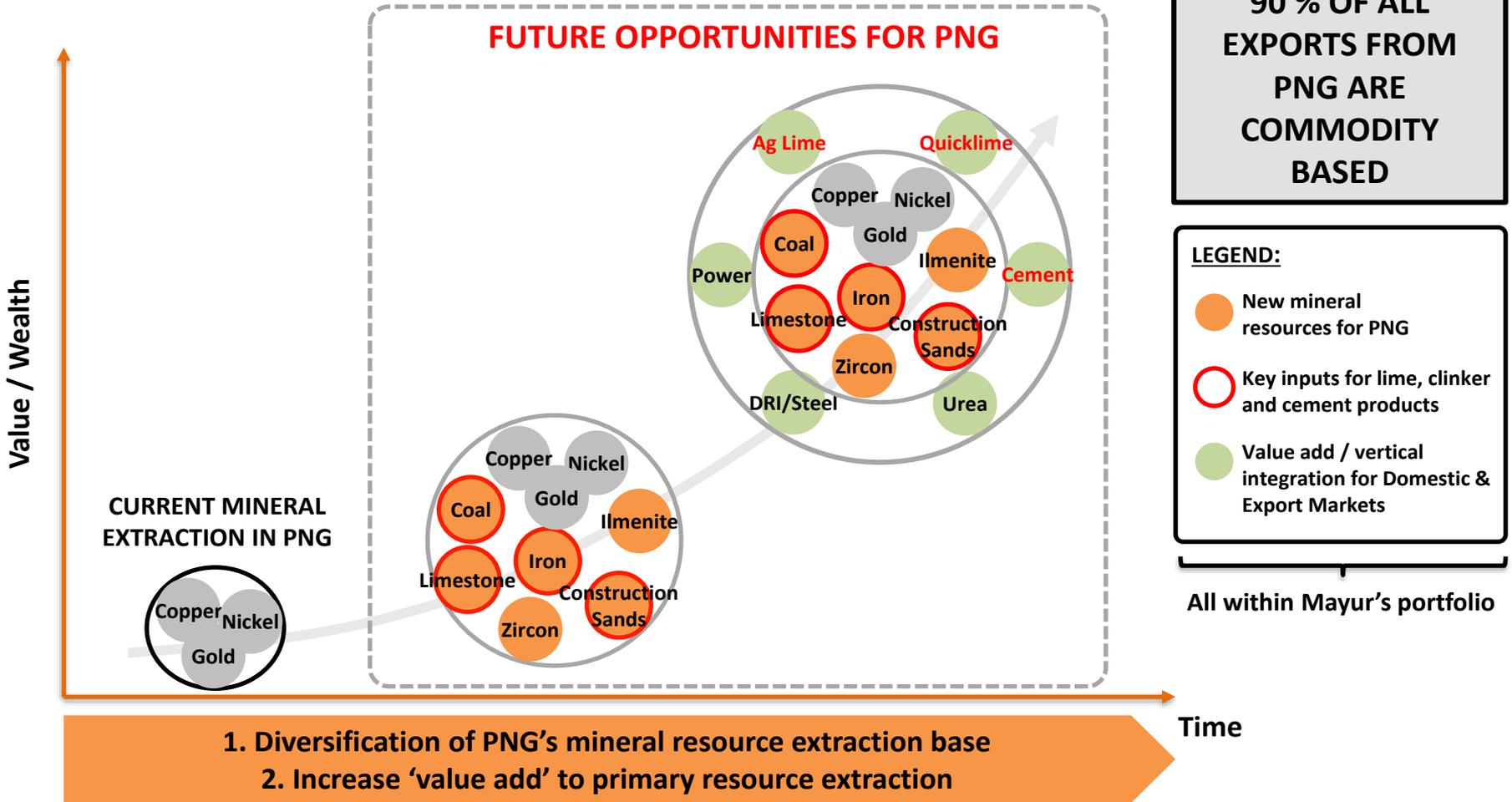
This presentation is not, and does not constitute, an offer to sell or the solicitation, invitation or recommendation to purchase any securities and neither this presentation nor anything contained in it forms the basis of any contract or commitment.

# Macroeconomics - Lime & Cement in PNG



## EVOLUTION OF A RESOURCES BASED ECONOMY

A future trajectory for unlocking PNG's natural resources wealth.....



## OPPORTUNITIES WITHIN MAYUR'S PORTFOLIO

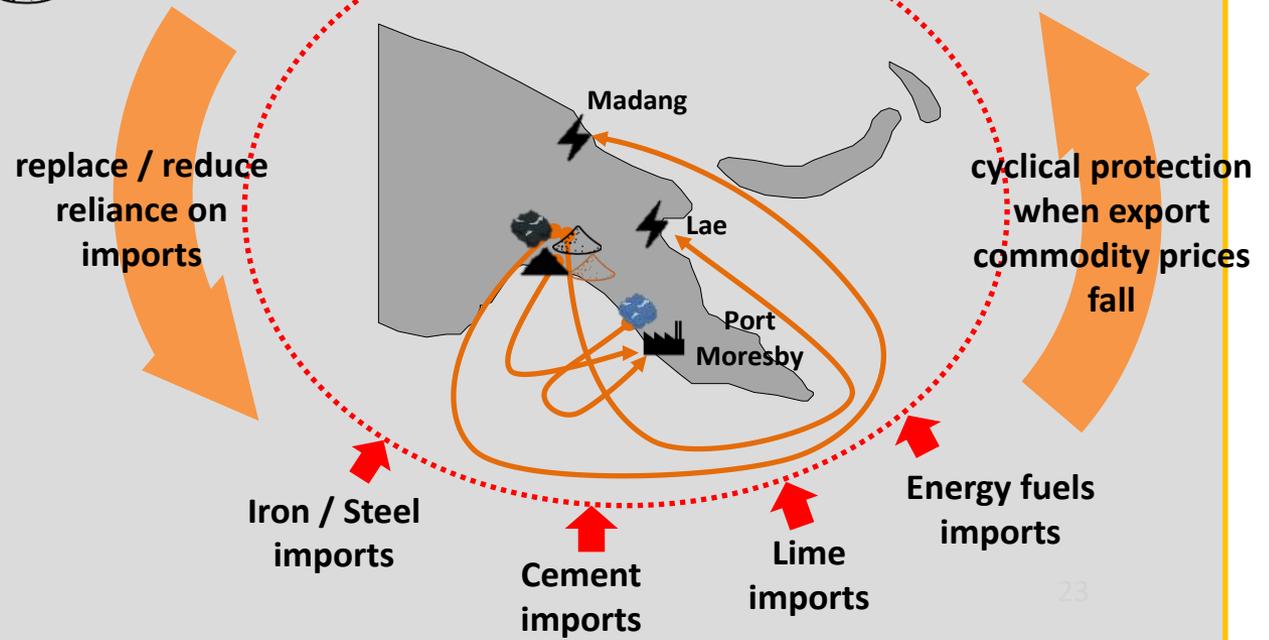
Mayur's mineral inventory in PNG  
(in Western, Gulf and Central provinces):

- Iron (Titanomagnetite) 
- Construction Sands 
- Mineral Sands (zircon + Ilmenite) 
- Limestone 
- Coal 

Resources used for  
'in-country value add':

- Power Generation 
- Cement
- Quicklime
- Agricultural lime
- Construction materials
- Petrochemicals
- DRI / Steel

### A FUTURE STATE FOR PNG

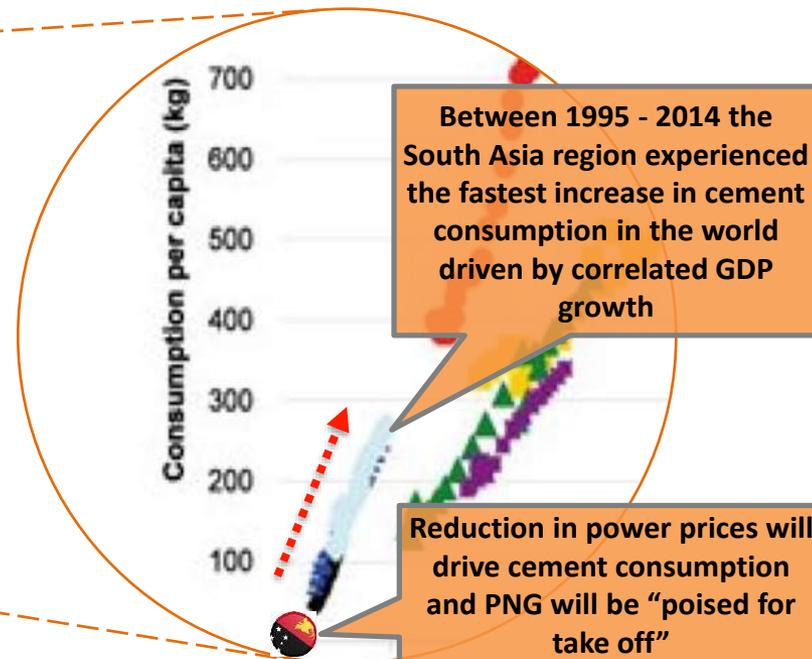
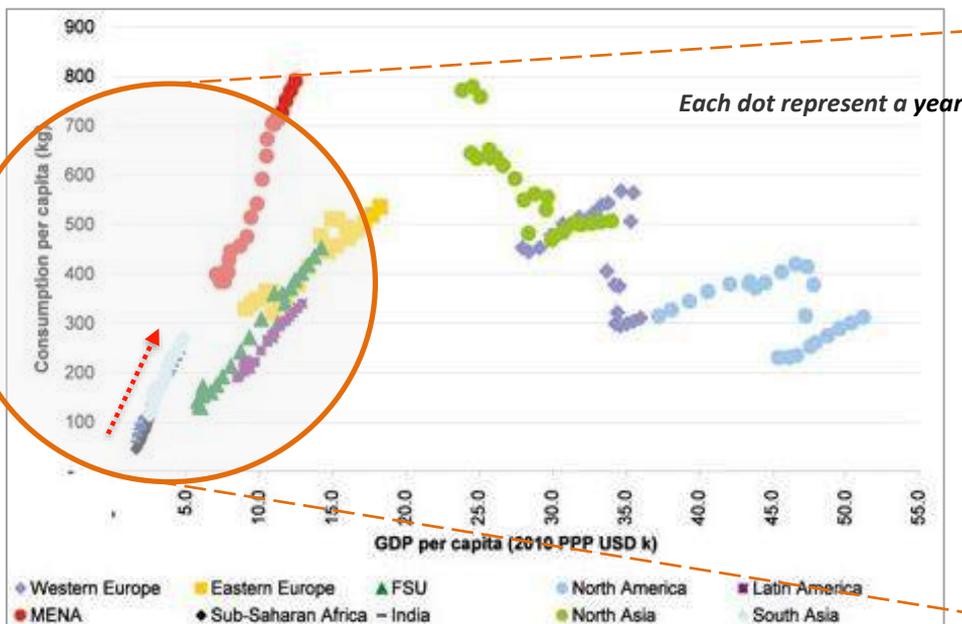


● Mayur has access to key raw materials for an integrated Cement & Lime business in PNG

**Whilst PNG's consumption growth has been strong, it still has much growth potential**

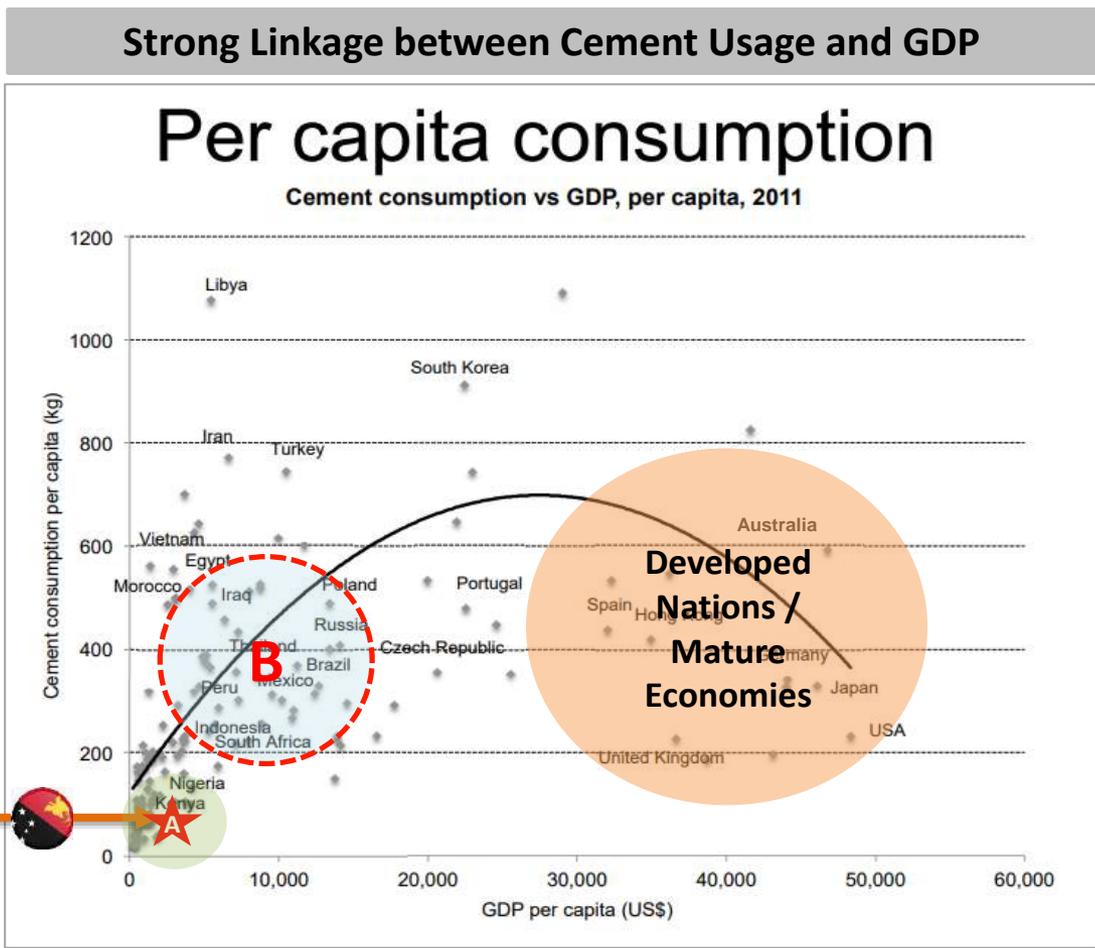
- **Cement consumption** – a key indicator of industrialisation
- As PNG's GDP per capita increases demand for cement will grow as standards of living and national infrastructure spend increases

**Global cement consumption growth per capita, 1995-2014** *Cemnet, 2014*



**As PNG's economy develops there will be an increase in cement demand as a building block for sustained economic growth**

- PNG's cement consumption is very low – 60kg per capita, places PNG at the bottom of the global curve (**point A**)
- PNG will increase cement consumption by **500% to 1,000%** as it moves towards its developing nation peer group (**zone B**)



**PAPUA NEW GUINEA**

Cement consumption per capita: ~60 kg

No domestic production, all cement / clinker imported

- Developing nations
- Undeveloped nations

## Lime in PNG – import replacement

- PNG quicklime demand is currently dominated by use in mineral ore processing by the resources sector
- Domestic strategy to **displace PNGs current 100% import** of quicklime with a domestic sourcing option
- Future mining projects (e.g. Frieda River, Wafi Golpu etc.) could see current demand grow significantly



## Cement / Lime in PNG – domestic import replacement

- Future **domestic demand** for lime and cement in PNG to increase as a result of :
  - Mining mega projects (future and current)
  - Large scale road infrastructure investment (e.g. US\$4.5bn Chinese ‘Belt & Road’ funded) to build much needed national road networks<sup>^</sup>
  - Potential Gulf LNG / expansion of PNG LNG (7km from Mayur’s project)
  - GDP per capita growth- driving housing demand for building materials including cement

## Future export opportunities – a low cost supplier

- Export strategy to be one of **Asia’s lowest cost producers of clinker, cement and quicklime** and penetrate the Australian, NZ and other regional markets
- Production of clinker in Australia / NZ progressively being phased out for political and economic headwinds
- Mayur to position itself to offset this lost supply capacity

<sup>^</sup> <http://www.thenational.com.pg/china-fund-k14-billion-projects/>

# Port Moresby Lime Project - Overview



## Strategically located on the coast 25km north of Port Moresby

- High grade limestone deposits 25km from Port Moresby, 7km from Exxon PNG LNG Refinery
- Huge 382 Mt Maiden JORC Resource <sup>1</sup>
- 2 deposits (Kido / Lea Lea), including 205 Mt Measured
- MOU signed for gas supply from PNG LNG <sup>2</sup>
- DFS underway for a vertically integrated quicklime and clinker/ cement business in PNG
- Import replacement and export market penetration opportunities identified



<sup>1</sup> Port Moresby Limestone Project JORC Resource as disclosed in the ASX Announcement dated 12 January 2018. The Company is not aware of any new information or data that materially affects the information contained in that announcement. <sup>2</sup> MOU with Kumul as disclosed in the ASX Announcement dated 10 January 2018.

## Moresby Limestone Project – Giant size Resource with significant exploration upside

- Huge **382 Mt** Maiden JORC Resource across 2 deposits (Kido and Lea Lea), including **205 Mt** Measured sufficient to support long life multi generation low cost quick lime and cement businesses

A. MEASURED MINERAL RESOURCE ESTIMATE*						
Area	Category	CaO cut off %**	Tonnes	CaO %	Al <sub>2</sub> O <sub>3</sub> %	SiO <sub>2</sub> %
Lea Lea	Measured	52%	61,000,000	53.4	0.6	1.65
Kido	Measured	52%	144,000,000	53.6	0.62	1.77
<b>Total</b>	<b>Measured</b>	<b>52%</b>	<b>205,000,000*</b>	<b>53.5</b>	<b>0.61</b>	<b>1.73</b>
B. INDICATED MINERAL RESOURCE ESTIMATE*						
Area	Category	CaO cut off %**	Tonnes	CaO %	Al <sub>2</sub> O <sub>3</sub> %	SiO <sub>2</sub> %
Lea Lea	Indicated	50%	117,000,000	51.8	0.9	2.7
Kido	Indicated	50%	11,000,000	51.5	0.6	1.1
<b>Total</b>	<b>Indicated</b>	<b>50%</b>	<b>128,000,000</b>	<b>51.8</b>	<b>0.9</b>	<b>2.6</b>
C. INFERRED MINERAL RESOURCE ESTIMATE*						
Area	Category	CaO cut off %**	Tonnes	CaO %	Al <sub>2</sub> O <sub>3</sub> %	SiO <sub>2</sub> %
Lea Lea	Inferred	48%	7,000,000	48.1	1.1	2.5
Kido	Inferred	48%	42,000,000	48.4	1	1.8
<b>Total</b>	<b>Inferred</b>	<b>48%</b>	<b>49,000,000</b>	<b>48.3</b>	<b>1</b>	<b>1.9</b>

\*Minor rounding errors apply pursuant to JORC 2012. \*\*The cut-off grade for the Measured Mineral Resource is based on a commonly accepted CaO grade for the production of lime and quick lime.

## Moresby Limestone Project – Quicklime

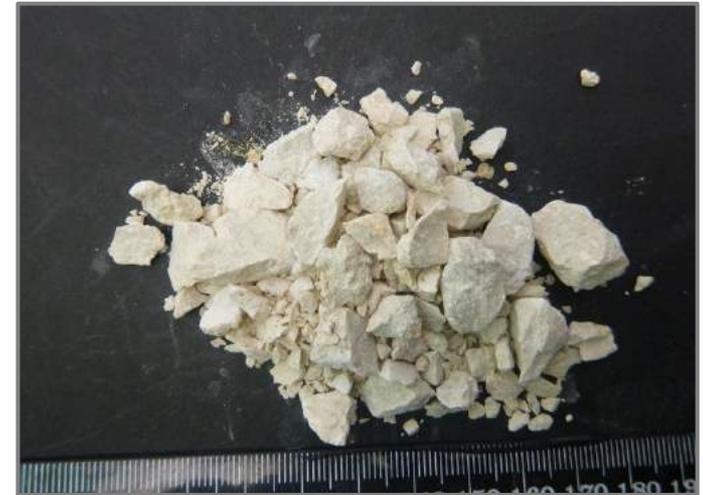
- Commenced feasibility work for a 250,000 tpa quicklime plant (ramping to 750,000 tpa over 10 years) with associated power and port facilities (co-located with the cement/clinker facility outlined below)
- PNG has an import demand of approximately 150,000 tpa, sourced from locations as far away as NZ and Thailand
- Potential for demand to increase to over 500,000 tpa with future mining projects (e.g. Frieda River, Wafi Golpu etc)
- Signed a gas supply MOU with Kumul petroleum (for piped gas supply from PNG LNG, 7 km from proposed site)
- Seeking to leverage PNG's proximity to Australian users of quicklime ( > 1.5 Mtpa market) and access this market

## Moresby Limestone Project – Clinker/Cement

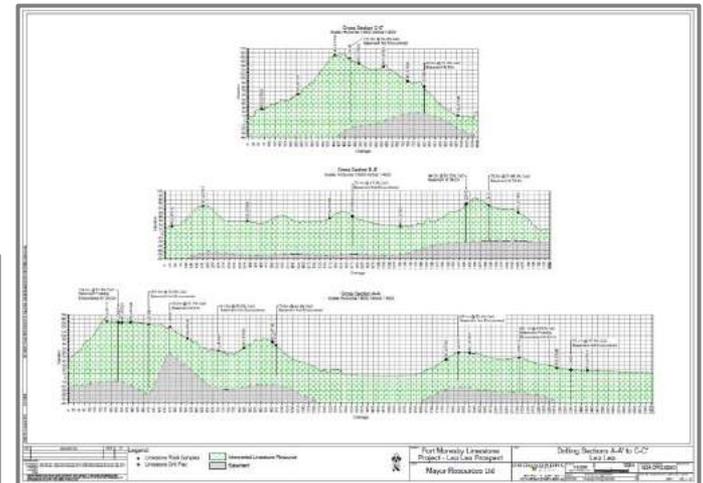
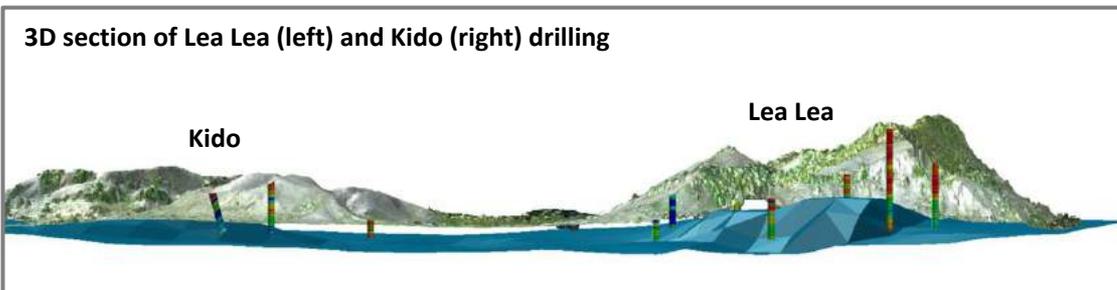
- Study to develop a 1.5 million tpa cement and clinker facility (50/50 tonnage split), ramping to 3 million tpa within 10 years. It is proposed that this facility would share power and port facilities with the above lime facility
- PNG currently imports all of its cement and clinker (approximately 300,000 tpa) with 500% growth opportunity
- Australian cement consumption is approx. 10 Mtpa predominantly on the Eastern seaboard of Australia
- Australian industry moving towards a clinker/cement import model – thus providing new market opportunities for PNG as closest low cost developing nation neighbour

# Two large scale, high grade, coastal lime deposits

## Regional layout of Kido and Lea Lea deposits

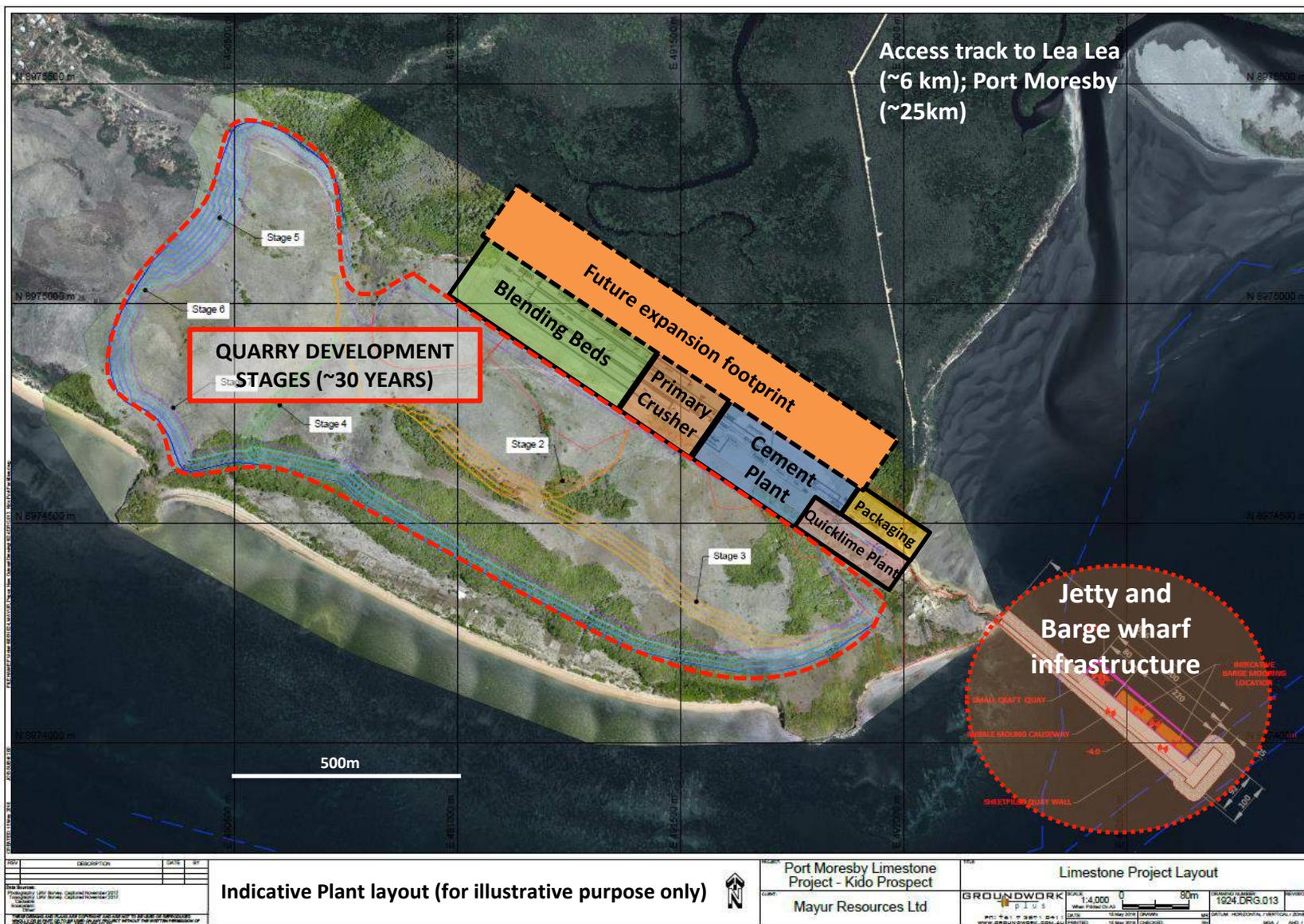


Mayur crushed limestone



X-sections of Kido limestone deposit

# Cement & Quicklime – Kido Plant Development Layout





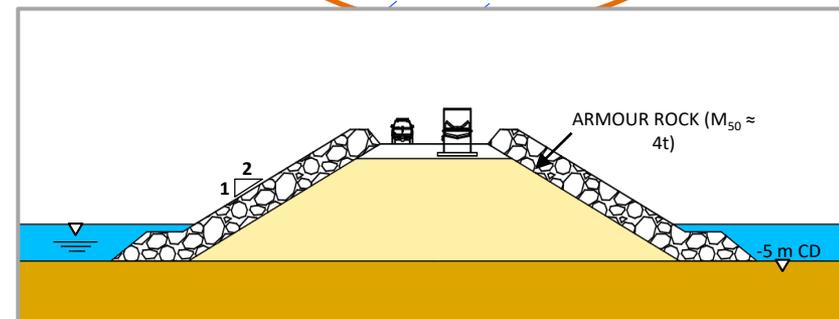
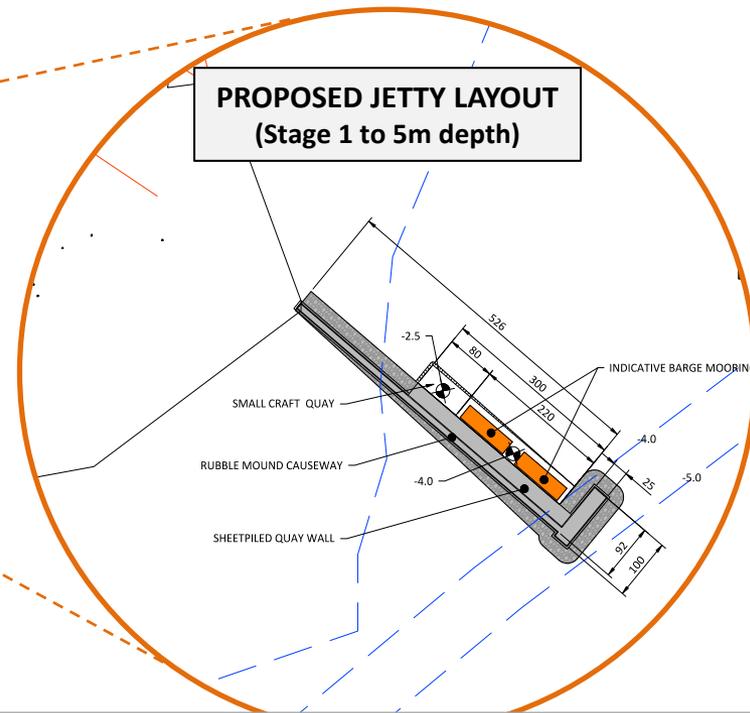
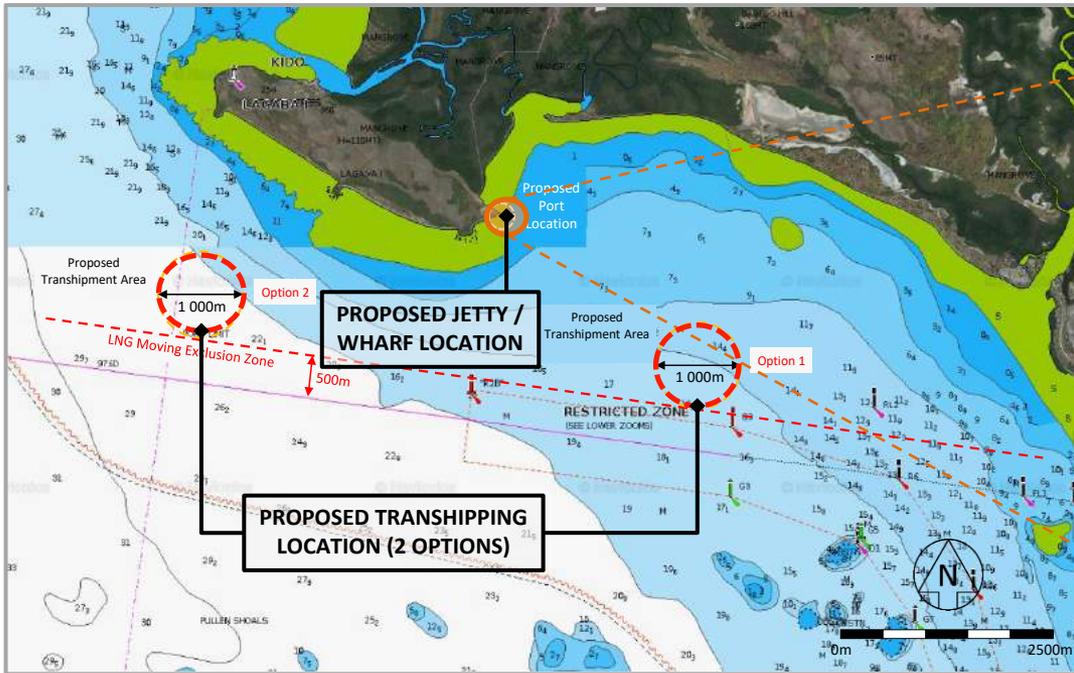
Typical limestone quarry



Aerial view of Kido headland



# Cement & Quicklime – Bathymetry & Jetty Plan



Proposed Jetty - typical Cross Section @ -5m Water depth

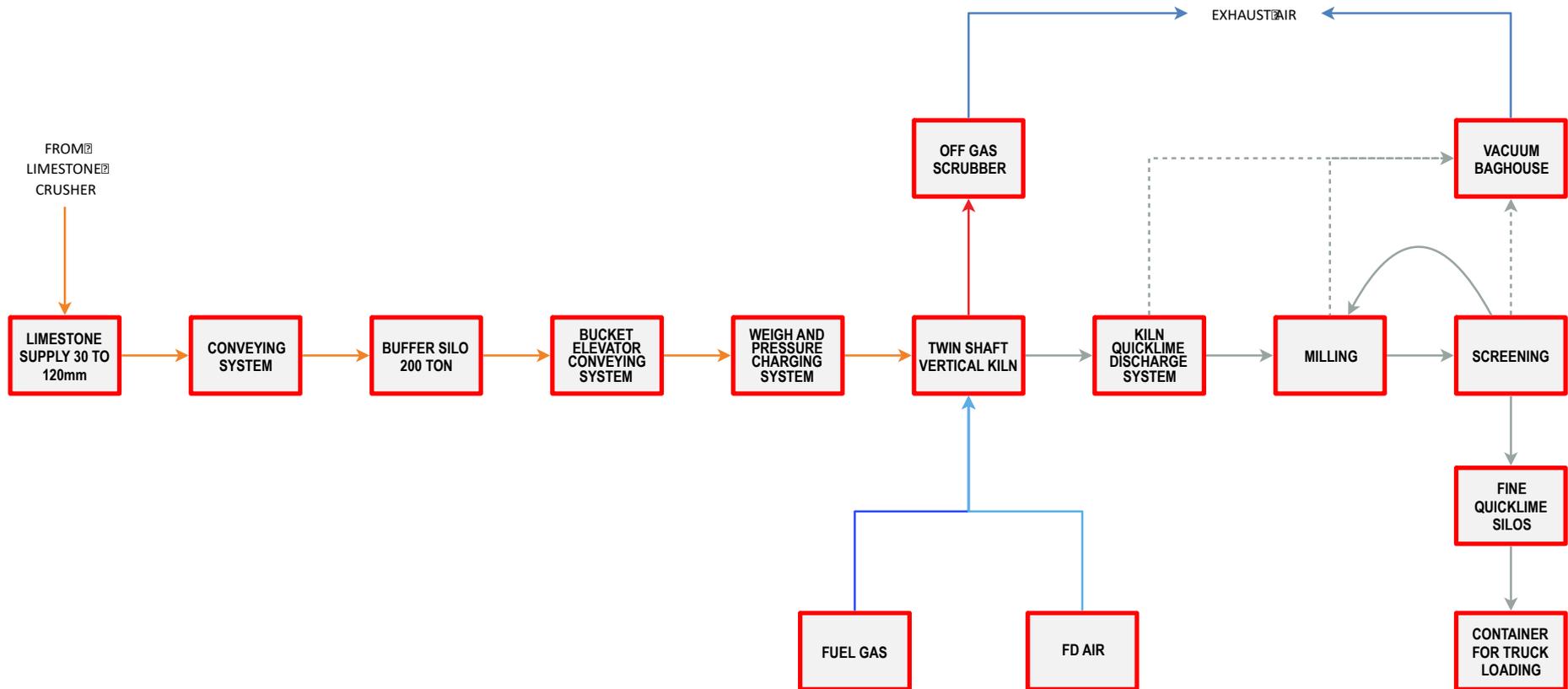
Typical vessel loading solutions

# Quicklime – for PNG & Export Market



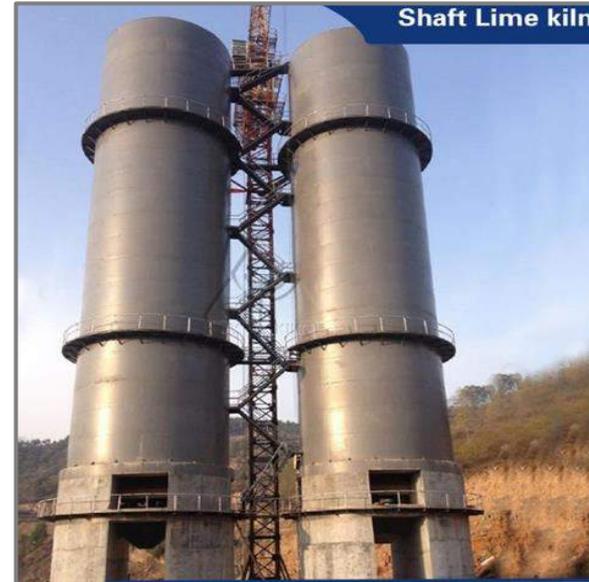
## Quicklime– Process Block Diagram

➤ Simplified process diagram for the production of quicklime



## Moresby Limestone Project – Quicklime Production

Examples of vertical shaft quicklime kilns



Quicklime to be bagged and containerised for transport by truck or sea freight

# Quicklime – geographic location provides excellent market opportunities

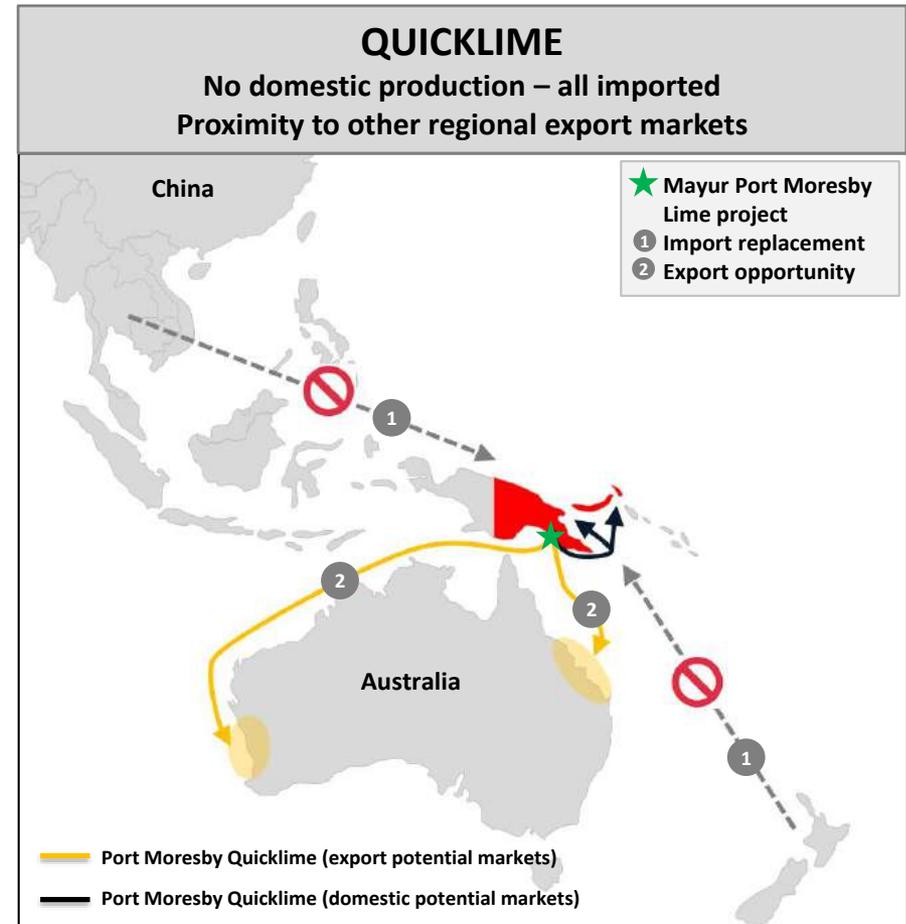
## Domestic import replacement and proximity to major markets in Australia

### Domestic market opportunities:

- Current import demand ~150,000 tpa from mining projects
- Quicklime users (e.g. mines) have commitments to use domestic supply where possible yet have no option but to import.
- PNG demand could increase to +500,000 tpa with potential future mining projects (e.g. Frieda River, Wafi Golpu)

### Export market opportunities:

- Australian lime market currently > 1.5 Mtpa
- Predominantly alumina smelters and mining industry in QLD and WA
- Quicklime market in Australia is expected to expand at a CAGR of 2% in terms of value (2016–2024)<sup>^</sup>
- Australian lime customers are focusing not only on basic lime products but also importing quicklime from ASEAN countries<sup>^</sup>



**Mayur's project site is well placed to service both domestic demand and regional growth in the coming years**

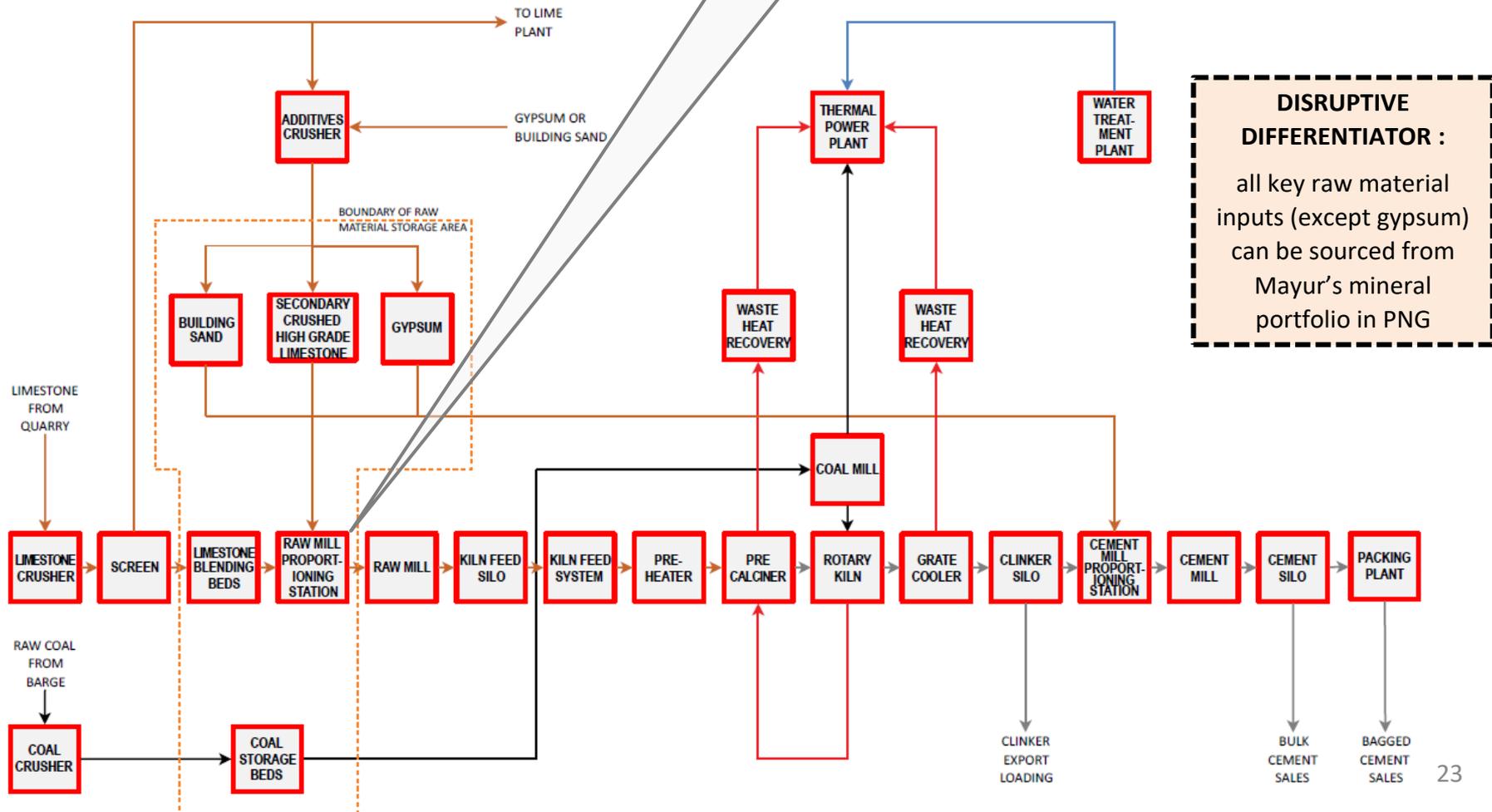
# Cement & Clinker – Industrialising PNG & Export



## Cement and Clinker – Process Block Diagram

➤ Simplified process diagram for the production of cement and clinker

Indicative Raw Feed Mix (1.5Mtpa)	Limestone	Marl	Silica
Proportions (%):	86.63	5.66	7.71
Tonnes per year:	2,319,122	175,766	239,505



## Cement and Clinker plant

- Examples of the main plant and equipment for the cement and clinker facility



Pre heater & feed meal silo



Straight Line layout  
(as proposed for Mayur's project)

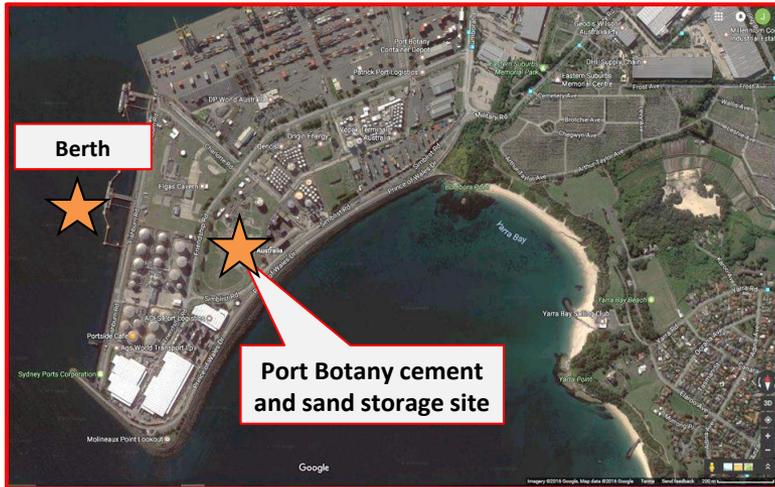


Rotary Kiln



Clinker grinding vertical mill

## Cement and Clinker - bagging and transport



Mayur has secured a site at Port Botany (Sydney, Australia) for a potential cement & construction sands discharge, storage and distribution facility <sup>1</sup>

## Pneumatic loading from barge on to bulk carrier



Bulk carrier with pneumatic un/loading

<sup>1</sup> Refer to section 14.9 of the MRL Prospectus for further details of the arrangement with NSW Ports

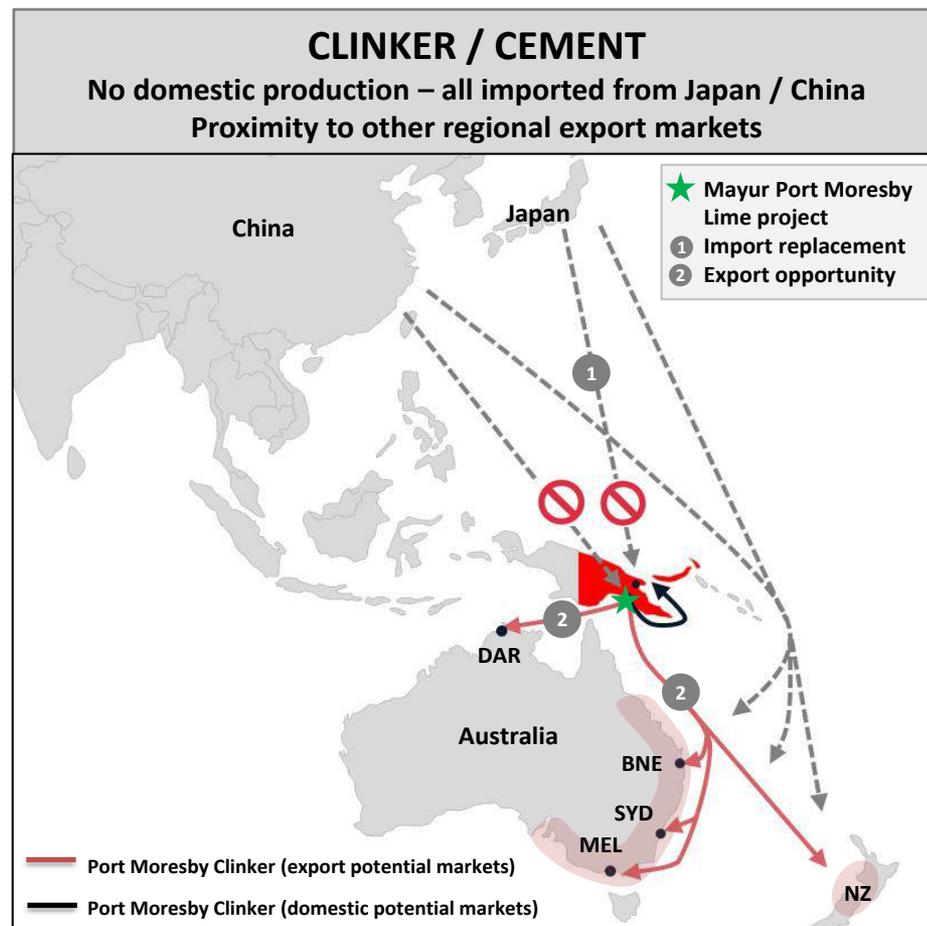
## Domestic Import replacement and regional market penetration opportunities

### Domestic market opportunities:

- PNG currently imports all of its cement and clinker (approximately 300,000 tpa)
- Potential for 5 to 10 times demand increase opportunity from power price reduction, infrastructure project development and GDP growth

### Export market opportunities:

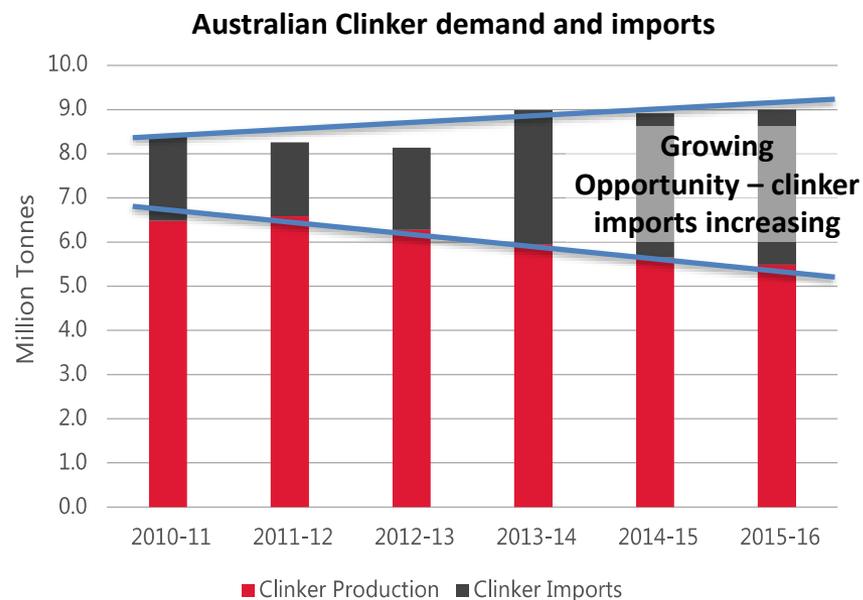
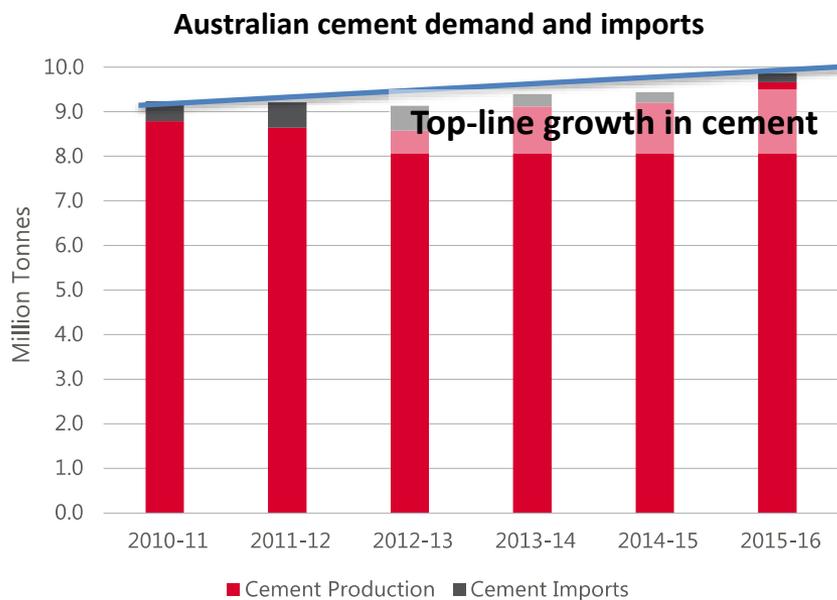
- Main opportunity is Australia (~10 Mtpa market) given market size and proximity to PNG
- In 2016, 40% of clinker used in Australia was imported; clinker imports are growing at 4% p.a.<sup>1</sup>
- New Zealand has been ramping down clinker production capacity over the same period with imports increasing being used
- Unlikely that current clinker grinding capacity will expand – hence opportunity for increased imports of cement in future to both countries from PNG



<sup>1</sup>source- Australian Bureau of Statistics

## Stable growth in Australia, with imports continuing to replace domestic production

- Australian cement usage increased 5% in 2014-16, despite clinker production declining 3% over the same period.
- The difference being an increase in imports and this trend is likely to continue.
- In the medium-longer term, cement imports should also increase as older cement plants are decommissioned



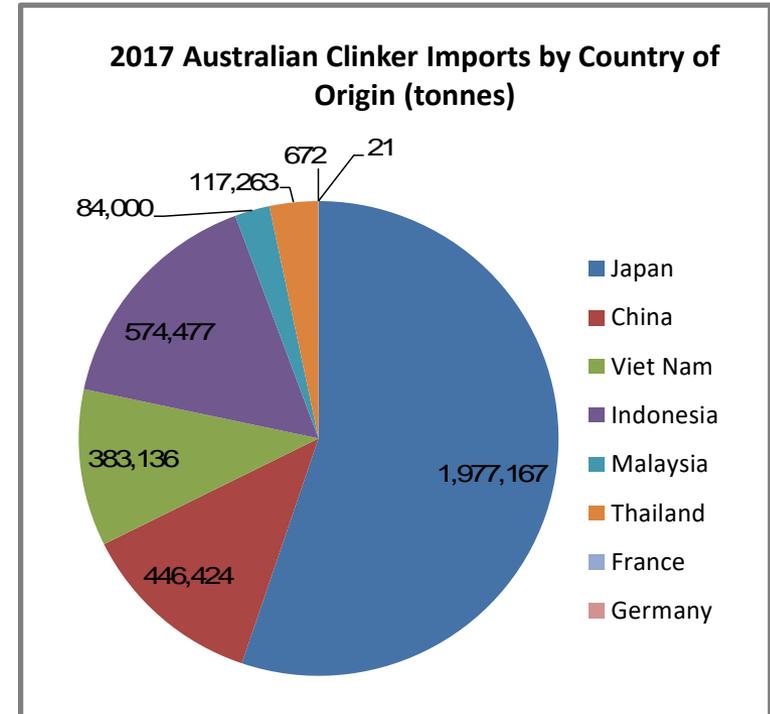
Data source: Australian Bureau of Statistics

**Opportunity for export of clinker / cement from PNG to Australia, given it's increasing reliance on imports**

## Cement / Clinker - Australian Import replacement opportunities

### Australian market opportunities:

- Main opportunity to displace imports of clinker / cement from Japan, China, Vietnam and Indonesia
- Mayur aims to leverage its natural advantages of :
  - having a clinker /cement plant on the coast,
  - adjacent to a large high quality limestone deposit,
  - within a few kilometres of energy source (gas supply)
  - possessing all key raw materials within its mineral portfolio,
  - in a low cost country to become a low cost clinker / cement producer in the region
- Furthermore, the shipping distances from PNG to east coast Australia are far shorter than from current north Asian suppliers



*Data source: Australian Bureau of Statistics*

**Mayur's Port Moresby project is in the 'sweet spot' of mineral resource and shipping location thus enabling a low delivered cost to Australia**

## Other Products – Aggregates, Agri lime

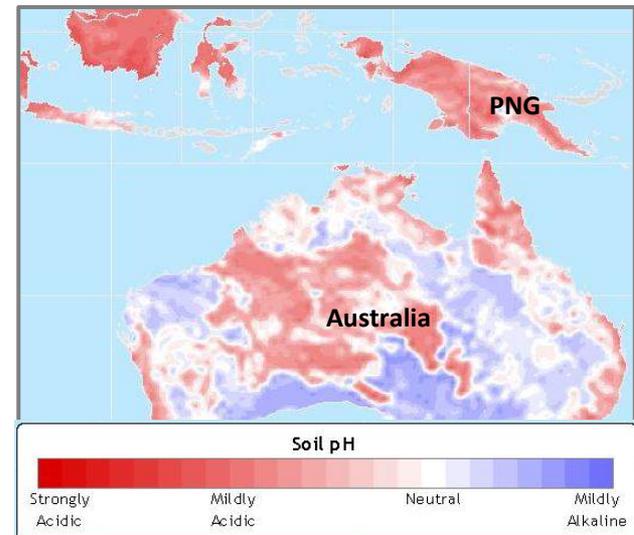


## Moresby Lime Project – other potential products and applications

PRODUCT	APPLICATION
Agri lime	Soil improvement, Livestock feed e.g. chicken feed, pig feed
Aggregates	Road building, concrete manufacture
Finely ground high grade limestone	Paper manufacture, paints, plastics, toothpaste
Crushed limestone	Water treatment, waste water treatment, oil and gas, air filtration
Lime Hydrate	Various Industrial processes
Coarse quicklime	Iron and Steel manufacturers, environmental dust emissions

### Example - Agricultural Lime

- PNG's population of 8.4 million is rapidly increasing and due to almost double in the next 30 years
- Growing population and affluence will see increase in demand for foodstuffs and thus more intensive farming and agricultural production
- Much of the topsoil in PNG is acidic and will need lime to neutralise and optimise cropping with increased yields



- Mayur's strategy is aligned with the PNG government's '**Nation Building Agenda**'
- Mayur's business activities have **strong support** across all levels of Government including the Prime Minister Mr Peter O'Neill.
- Mayur has strong support from both the **Gulf Provincial Governor** (Hon Chris Havieta) and the **Central Province Governor** (Hon Robert Agarobe) where the lime and cement raw materials and facilities are to be located



From right, Paul Mulder (Mayur MD), Prime Minister of PNG – Hon Peter O'Neill, Tim Crossley (Mayur Executive Director), PNG Bank Governor – Mr Bokani) at the PNG/UK investment Forum - April 2018



Mayur Managing Director (Paul Mulder) and Gulf Provincial Governor (Hon Chris Havieta) signing MOA, 7 December 2017



Mayur's Head of Business Affairs (Darren Lockyer), MD (Paul Mulder) and Central Province Governor (Hon Robert Agarobe) addressing the community at the Port Moresby Limestone Project

## Moresby Limestone Project – targeting to be Asia’s lowest cost producer

- ✓ High grade, lime resource (~96% CaCO<sub>3</sub>) at surface (zero strip ratio)
- ✓ Excellent decrepitation properties with very low fines generation (< 1%) when crushed (highly marketable)
- ✓ On coast (no requirement for land based transport, other than local Port Moresby market)
- ✓ Close to markets (PNG and export)
- ✓ Low cost labour country
- ✓ Supportive, pro development and pragmatic government
- ✓ Adjacent to PNG LNG as gas for fuel supply (7km from deposits)
- ✓ Direct control of other cement raw materials i.e. iron, silica, clay, coal all within Mayur’s portfolio in PNG
- ✓ Directly owned wharf jetty infrastructure

**Mayur is strongly positioned to be a lowest cost lime, clinker and cement producer in Asia Pacific**