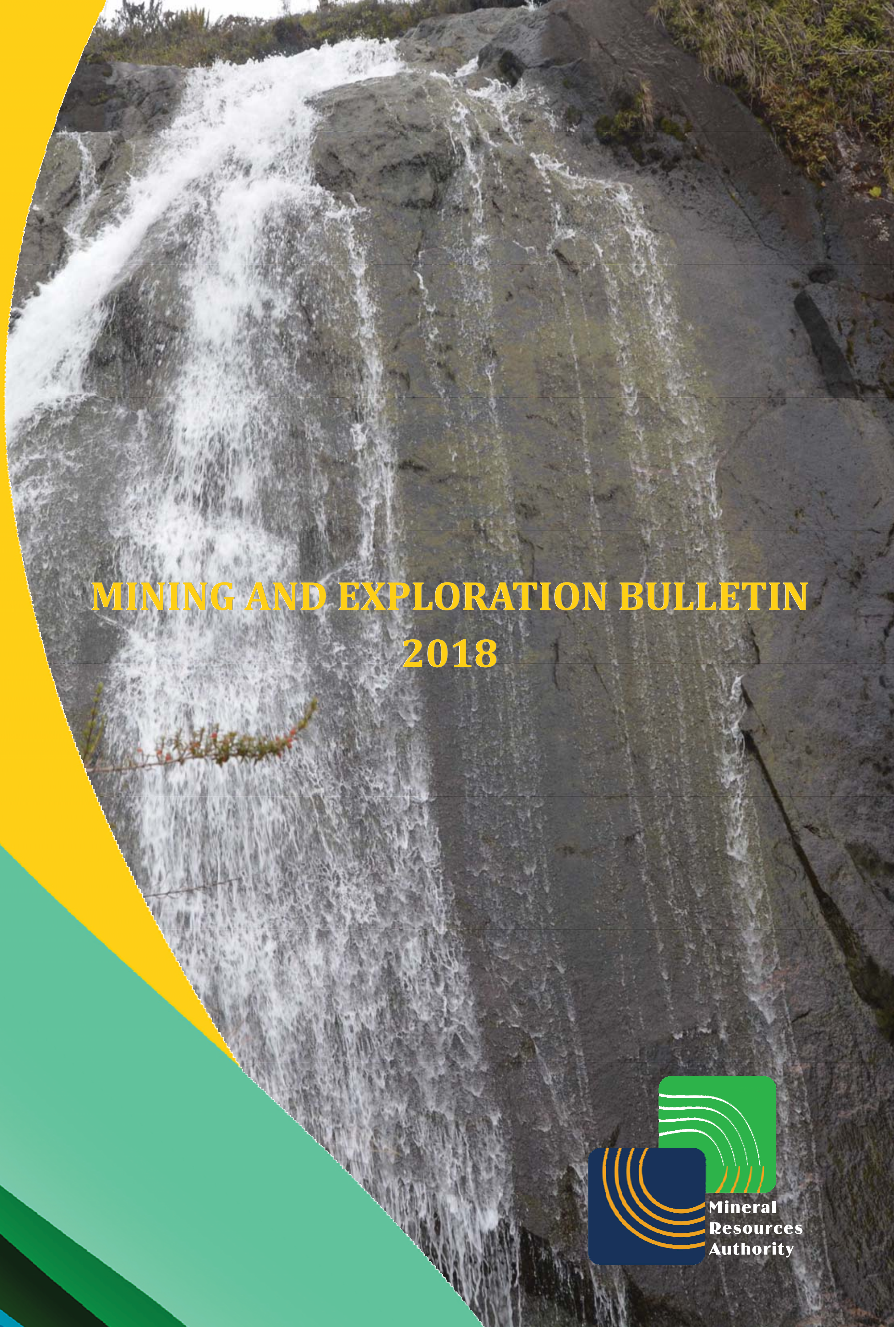

MINING AND EXPLORATION BULLETIN 2018

Mineral Resources Authority

Cover Picture: **Waterfall on the summit of Mt Wilhelm in the Simbu Province**

Mining & Exploration Bulletin 2018

A Publication of the Mineral Resources Authority

2018

The Mining and Exploration Bulletin is an official publication of the Mineral Resources Authority (MRA) of Papua New Guinea.

The Bulletin is an annual publication that is intended to give information on the performance and development of mineral exploration and mining projects in the country.

It also contains updates on government policies and activities relating to the sector.

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Papua new guinea

Background Information

Mineral Resources Authority (MRA) was established to serve the nation's needs for promoting a sustainable mineral industry in PNG, and acts as a regulator to the industry.

On 19th August 1998, the National Executive Council (NEC) considered a Policy Submission requesting approval for the creation of the Mineral Resources Authority through an Act of Parliament. On 9th November 2005, the National Executive Council certified the Mineral Resources Authority Act 2005 and which came into force on January 1, 2006.

Organisation Description

MRA is a state owned entity – a statutory organization, established by an Act of Parliament. The set-up or governance structure of the organization is as follows;

Vision, Mission & Goals

Vision: Improving the lives of all Papua New Guineans through the responsible management of the nation's mineral resources.

Mission: Effectively promote a healthy and sustainable mineral industry and provide a regulatory environment which maximizes mining opportunities to ensure optimum benefits for the people of PNG

Goals: Achieving client & employee satisfaction through responsible management of our mineral resources today with tomorrow in mind.

The primary responsibility of the Mineral Resources Authority is to;

- Advise Minister on matters relating to management, exploitation, and development of PNG mineral resources
- Promote orderly exploration and development of PNG mineral resources
- Oversee administration and enforcement of Mining Act 1992, Mining Safety Act (chapter 195A), Mining Development Act, Ok Tedi Acts and Bougainville Copper Agreement Act
- Negotiate mining development contracts and MOAs
- Conduct geo-scientific investigations into PNG geological resources
- Provide small scale mining services
- Collect, analyse, store, archive and disseminate and publish geo-scientific information

Corporate Governance

We set the highest standards of good governance, adopting uncompromised standards of integrity, transparency, professionalism, and ethical behaviour in all that we do. We strive for efficiency and effectiveness in all of our processes, recognising that we exist and operate on behalf of the people of Papua New Guinea.

Organisation's corporate social responsibility

We exist to service all our customers , stakeholders and investors in Papua New Guinea and beyond.

We value all stakeholders ensuring they remain at the centre of our decision- making processes.

We value the principles of Sustainable Development never conceding serious, long-term potential risks for the sake of easy short-term gains especially in matters of environmental care and/or social cohesion.

Divisional Functions

Development Coordination Division

Improve stakeholder consultation, project facilitation and management of mining benefit streams including small scale mining, from exploration to mining phases of development, by formation of a project facilitation function.

Geological Survey Division

Document, manage and provide regional geological, geophysical and geological resource information by formation of modified geological mapping.

Regulatory Operations Division

Efficiently implement existing legislation, and continuously improve operational processes by establishment of a regulatory operations function and establish a working partnership with the Department of Mineral Policy and Geo-hazards Management Policy and regulation division.

Corporate Services Division

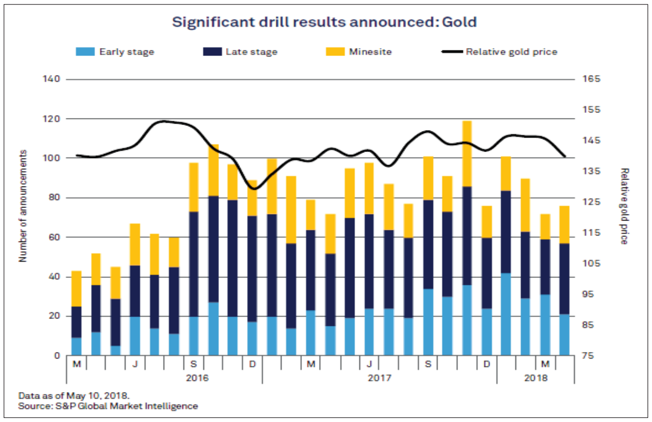
Provide ongoing human resources, financial, and information technology services and support to the MRA and its Board by establishment of a small corporate support function

EXECUTIVE SUMMARY

Mr. Nathan Mosusu
Acting Managing Director

If drilling for gold is an indicator of the state of global mining activities (figure below, S & P Global Market Intelligence), things improved in the mining sector from 2016 when a good number of drillings took place from the slump prior to that. This means the global market has opened up again with increased investments and therefore increased exploration. Papua New Guinea has its fair share of this activity which has continued into 2017-2018.

During this same period a significant number of major projects have advanced to feasibility and mine application stages, notably, Frieda River, Wafi Golpu, Ramu Mine upgrade and Yandera. Those with mining leases continue development, such as Solwara 1 and Woodlark Island projects. Others such as the:



- Mambare Nickel Cobalt project, Northern (Oro) Province
- Mayur Iron Sands projects in Orokolo Bay, Gulf Province
- Mayur Coal in the Gulf province
- Mayur Limestone in Lealea-Kido, Central Province
- Manus Bauxite in the Manus Province
- Wowo Gap Nickel Cobalt in the Northern Province.

Gold remains our key mineral, contributing 69% of our export mineral revenue. Production at the Lihir mine in New Ireland province produced 918, 685 ounces of gold in 2017, and is on target to exceed a million ounces in calendar year 2018. Kainantu mine started exporting concentrates in July 2017. Ok Tedi and Porgera, both impacted by the February 2018 earthquake, have both recovered and are back to full production, although 2018 figures will be reduced. Hidden Valley and Simberi continued to increase production, the 4th year in a row for Simberi.. Ramu NiCo, PNG's only base metal producer also increased its production exceeding its nameplate capacity, producing more than 35,000 tonnes of nickel and more than 3,500 tonnes of cobalt in 2017. While its 2018 production has been consistent, the decline in both nickel and cobalt prices since July 2018 has led to stockpiling, rather than export of ore, thereby directly impacting revenue and distorting the results.

Data from our Flexicadastre tenement management system indicates a levelling off in exploration tenement applications between 2016-2018, but an increase in mining tenements aided by the lodgement of the SML and other associated tenements for the Frieda River and Wafi-Golpu gold and copper projects, and increased activity in the alluvial sector. This electronic tenement management system continues to increase the transparency index of business in the mining sector. The EITI PNG country report 2017 and International EITI evaluation report 2018 indicated good progress on the management of licensing and administration of the various tenements. The regulator of the industry, Mineral Resources Authority is committed to ensuring that the mining sector is transparent and activities are compliant with regulations and regulatory standards.

Records from MRA showed zero fatalities in the 2017 operational year. I take this opportunity to thank the companies and their management for this tremendous record.

In summary, business in the minerals sector is maturing and from here on we anticipate further growth towards the 2030 aspirational target of doubling mining revenue. This is testimony to Papua New Guinea's high mineral prospectivity, significant world class deposits, expanding mineral base and being well recognised as a mining destination for investors.

Enjoy the publication and we trust that you will find the information in it useful for your purposes.

NATHAN MOSUSU

Acting Managing Director

Continuously Improving the Mineral Sector: Update 2017-2018

Introduction

According to the S & P Market Intelligence Report, March 2018, there is an improvement in the investments for exploration, thereby influencing a high in exploration budget and stimulating activities by some dormant explorers.

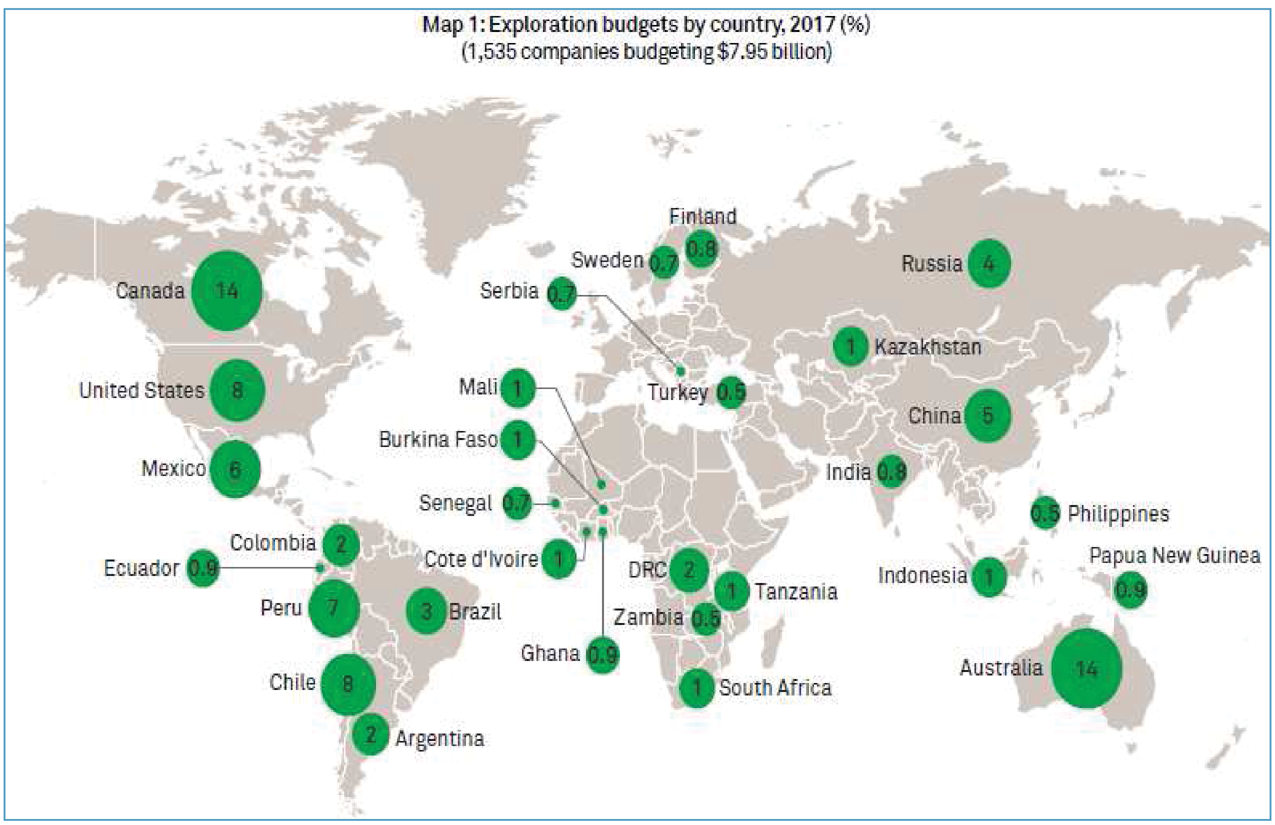
However exploration budgets for the Pacific SE Asia region declined by 1% compared to the 2016 period whilst Australia experienced an increase by 1 % from 13 %.

Papua New Guinea recorded 0.9 % of the global exploration budget in 2017. There were significant drillings for gold and copper in this reporting period, for Papua New Guinea (PNG).

The general trend is a rise in exploration budgets in the top 10 countries which included Canada and Australia. Gold is the target mineral commodity for exploration. S & P's data on drilling programs showed highest drilling in the period June-December 2017, surpassing the highs recorded in 2012.

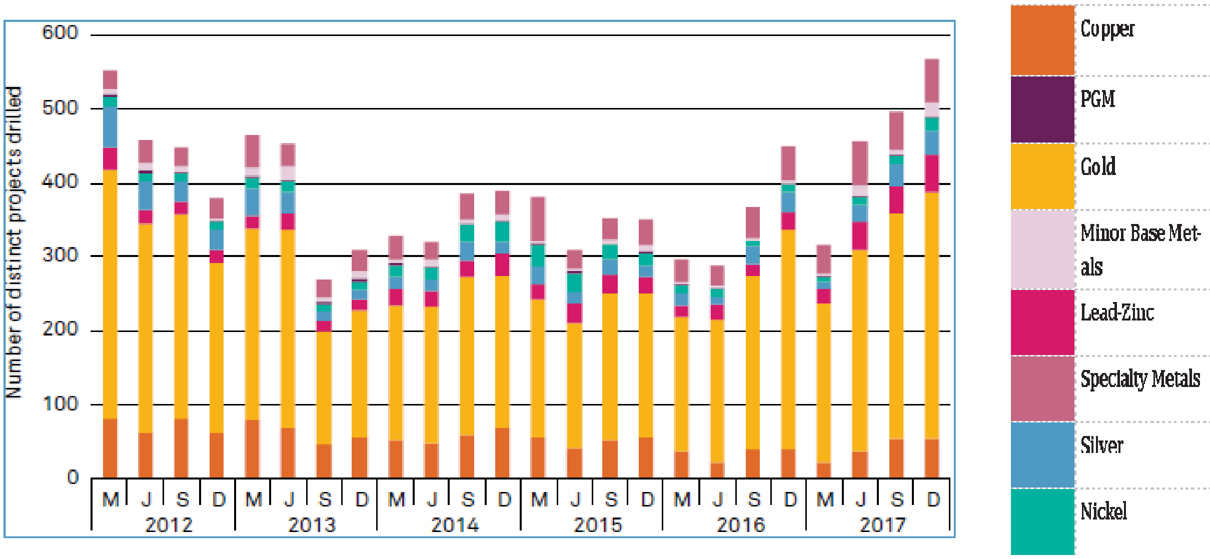
Drilling for industrial minerals is fairly stable from 2012-2017. In PNG, drilling was low for these minerals i.e. nickel, cobalt, iron, however over this period Ramu NiCo has been quietly exploring to gain confidence in their resources for their proposed upgrades to mining.

Figure 1: Global exploration budgets (%) per country in 2017



S & P Image: World exploration trends, S & P Global Market Intelligence, March 2018

Figure 2: Number of global drill holes



S & P Image: World exploration trends, S & P Global Market Intelligence, March 2018

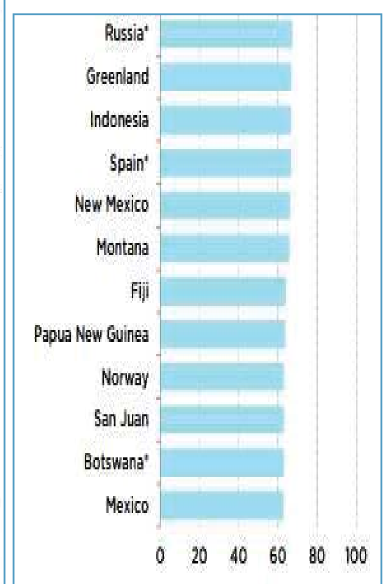
Frazer Institute (2017 report) gave Papua New Guinea (PNG) a score of 63.93 % and ranked as 40/91 countries that are attractive for investments in the mining sector. In 2016 PNG had a score of 63.48 % and a ranking of 59/104 countries. There is an improvement, but still bunched in the middle of the surveyed countries. PNG sit amongst some of the prospective countries, i.e. Russia, Botswana, and Mexico.

Figure 3: Where PNG sits in the Investment Attractiveness Index

Fraser Institute Annual Survey of Mining Companies 2017

Table 1: Investment Attractiveness Index

		Score					Rank				
		2017	2016	2015	2014	2013	2017	2016	2015	2014	2013
Canada	Alberta	61.77	68.55	69.71	74.78	78.49	49/91	47/104	34/109	28/122	14/112
	British Columbia	74.01	74.15	75.71	74.27	79.02	20/91	27/104	18/109	29/122	13/112
	Manitoba	74.50	89.05	75.27	84.14	79.90	18/91	2/104	19/109	5/122	12/112
	New Brunswick	68.87	69.45	66.51	77.34	74.38	30/91	40/104	45/109	19/122	26/112
	Newfoundland & Labrador	80.58	78.94	73.55	83.27	83.93	11/91	16/104	25/109	8/122	3 /112
Oceania	Fiji	64.23	69.43	53.87	65.70	49.69	39/91	41/104	79/109	50/122	87/112
	Indonesia	66.84	50.16	65.16	55.24	58.01	35/91	78/104	49/109	81/122	67/112
	New Zealand	60.51	57.47	66.73	66.38	65.85	55/91	67/104	44/109	48/122	41/112
	Papua New Guinea	63.91	63.48	67.15	61.92	63.64	40/91	59/104	43/109	58/122	52/112
	Philippines*	50.32	58.97	56.59	48.78	64.54	75/91	66/104	72/109	95/122	49/112



Source: Frazer Institute report, 2017

Mining in PNG

Papua New Guinea is still considered a mining state with over 80 % coming from mineral (minerals plus LNG) exports, with almost 59 % coming from mineral exports alone, excluding LNG exports. The export of gold, copper, silver, nickel and cobalt had an export value of over PGK 14.9 billion (Bank of PNG Quarterly Bulletin, December 2017).

Figure 4 a: Mineral Export Revenue

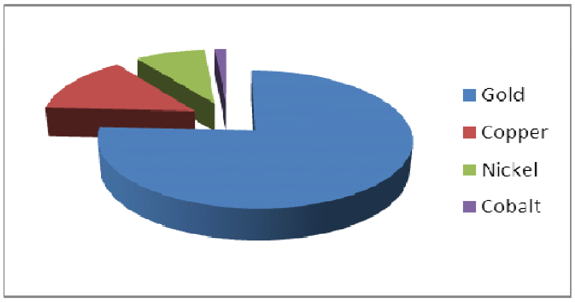
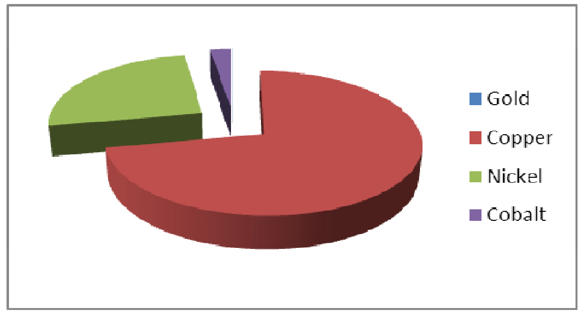


Figure 4 b: Mineral Exports (000 tonnes)



These exports are from eight hard rock operational mines, i.e. Ok Tedi, Lihir, Porgera, Ramu, Hidden Valley, Simberi, Kainantu, Eddie Creek and from the small scale (alluvial) mining sector.

Table 1: Productions from various mines in PNG, 2017

No.	Mines	Gold (ozs)	Silver (ozs)	Copper (t)
1	Porgera	535,944	355,523	
2	Ok Tedi	260,660	1,231,361	102,882
3	Simberi	133,126	16,935	
4	Lihir	918,685		
5	Hidden Valley	68,867	657,354	
6	Ramu	35,699 t (Ni)	3,430 t (Co)	29,229 (Cr)
	Total production	92865482 (**Au Oz)**	2279173 **(Ag Oz)**	

The total mining licenses held is 859 licenses, of which 10 are special mining leases (SML), 711 mining licenses (ML) and 453 alluvial mining licenses (AML). Note that SML 9 is Frieda River and SML 10 is Wafi Golpu, both in the application stages, whose mine development feasibility studies are under-going evaluation by the government of PNG.

Revenue from these mining projects continues to contribute significantly to the government's budget. According to the Bank of PNG (BPNG quarterly bulletin, Dec. 2017), of the total PGK 25.401 (minerals + LNG condensates) extractive commodities exported, the mineral sector contributed PGK 14.980 billion, approximately 56 per cent. Gold still maintains as the highest earner for the country.

This (table 1) is the kind of production expected over the next five years from the existing mines. With Wafi Golpu, Frieda River project (currently in SML application stages) and Solwara 1 (ML granted) come into production around 2025, these production figures in copper and gold will increase tremendously. A new export commodity in Molybdenum (Mo) will be added to PNG's mineral exports portfolio. Wafi Golpu and Frieda will be exporting copper gold concentrates while Solwara exports as multi-element ore.

As of August 2018, the small scale miners of PNG exported 78 kilo ounces (Koz) of gold valued at PGK 312 million, from the Bank of PNG registered gold exporters. In 2017, a total of 93 Koz of gold were exported, generating PGK 365 million in revenue

Table 2: Mineral Exports in 2017.		
Export Mineral	***Quantity Exported (Tonnes)***	***Export Revenue (PGK)***
Gold	61.8	7.582 Billion
Copper	100, 400	1.962 Billion
Nickel	35, 800	1.179 Billion
Cobalt	3, 400	195.2 Million

Source: Bank of PNG Quarterly Bulletin, Dec 2017

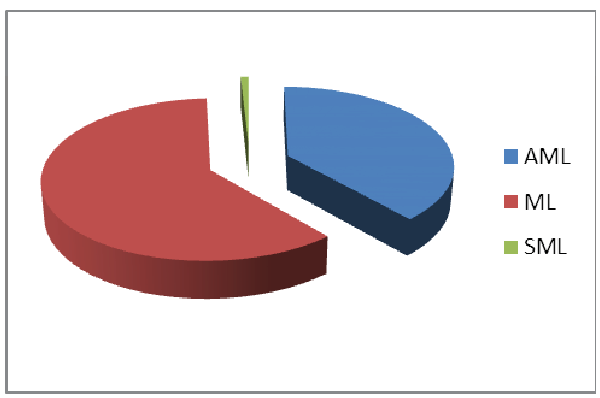
Of the mining tenements held in the Flexi-Tenements Management System, larger portion of these tenements are (both as ML & AML) for alluvial gold mining.

Table 3: Forecasted productions from new mines in 2025.			
Mine	***Copper Production***	***Gold Production***	***Molybdenum***
Frieda River	175,000	250,000	Nil
Yandera	91,000	45,000	2,000
Wafi Golpu	300,000	500,000	unspecified
Total	566,000	795,000	

Estimated Stats based on companys' updates at the PNG Mining Conference 2016 & 2017

The mineral industry in PNG is a matured industry where lessons learnt have been implemented to better the management of this industry, one of which, "Development Forum" can be adopted by other mining jurisdictions (*Dr John Armstrong, World Bank Senior Mining Consultant, APEC presentation, UPNG, Sept 2018*). The Mineral Resources Authority (MRA) and Conservation Environment Protection Authority (CEPA) are the two key government regulatory institutions regulating this industry. In 2018, MRA issued a statement of zero fatalities and fewer injuries in 2017 recorded in all mines operating in PNG.

Figure 5: Types of Mining Tenements



The sector in the mineral industry that requires more attention now is the alluvial mining sector, with almost 60-80, 000 local miners engaged in. MRA has a small or alluvial miner's training school in Wau. It offers various levels of training ranging from basic business cash book administration to mining and environmental protection, including health & safety. The school is accredited to the PNG National Institute of Standards and Industrial Technology (NISIT) and certificates are awarded on successful completion of the programs. The school's outreach training programs reaches out to more miners who can't enrol at the school.

Exploration in PNG

As of August 2018, the flexi cadastre tenement management system of MRA registered 73 active current licenses, 53 applications and 89 for renewal licenses, (figure 5). There seem to be a slight decrease in the active (current) tenements and an increase in the applications in 2018. The EL is fairly stable, within the 200-250, (figure 6) the number of EL from January 2017-August 2018.

Exploration is showing stability in the numbers of tenements, with a significant number of projects*[1] advancing to pre-feasibility or feasibility studies, and these (not in any order of significance) are;

- Mambare Nickel Cobalt project in Mambare, Northern (Oro) Province
- Mayur Iron Sands projects in Orokolo Bay, Gulf Province
- Mayur Coal in the Gulf province
- Mayur Limestone in Lealea-Kido, Central Province
- Manus Bauxite in the Manus Province
- Wowo Gap Nickel Cobalt in the Northern Province
- Ramu NiCo-studies on an upgrade of the existing mining project

Figure 6: Types of Exploration Licenses

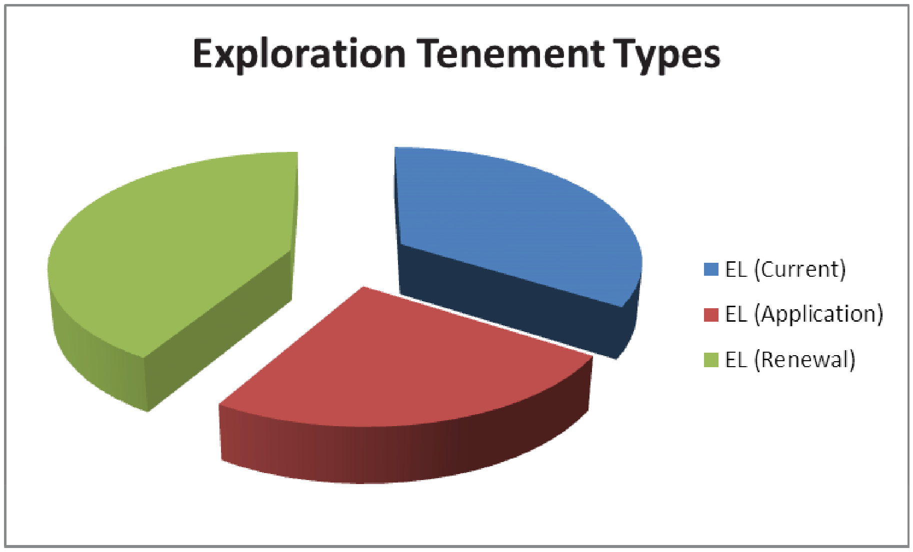
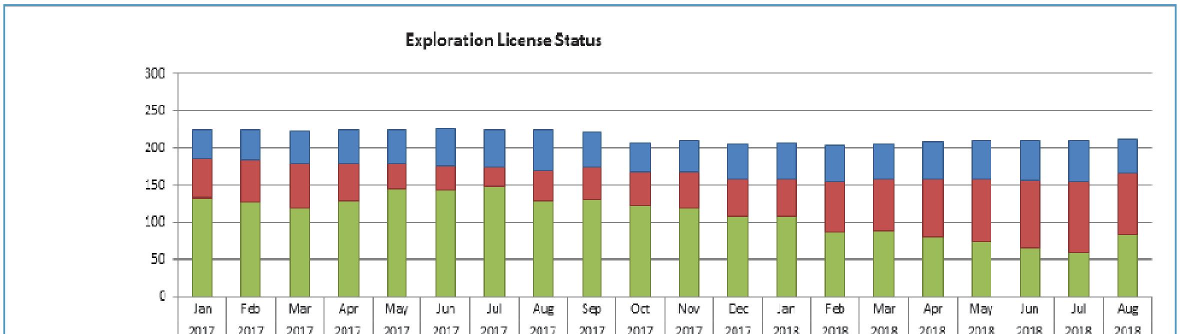


Figure 7: Exploration Licenses Jan 2017- August 2018



	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	Jun 2018	Jul 2018	Aug 2018
Total	225	224	223	225	224	226	224	224	221	207	211	206	208	204	206	209	210	210	210	212
New Applications	39	40	44	45	44	49	50	55	46	40	44	47	49	48	47	50	51	53	54	46
Active Tenement - Renewal Applications	53	56	59	50	35	33	26	39	44	44	48	52	52	69	70	79	84	90	95	83
Active Tenements	133	128	120	130	145	144	148	130	131	123	119	107	107	87	89	80	75	67	60	83

Note: Figure does not include applications lodged before 2011, applications put On Hold, InTime and conversion applications

Social Licenses in PNG

It is explicitly stated in the mining legislations and regulations that the land on which mining activities is carried out belongs to the state, however in Papua New Guinea access to the land for exploration and mining can be an issue with land owners, on benefits and other varying social issues, sometimes not directly related to the exploration or mining projects. The importance of these issues got the government of PNG set up a division within the MRA, Development Coordination Division (DCD), to manage all social and other non-regulatory issues. One of their signature activities is the administering and managing of the various mines' Memorandum of Agreements.

MOA of PNG Mines

A great deal of time in man-hours and resources is put to gaining access to land for scientific studies, exploration and mining in PNG. With land being a resource with aesthetic values to the local land owners and holders, care and sensitivity must be considered in dealing with land acquiring and accessibility. The MRA has well qualified and experienced team of officers that deals with these issues on a daily basis and front up at problem sites on real time to address issues. As a result, no mine has closed due to land owner or stakeholder issues in the last ten years.

Each mine has what is called a MOA (Memorandum of Agreement). All MOAs have standard clauses that are records of the negotiated undertakings and commitments of each of the parties to the MOA. In most cases it contains the benefits that will flow to the landowners and the provincial governments – The affected provincial government and landowners only commitment is providing project security. The benefits are classified into direct and indirect benefits. The direct benefits include royalty and compensation whilst indirect benefits include business spin-offs, infrastructure development and so forth.

All current operating mines have their MOAs under various stages of review or completed a process that started in 2010.

Below, table 4, is the various stages of the different mine MOA;

Mineral Resources Data in MRA

Table 4; Status of various mine MOA

Mine MOA	***Status of Revised MOA***	***Expected Date of Completion***	***Comments***
OK Tedi Copper Mine	99% completed	November 2018	Pending signature
Lihir Gold Mine	99% completed	November 2018	
Porgera Gold Mine	95% completed	December 2018	Pending, one party agreeing
Ramu Nickel Cobalt Mine	100% Competed		Implementation of commitments in the new MOA.
Hidden Valley Gold Mine	95% completed	December 2018	Pending NEC
Simberi Gold Mine	99% completed	December 2018	Pending signing by all MOA Parties
Kainantu Gold Mine	90% competed	December 2018	Review ongoing
Tolukuma Gold Mine	Completed		Implementation of undertakings as per MOA

Filling this exploration gap is MRA's exploration team from the Geological Survey Division (GSD). Over the years MRA built up its capacity to establish business units in the Geological Survey Division to collect collate and process new mineral resources data of PNG.

It is also collaborating with regional organisations such as CCOP to have non sensitive geo-data accessible via regional web based mapservers.

Numerous technical notes (TN) have been completed in this issue's period, from the various scientific studies completed by the GSD, and these can be accessed from the library. Anyone interested can contact info@mra.gov.pg for copies. The e-copy summaries of these will be online soon, on the MRA website, www.mra.gov.pg

This issue of the Mining Bulletin can only mention a few of these programs that assist in stimulating business in the mining industry of PNG.

Regional PNG Geochemical Survey

Slowly but steadily, the Geosurvey team of MRA is making good progress in geology mapping of the whole country, with a target to cover the country with 1:50K geological map sheets. This ambitious project will take many years to complete. The highest map sheet coverage to date of the whole country is 1:250K geological map sheets.

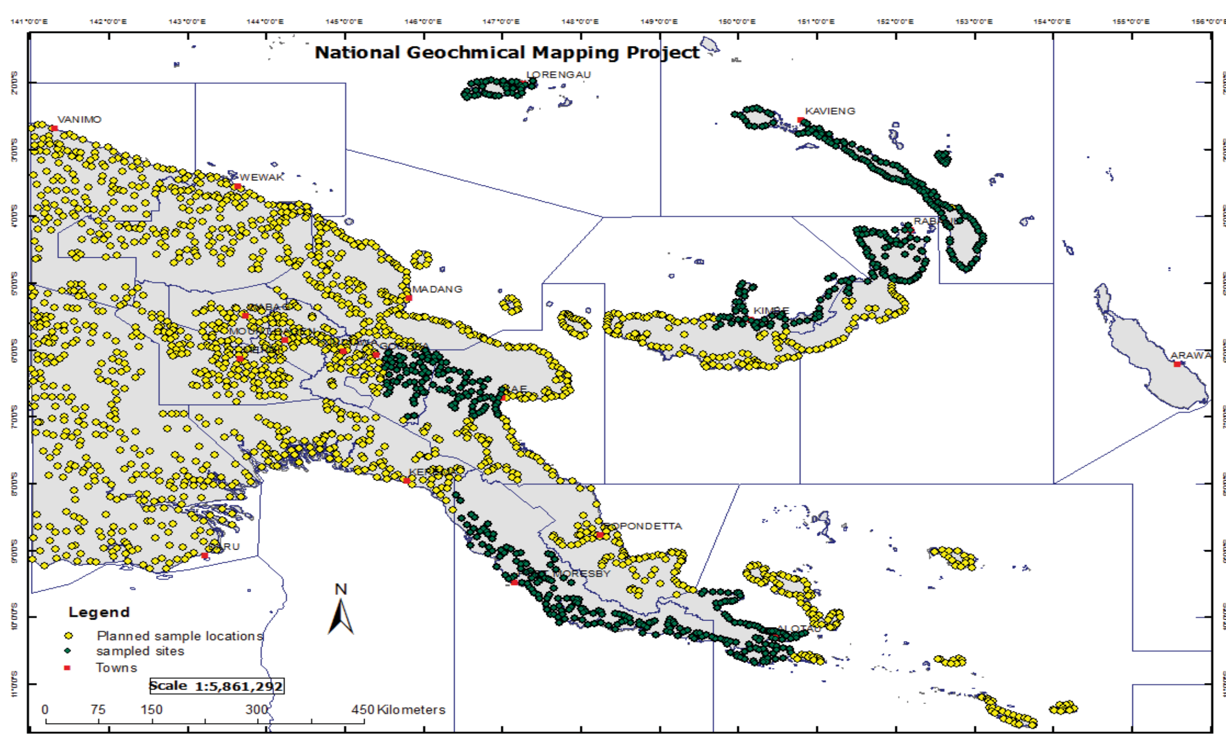
Apart from the geological survey in targeted areas, geo-scientists from MRA and China Geological Survey, Nanjing Centre, are engaged in a country wide regional geochemical sampling project, funded on a 50:50 ratio, between MRA and the China Geological Survey. So far, New Guinea Islands and part of Papua and Morobe were sampled, with larger parts of MOMASE and Highlands pending expeditions. It's a massive project involving many man ours and financial resources. MRA is set on to complete sampling the country as much as its resources can take to implement the planned sampling points. Results from these surveys will be available for potential investors and explorers as indicator data for further investigations.

Data Acquisition

MRA continues to put out new digitised data either as new geological, geophysical and geochemical data from its own field survey or from historical and archived (hard copied) exploration reports. A dedicated team of three have been extracting hard copy data into digital format since the last World Bank funded project in 2014.

Since then the Mineral Resources Authority has extracted and compiled in excess of 70,000 data points comprising of rock chip, stream sediment, soil and drill hole samples. Areas targeted in the first year, 2016 (2015 was more a training phase) were those in the mid-western part of PNG as well as parts of Morobe and Oro provinces. By mid-2016, target areas were changed to coincide with geological mapping targets by the GS Di-

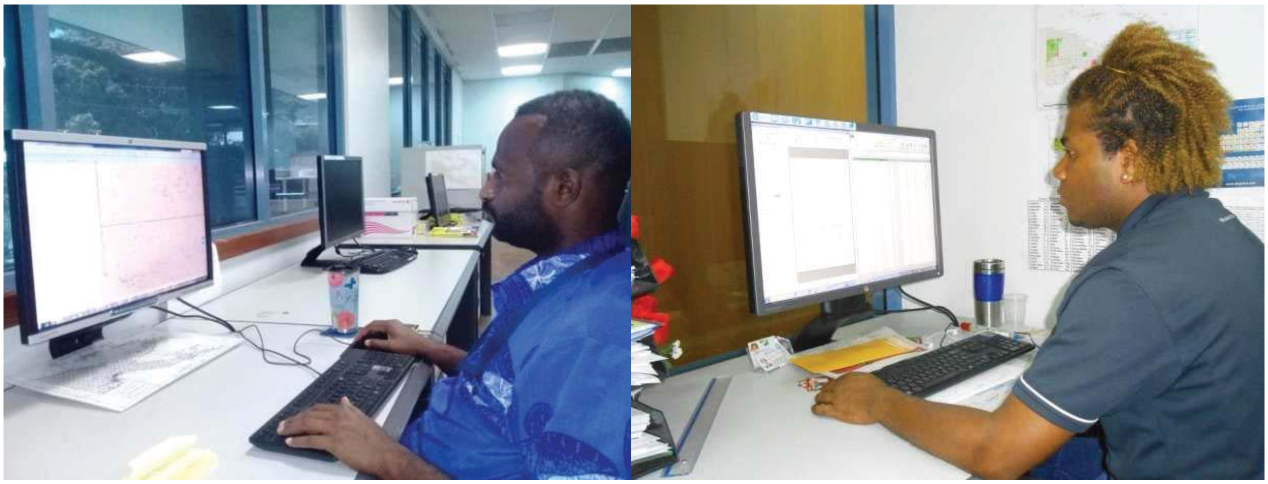
Figure 8: Geochemical sampling point, 2018.



vision, to compliment data from these areas of interest (AOI). These AOI included Aseki, Wau, Tauri, Biaru and Garaina.

In addition to this project, MRA continue to acquire new data in;

- Geological to update existing geological maps seamless and to lower higher scale i.e. 1:50 map sheets.
- Geothermal to better understand the geothermal resources in PNG
- Geochemical to further identify mineral anomalies & hotspots and AOI for potential investors and explorers
- Geophysical to assist understand mineralization in the areas surveys were taken



Jason Inau (left) and Austin Pion (right) of GSD data digitizing team hard at work digitising geochemistry data.

One such project is discussed below, the North Western PNG-Indonesia border area airborne survey.

North Western PNG-Indonesia Border Geophysics Survey

The latest geophysics (magnetics & radiometrics) data delivered in 2016 is available since 2017.

The data is from a MRA funded survey completed in 2015 by GPX of Australia.

These data provides excellent points of interest to those interested or are already exploring in the Western PNG area, between Ok Tedi-Frieda and the PNG-Indonesian border, within these coordinates;

Table 5: Summary of digitised points

Sample Type	**Number of Samples**
Soil	20,282
Stream sediment	10,537
Rock chip	23,434
Drill hole sample	17,046
Drill collar	158

Some companies having EL within or in the vicinity of the area have acquired these data for their purposes.

Thematic geochemistry mapping of this area displayed some high anomalies of copper, a belt known to give large projects such as Ok Tedi, Frieda, Porgera in PNG, and Grasberg over the border in the West Papua Province of Indonesia.

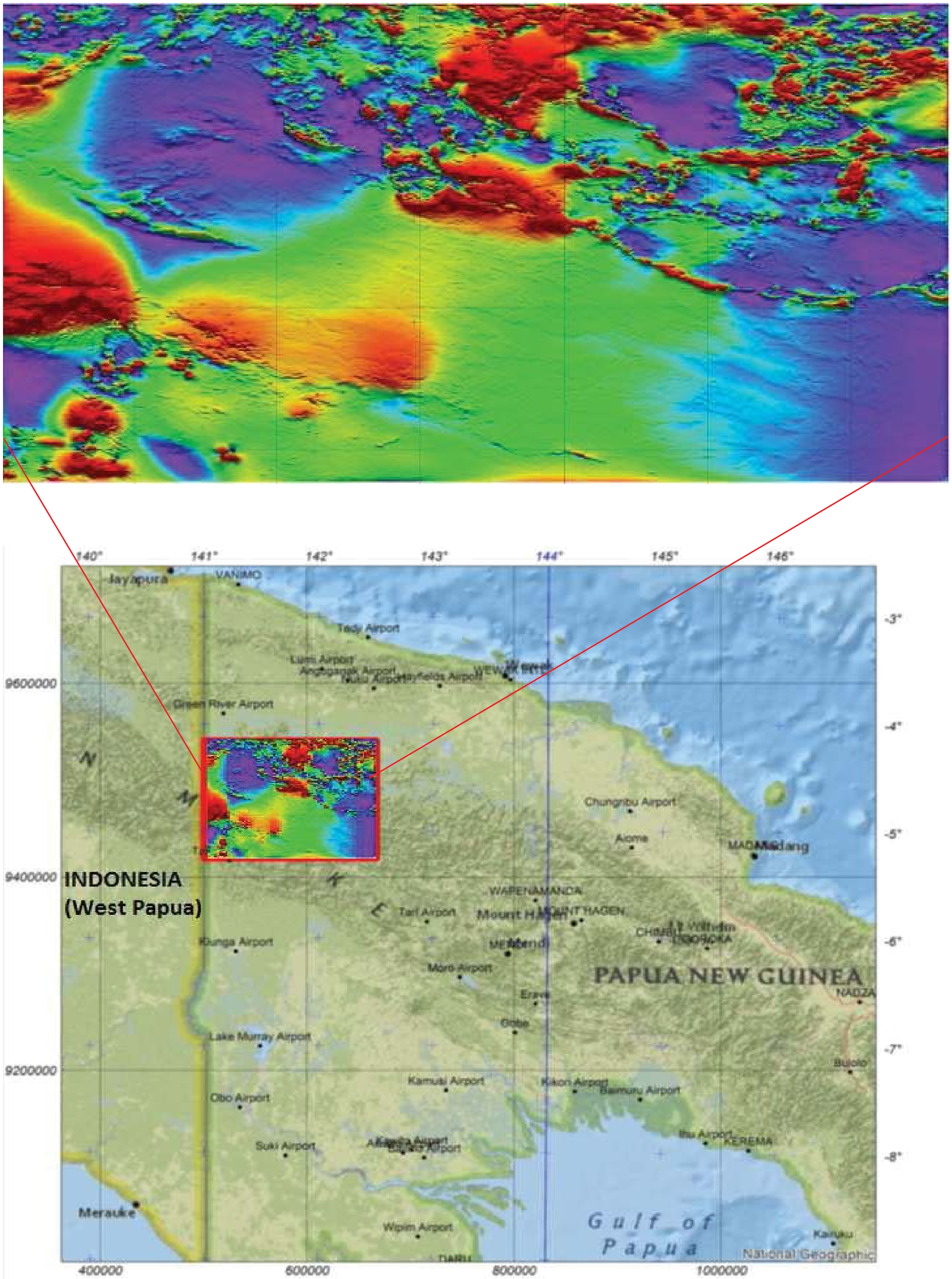
Papua New Guinea still has some virgin areas geologist have not yet ventured into for mineralisation surveys.

Table 6: Survey area coordinates, North Western PNG-Indonesia geophysics survey.

WPAGS_AOI_Cornerpnts Browser | WPAGS_AOI_Cornerpnts,WGS84_Zone54Srgn Map

ID	Longitude	Latitude
0	141.013	-4.49552
0	142.516	-4.49395
0	142.514	-5.2545
0	141.013	-5.25634

Figure 10: Aeromag data, Northwest PNG, 2017.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Lumi Airport
Green River Airport
Chungribu Airport
Aiome
Madang
INDONESIA
(West Papua)
WAPENAMANDA
Tari Airport
Mount Hagen
MOUNT HAGEN
Mendi
Kiunga Airport
Moro Airport
PAPUA NEW GUINEA
Erave
Gobe
Lake Murray Airport
Bulolo
Kamusi Airport
Kikori Airport
Baimuru Airport
Obo Airport
Ihu Airport
KEREMA
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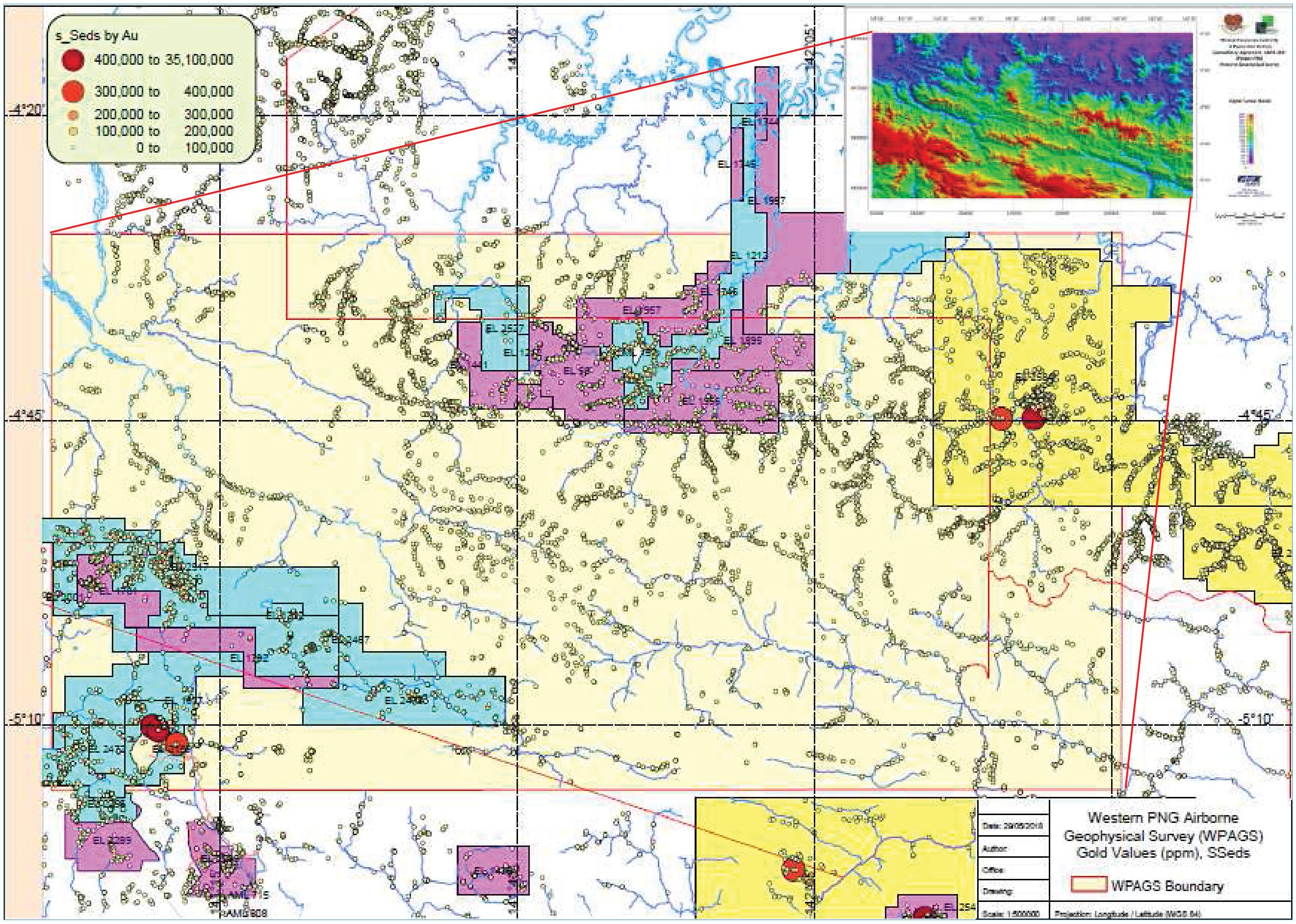
Wipim Airport
DARU
Gulf of
Papua
Kairuku
National Geographic

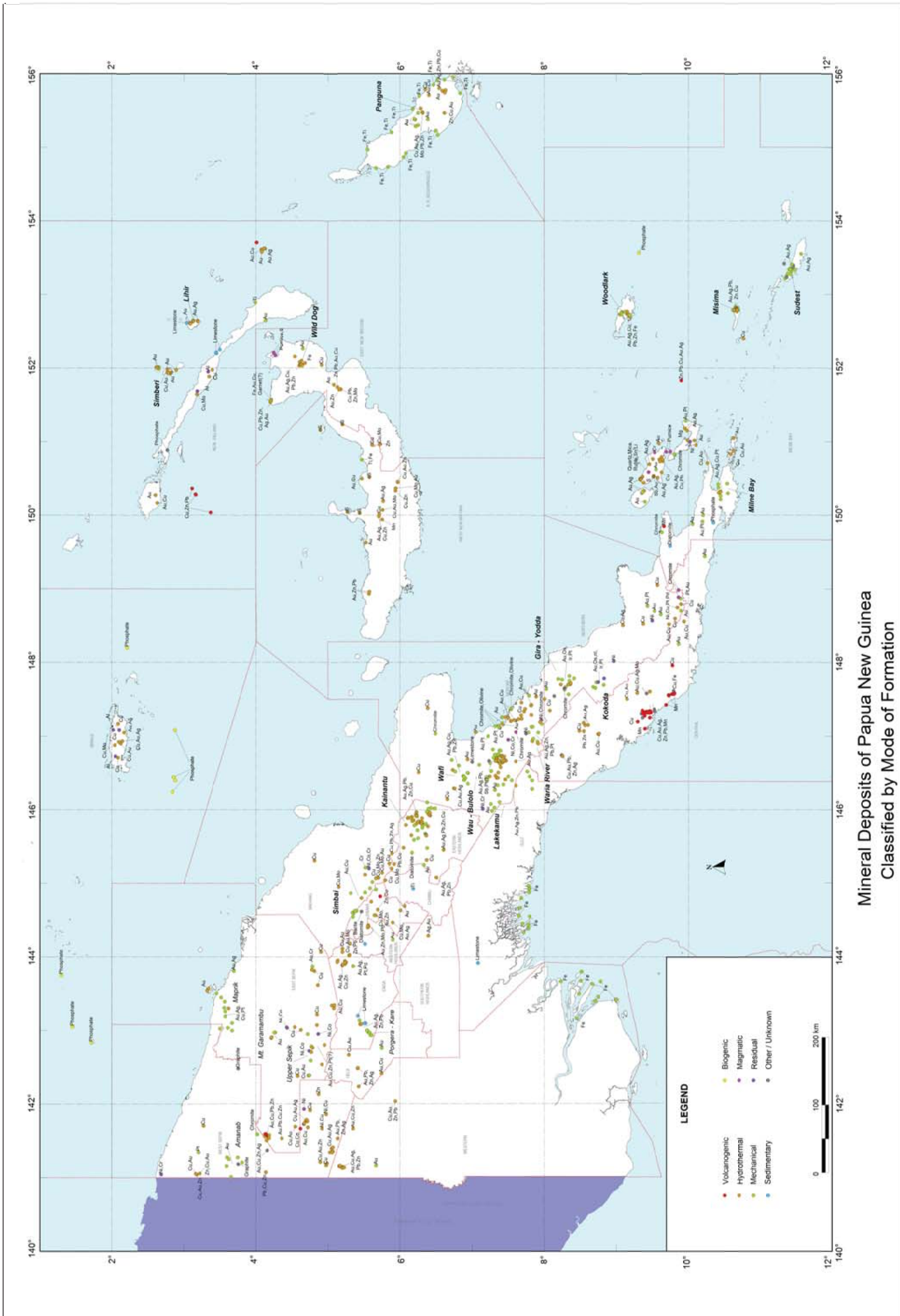


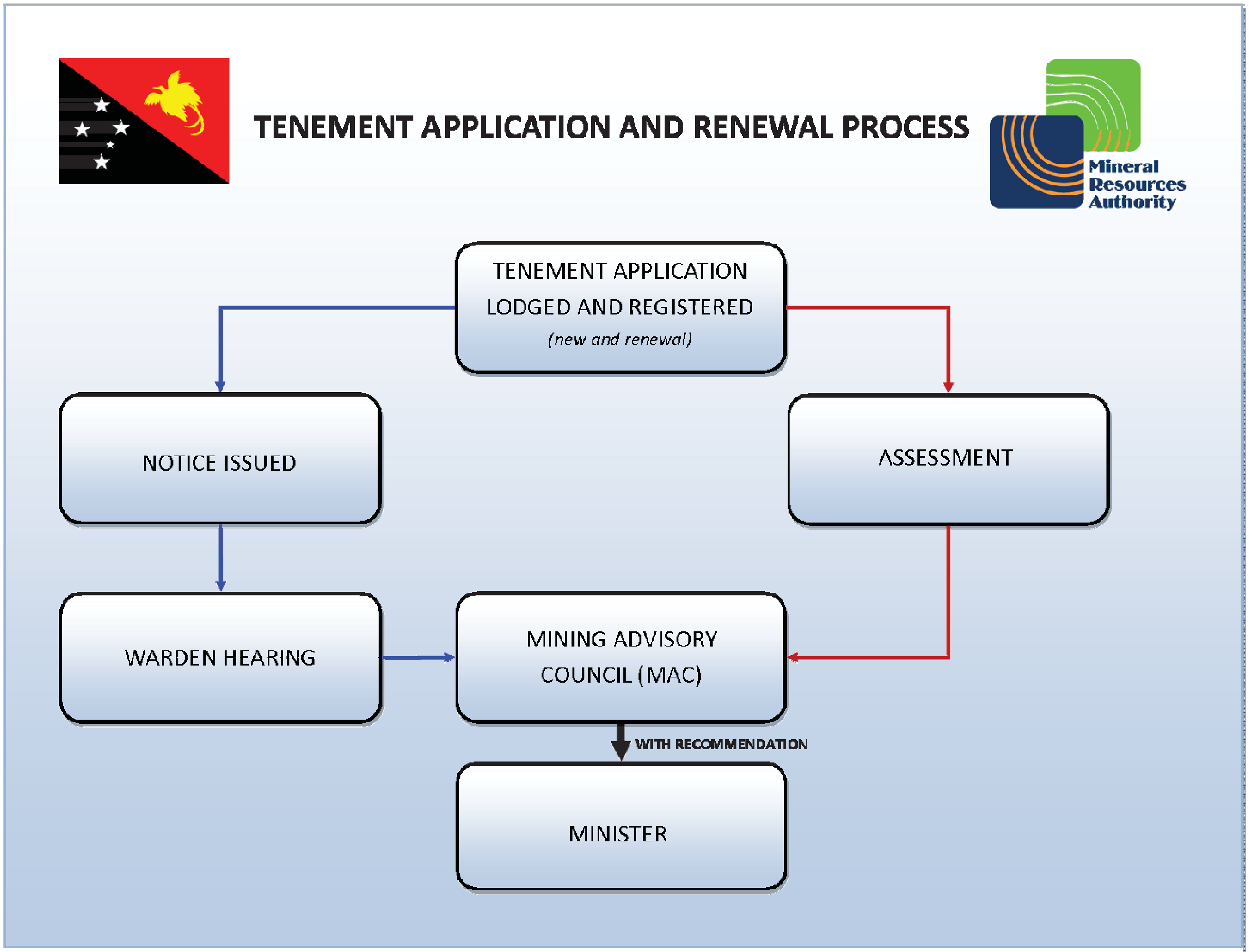
Summary

Mining is a global business and a mixture of factors, from commodity price, legislative & fiscal regimes, natural & business environmental, having open data and information, to social & security issues, control the industry. Papua New Guinea must balance these well to be competitive and attractive to investors.

Mineral Resources Authority continues to build its mineral resources database, accessibly to all interested for their purposes. These data generates exploration interests which develop mines, and mines are developed between 10 to more than 50 years. To stimulate exploration, the country must set an environment conducive for business in all sectors; social, legislative, fiscal, natural & geographical, and physical i.e. infrastructure, communication, logistics.

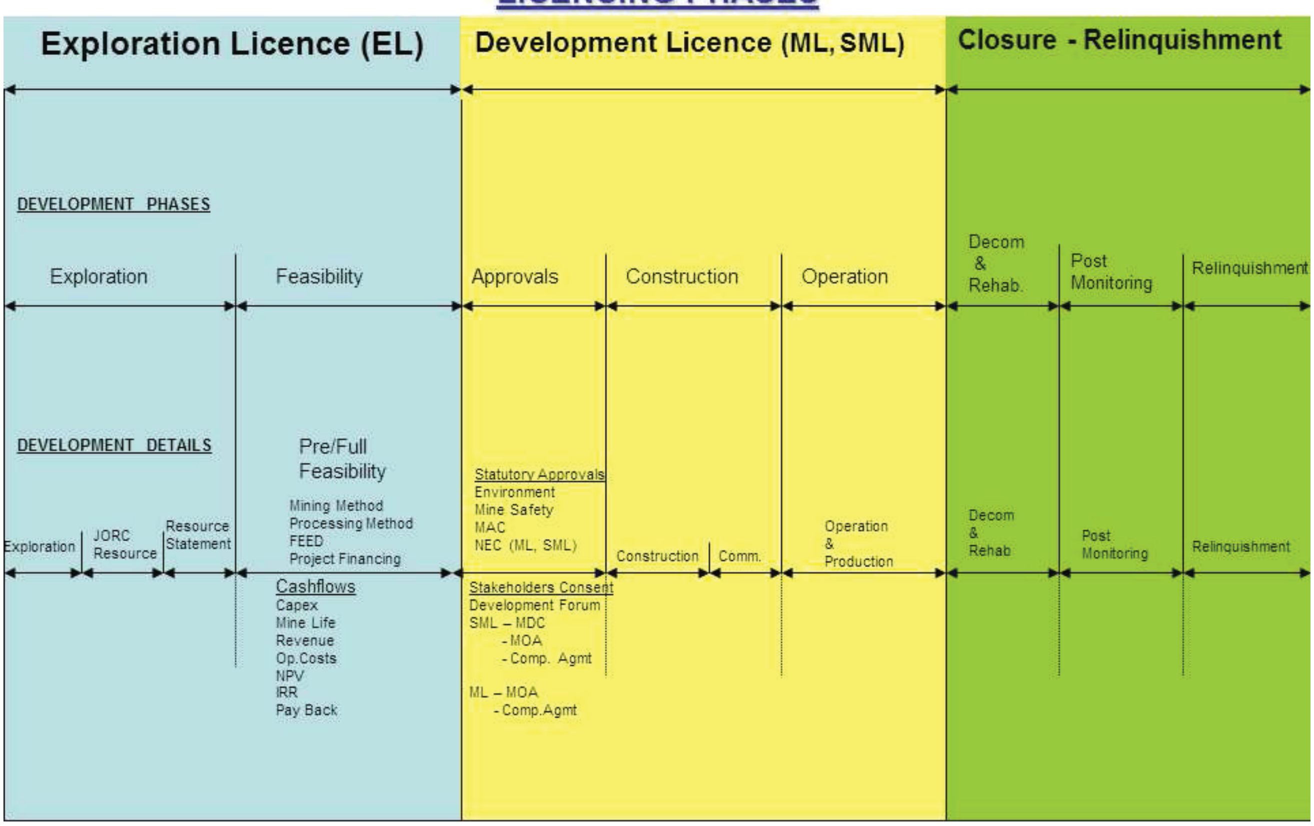
Due to the prospectivity of this country, investors and developers will always listen in on what new data is available, what the government does to create investments, and what the country's stances are in supporting business and related activities, including providing social environment for visitors and foreign employees. There is still a lot to discover in terms of mineral resources, and there are few more world class deposits like Ok Tedi & Grasberg to be discovered, we just have to look harder than before.

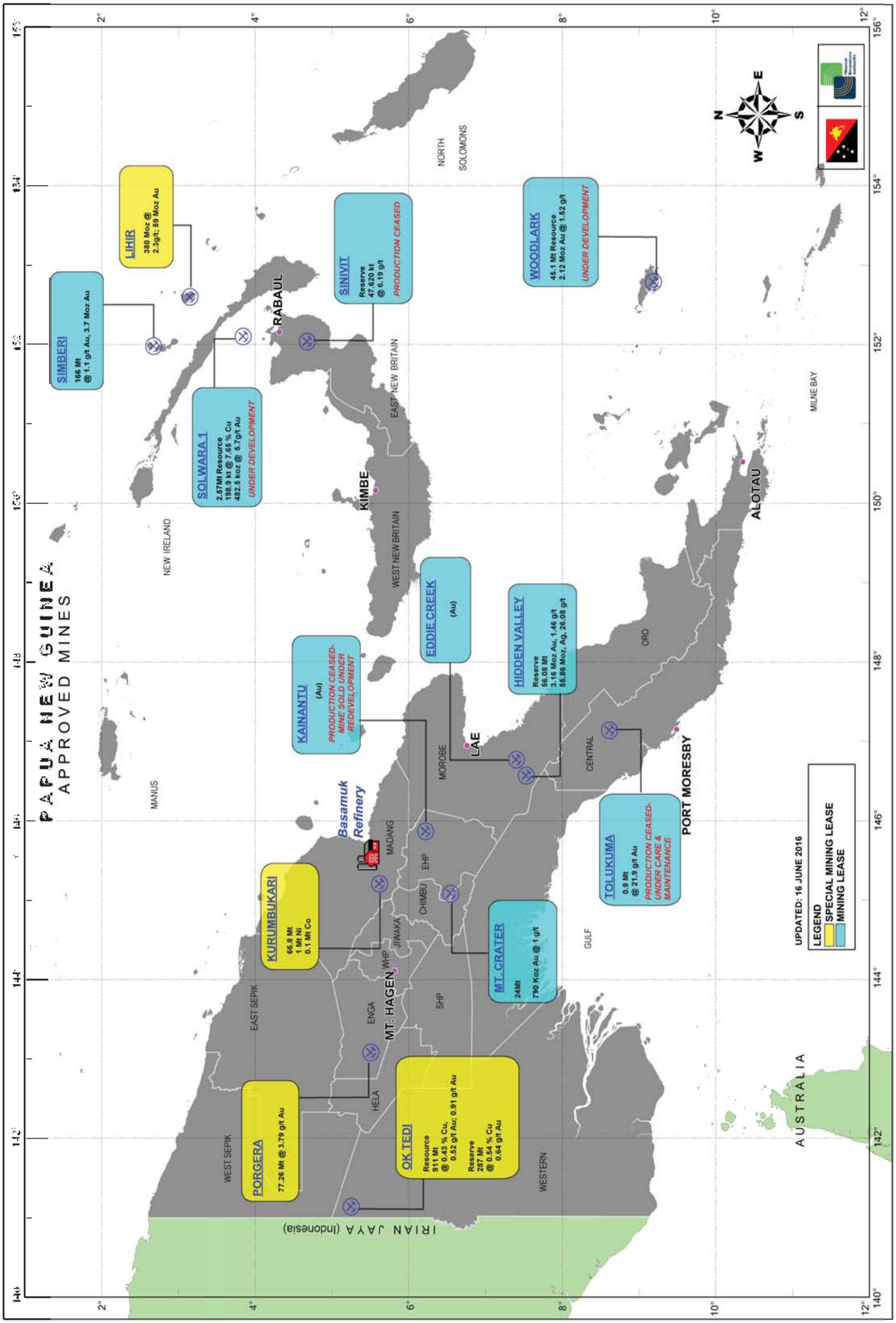

Mineral Deposits of Papua New Guinea
Classified by Mode of Formation
LEGEND
Volcanogenic
Hydrothermal
Mechanical
Sedimentary
Biogenic
Magmatic
Residual
Other / Unknown
0
100
200 km
Panguna
Lihir
Simberi
Wild Dog
Woodlark
Misima
Sudest
Milne Bay
Gira - Yodda
Kokoda
Waria River
Wafi
Wau - Bulolo
Lakekamu
Kainantu
Simbai
Porgera - Kare
Upper Sepik
Mt. Garamambu
Maprik
Amanab



Mineral Project life cycle

LICENCING PHASES




PAPUA NEW GUINEA
APPROVED MINES
LIHIR
380 Moz @ 2.3g/t; 59 Moz Au
SIMBERI
166 Mt @ 1.1 g/t Au, 3.7 Moz Au
SINIVIT
Reserve 47,620 kt @ 6.19 g/t
PRODUCTION CEASED
WOODLARK
45.1 Mt Resource 2.12 Moz Au @ 1.52 g/t
UNDER DEVELOPMENT
SOLWARA 1
2.57Mt Resource
198.9 kt @ 7.65 % Cu
482.5 koz @ 5.7g/t Au
UNDER DEVELOPMENT
EDDIE CREEK
(Au)
HIDDEN VALLEY
Reserve
56.08 Mt
3.16 Moz Au, 1.46 g/t
55.86 Moz, Ag, 26.08 g/t
KAINANTU
(Au)
PRODUCTION CEASED-MINE SOLD UNDER REDEVELOPMENT
TOLUKUMA
0.9 Mt @ 21.9 g/t Au
PRODUCTION CEASED-UNDER CARE & MAINTENANCE
KURUMBUKARI
66.8 Mt
1 Mt Ni
0.1 Mt Co
MT. CRATER
24Mt
790 Koz Au @ 1 g/t
PORGERA
77.26 Mt @ 3.79 g/t Au
OK TEDI
Resource
911 Mt
@ 0.43 % Cu, 0.52 g/t Au; 0.91 g/t Au
Reserve
287 Mt
@ 0.54 % Cu
0.64 g/t Au
Basamuk Refinery
RABAUL
KIMBE
LAE
PORT MORESBY
ALOTAU
MT. HAGEN
NORTH SOLOMONS
NEW IRELAND
EAST NEW BRITAIN
WEST NEW BRITAIN
MANUS
MADANG
MOROBE
EHP
CHIMBU
JIWAKA
WHP
ENGA
SHP
HELA
EAST SEPIK
WEST SEPIK
WESTERN
GULF
CENTRAL
ORO
MILNE BAY
AUSTRALIA
IRIAN JAYA (Indonesia)
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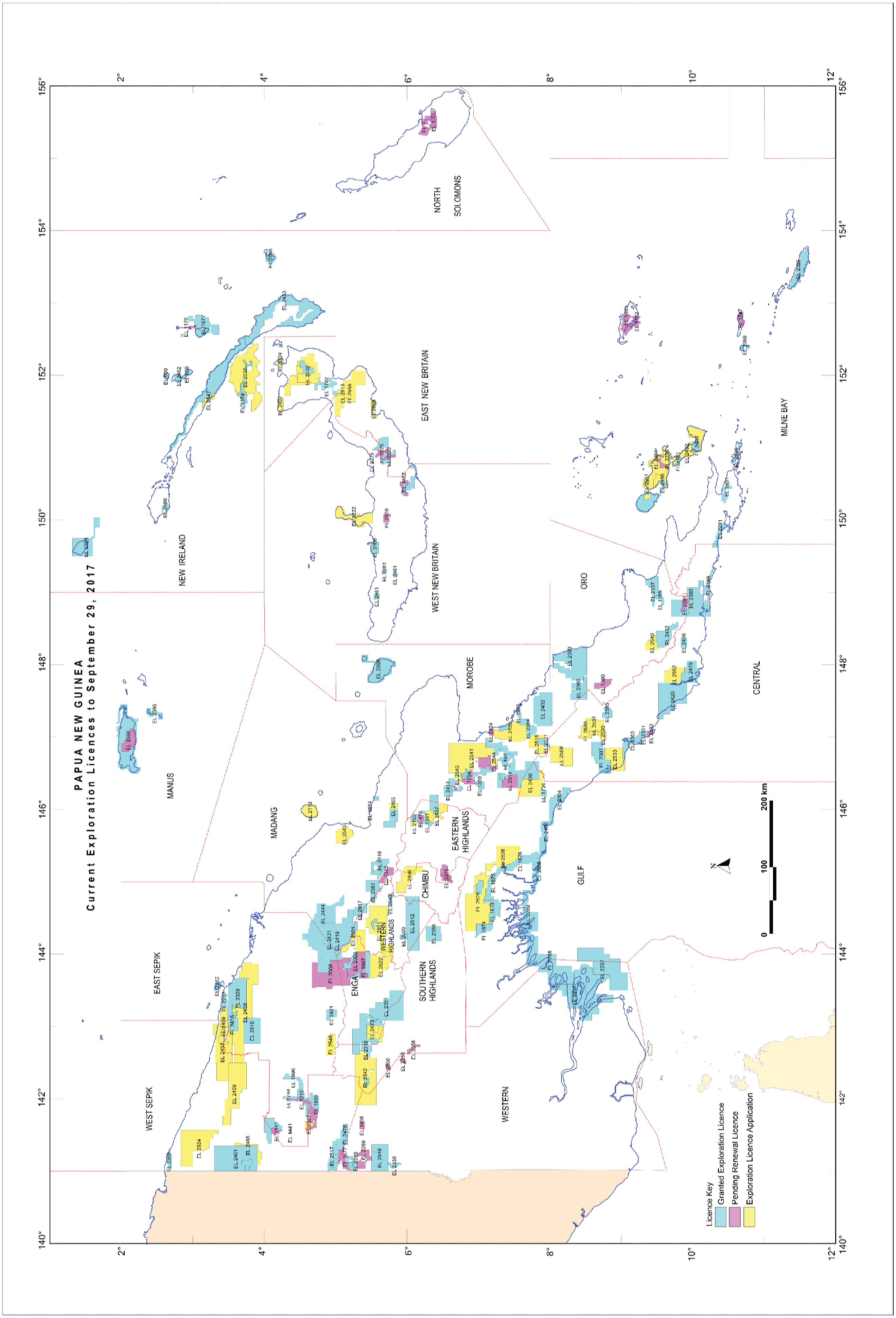
LEGEND
SPECIAL MINING LEASE
MINING LEASE


PAPUA NEW GUINEA
Current Exploration Licences to September 29, 2017
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EAST SEPIK
MANUS
NEW IRELAND
MADANG
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WEST NEW BRITAIN
NORTH SOLOMONS
MOROBE
ORO
MILNE BAY
CENTRAL
GULF
WESTERN
SOUTHERN HIGHLANDS
EASTERN HIGHLANDS
WESTERN HIGHLANDS
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Licence Key
Granted Exploration Licence
Pending Renewal Licence
Exploration Licence Application
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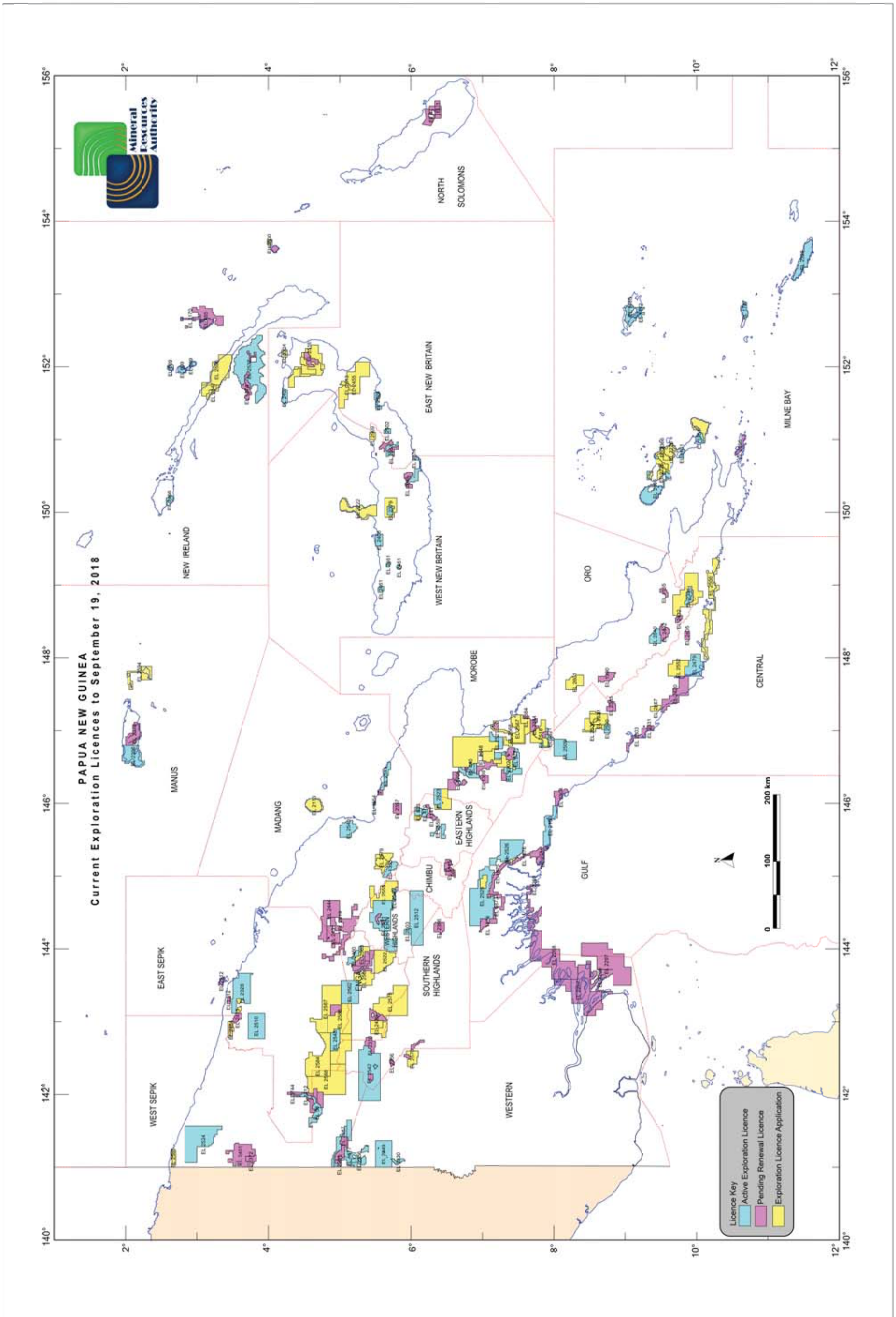
PAPUA NEW GUINEA
Current Exploration Licences to September 19, 2018
Mineral Resources Authority
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EAST NEW BRITAIN
WEST NEW BRITAIN
NORTH SOLOMONS
MILNE BAY
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CENTRAL
MOROBE
MADANG
EAST SEPIK
WEST SEPIK
EASTERN HIGHLANDS
CHIMBU
WESTERN HIGHLANDS
ENGA
SOUTHERN HIGHLANDS
GULF
WESTERN
0 100 200 km
Licence Key
Active Exploration Licence
Pending Renewal Licence
Exploration Licence Application

CLEAN COAL

INTRODUCTION

COAL, The rock that fuelled the industrial age, is once again remaking the global energy landscape (Morse, R.K, 2012, Dowdey S, 2016). Morse (2012) also stated that over the past decade, while most of the world stood transfixed by the continuous dependency of the oil markets, the promise of alternative energy, and the boom in cheap natural gas, coal left all other forms of energy in its dust, contributing nearly as much total energy to the global economy as every other source combined.

Coal is the world's fuel of choice for electricity generation because it is affordable and reliable. Coal accounts for 41 per cent of global electricity generation, followed by gas (22 per cent), hydro (16 per cent) and nuclear (12 per cent) (MCA, http://www.minerals.org.au/resources/coal/, accessed, 13/12/16). Similar statements were made by Morse R K, (2012); Dowdey S, (2016); Bhatt M S, (2012); NRC, USA, (2016).

Furthermore, coal is expected to remain the primary source of electricity for the foreseeable future.

In Papua New Guinea, coal is a recent discovery in economic terms, despite its occurrences reported in earlier exploration and scientific survey reports and as early as the late 19th century when it was reported by the British steam powered navy vessels. The recent discoveries have proven resources, potentially capable for coal development and export, and for local power generation. Initiatives are being undertaken by an exploration company to develop this industry for export and power generation. This has stimulated debate on the mining and usage of this energy source in PNG. There is no specific policy on the exploitation of this mineral in PNG, whether for export or local use.

This paper is a review of coal as a source of energy available to Papua New Guinea. The question on whether it is mined and exported or used domestically to produce power and supply to citizens and businesses is for the government to answer. Coal has proven to have driven economic development and industrialisation in the Western World including USA, Australia, and is currently doing the same in the growing economies such as China and India, and the Asian region.

GLOBAL COAL OUTLOOK

That explosive increase in coal use came not from the developed world, where demand is plateauing, but from the developing world, where the fuel remains the cheapest, most reliable source of electricity. The agenda at hand in the developing countries is to reduce poverty, fairly different to that of the developed nations. What will PNG do with the abundance of coal resources, and some experts in this discipline say it could be in the billions of PGK?

In 2012 (Morse R K), the market in globally traded coal used to generate electricity was approximately 850 megatons, twice the total in 2000. In 2012 coal supplied 153 quadrillion Btu*1 and is expected to increase to 169 Btu by 2020 and 176 quadrillion Btu in 2040 (EIA, www.eia.gov/, accessed 14/12/16).

EIA predicted that in this period, the top three coal consuming countries, almost 70 % of the global coal, will be China, United States, and India, with China consuming almost 50 %. According to Mayur Resources Ltd (poster, Dec, 2016) 71 % of the total energy production in Australia is from coal power plants, with the balance coming from hydro, wind and gas.

Morse (2012) predicted that by 2035, China and India will drive 75% of growth in coal demand and coal will become the world's single largest source of energy. Coal consumption in the East and South East Asia is on the rise, with countries such as China, Thailand, Vietnam, Philippines, Malaysia and Indonesia showing between 15-18 % increase (Morse, 2012, Mayur Ltd 2016) in coal powered plants and the collective increase in SEA around 43 % rise (Mayur Ltd, 2016). Coal powered plants produces 36 % (graph 1 below) of the world's total energy production.

Table 1: Coal consumption in various regions of the world. World Bank data (http://data.worldbank.org/, accessed Dec 2016)

World	33.2	41.1
Arab World	1.2	1.2
Caribbean small states		
Central Europe and the Baltics	60.1	51.3
East Asia & Pacific	28.7	62.1
Euro area	39.9	22.3
Europe & Central Asia	26.6	25.0
European Union	46.2	27.5
Fragile and conflict affected situations	6.5	4.6

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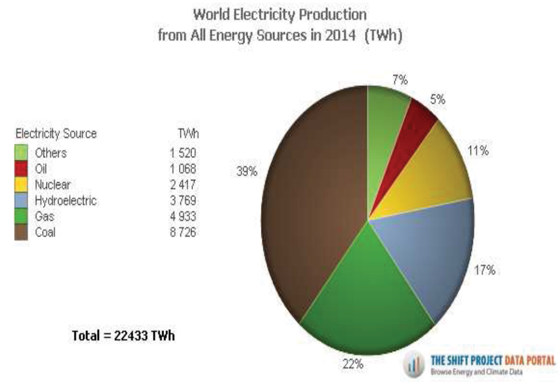
*1. British thermal unit; Measure of power in electric power, steam generation & heating

....Table 1 Continue

Heavily indebted poor countries (HIPC)	1.3	0.2
Latin America & Caribbean	3.2	6.4
Least developed countries: UN classification	2.1	1.1
Middle East & North Africa	0.8	3.4
North America	41.8	36.0
OECD members	39.2	32.5
Other small states	0.0	3.0
Pacific island small states		
Small states	0.0	2.5
South Asia	42.6	63.5
Sub-Saharan Africa	67.3	53.7
High income	38.9	31.8
Low & middle income	22.1	49.6
Low income		
Lower middle income	16.7	46.1
Middle income	22.4	50.1
Upper middle income	23.9	51.2



Graph 1: World electricity production
Source: http://www.tsp-data-portal.org/, accessed 13/12/16)

As coal remakes the global energy markets, it is also remaking the climate. Coal combustion is the world's largest source of carbon dioxide emissions, responsible for almost 13 billion tons per year (Morse R K, 2012). Although coal is often cast as an environmental villain today, just four decades ago, it seemed the obvious answer to some of the developed world's most pressing political and economic challenges. According to Morse (2012) the oil crises of the 1970s disrupted transportation systems. Oil was controlled by cartels, coal became increasing important as an alternate and cheaper source than oil.

Between 1980 and 2000, countries that were members of the Organization for Economic Cooperation and Development (OECD) increased the use of coal in electricity generation by 61 percent and reduced the use of oil in that sector by 41 percent. Formerly dispersed in niche regional markets, the international trade in coal grew into a sophisticated global commodities exchange and quadrupled in size. Stable, diversified networks of suppliers offered coal importing countries low energy costs and enhanced energy security. No longer were electricity prices vulnerable to
instability in the Middle East. Swapping oil for coal paid handsome dividends (EIA, accessed 14/12/16).

The OECD countries, as indicated in table 1, coal consumption is plateauing whilst new economies such as China and India are experiencing increasing demand for coal. The OECD countries though maintaining coal power plan are investing in green energy power sources, and replacing older plants with clean coal & less carbon dioxide emission technology coal power plants.

Given how dominant coal is, one of the most promising ways to fight global warming is to make it emit less carbon dioxide, a solution that is less elusive than commonly thought. Merely installing the best available technologies in coal plants in the developing world could slash the volume of carbon dioxide released by billions of tons per year, doing more to reduce emissions on an annual basis than all the world's wind, solar, and geothermal power combined do today (Morse RK, 2012, EIA, accessed 14/12/16). And advanced technologies now in the works could someday allow coal to be burned without releasing any carbon dioxide into the atmosphere.

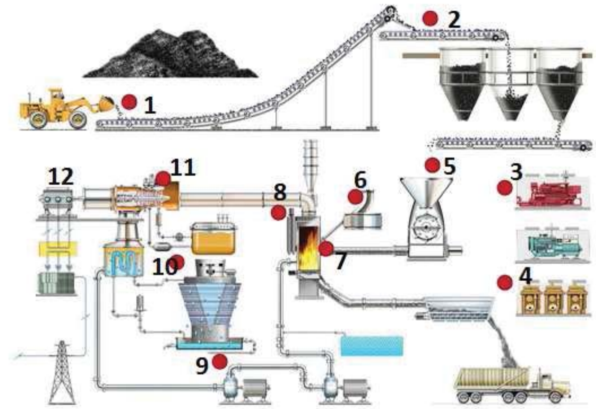
For PNG the question of whether coal should be mined and used for local power generation is encouraged or not, is something the government must seriously contemplate. The answer is more complex than merely aligning it with carbon dioxide emission, climate change or merely taking the position of a total ban. Countries such as China and India are using coal to electrify all homes to alleviate poverty. Should PNG follow China and India or save the planet at the mercy of its citizens with increasing poverty? PNG also assumes a leadership role for the Pacific region, and it is well known most Pacific Island nations are opposed to any development which might increase climate change impacts because of the vulnerability of many of the islands.

The US Department of Energy (DOE) by the US Energy Policy Act of 1992 (National Research Council of US, 2016) has stepped up its efforts to increase programs on environmentally acceptable coal based technologies for a whole range of applications including power generation, and manufacture of liquid and gaseous fuels and non-fuel products such as carbons & coal derived chemicals (NRC of US, 2016).

Saylor S, Agilonu B & Pichard S, (2011) in their report on SA's restructuring of the SA Power Industry identified lack of power as the priority factor that may threaten SA's position as an attractive investment destination for many of the country's important industries. A similar statement has been made by presenters of various mining business conferences in PNG, stating lack of available power as increasing mining projects development and business costs; is a deterrent to economic development progress

ELECTRICITY PRODUCTION
The diagram below shows how electricity is produced using coal. Coal mined is taken to coal yard of the power plant. The coal is pulverised (grinded) to fine powder. It is then transferred to large industrial heating furnaces. As the coal burns with intense heat, it heats the water in the boiler tubes which turns to steam. The steam under high pressure is directed to the turbines blades, causing it to turn. The turbines are connected to a generator which produces electricity.

Diagram 1: Schematic of a coal power plant (www.mobil.com/ accessed 14/12/16)



Coal Power Plant Key
1: Coal Yard
2: Conveyors
3: Back Up Generators, Fire Water Pumps
4: Air Compressors
5: Coal Pulverizers
6: Pre-Heater
7: Boilers
8: Soot Blower
9: Steam Loop/Water Feed Pumps
10: Cooling Towers
11: Turbines
12: Generators

POLLUTION
As observed from diagram 1 above, the generation of power is similar to that from hydro and diesel power systems. The much talked about pollution comes from the burning of the coal to produce heat. When it burns it releases gaseous by-products, some of which are discussed herein below.

Chemically, coal like diesel and other combustible gases such as ethane, propane, methane, butane contains Carbon (C) and Hydrogen (H) which are commonly referred to as a hydrocarbon; however it contains Oxygen (O) as well plus other constituents such as nitrogen, ash and sulfur. Oxygen is required in burning, so the by-products usually are gaseous oxides i.e. carbon dioxide CO_2, hydrogen oxide or water H_2O and sulfur oxide (SO_2)

A coal power plant exhausts are composed of gases referred to as flue gas and particulate matter plus other gases such as carbon monoxide (CO), nitrogen oxide (NOx) and sulfur oxides (SOx). Flue gas may contain gases such as carbon dioxide (CO2), oxygen (O2) and water vapour (H2O (g)).

Coal Pollutants

There is no denying that coal plants pollute the environment (air). According to UCS USA, coal plants are the nation's top source of carbon dioxide (CO_2) emissions, and most scientists believe it's the primary cause of global warming. A typical coal plant generates 3.5 million tons of CO_2 each year (http://www.ucsusa.org/, accessed 14/12/16).

On the above note, be advised that this assertion is made from typically older versions of coal power plants without any technologies to either clean coal or reduce CO_2 generation and emissions. The newer and modern power plants have clean technologies for greater CO_2 reduction, and most countries are upgrading older plants with these newer technologies.

Coal pollutants and the rates of pollution depend on the types of coal and on the preparatory activities prior to burning to produce electricity. Some common pollutants (other than dust) from burning coal are;

1. Sulfur dioxide (SO_2)

A typical uncontrolled coal plant emits 14,100 tons of SO_2 per year. A typical coal plant with emissions controls, including flue gas desulfurization (smokestack scrubbers), emits 7,000 tons of SO_2 per year (http://www.ucsusa.org/, accessed 14/12/16). This is almost 50 % reduction in the SO_2 emission, and the cleaner and efficient technologies are installed, the greater the reduction of SO_2.

2. Nitrogen Oxides (NO, NO_2, NO_3)

Nitrogen oxides could be in the forms of nitrous oxide (NO), nitrogen dioxide (NO_2) and nitrous oxide (N_2O). According to UCSUSA (http://www.ussusa.org/, accessed 20/12/16), a typical coal plant with emissions controls, including selective catalytic reduction technology, emits 3,300 tons of NO_x per year.

3. Mecury

A typical uncontrolled coal plants emits approximately 170 pounds of mercury each year (http://www.ussusa.org/, accessed 20/12/16). Activated carbon injection technology can reduce mercury emissions by up to 90 percent when combined with baghouses (http://www.ussusa.org/, accessed 20/12/16). In this context of discussion a baghouse can be described as a filter system to collect dust and other particulates from the coal power plant. ACI technology is currently found on just 8 percent of the U.S. coal fleet.

Baghouses have been known to filter off 90% other pollutants such as lead, cadmium, other heavy metals plus other volatile compounds that forms the ozone (O_3) (http://www.ussusa.org/, accessed 20/12/16).

Gasoline & Diesel Pollutants

By way of comparison, it is appropriate to discuss the pollutants from burning petroleum products such as gasoline and diesel. Gasoline and diesel fuels are mixtures of hydrocarbons - made of hydrogen, oxygen and carbon atoms (http://www.nutramed.com/, accessed 20/12/16). Like coal, when they burn, they produce pollutants such as sulphur dioxide, nitrogen oxides, carbon monoxide, carbon dioxide, benzene and others grouped as PAH (polycyclic aromatic hydrocarbon) (http://www.nutramed.com/, accessed 20/12/16).

At a closer look, all gasoline, diesel and coal when burned produces similar pollutants. It is commonly believed coal could produce more than the burning of the other energy sources, however one needs to analyse in terms of which one is heavily regulated to reduce these wastes. Currently, coal isn't burned in PNG, whereas the others are, and they aren't regulated. It is believed, coal will be subjected to heavy regulatory regimes when it enters as an alternate energy source.

CLEAN COAL TECHNOLOGIES

The perception from the industrial revolution to this age, coal is the dirtiest of all fossil fuels. When burned, it produces emissions that contribute to global warming, create acid rain and pollute water. With all of these perceptions anyone would think this dirty black rock is on its way out.

But not to be, coal is no sooty remnant of the Industrial Revolution (Dowdey S, 2016, http://science.howstuffworks.com/, accessed 20/12/16), it generates half of the electricity in the United States and will likely continue to do so as long as it's cheap and plentiful (EIA, 2008, 2011). Clean coal technology seeks to reduce harsh environmental effects by using multiple technologies to clean coal and contain its emissions.

Clean coal is the way to go to boost power supply whilst reducing pollution. Countries such as China and India whose energy demands are way too high compared to production is investing in clean technologies to continue using coal as a sources to produce electricity.

Coal is a fossil fuel composed primarily of carbons and hydrocarbons. Its ingredients help make plastics, tar and fertilizers. A coal derivative, a solidified carbon called coke, melts iron ore and reduces it to create steel. But most coal -- 92 percent of the U.S. supply -- goes into power production (source: Energy Information Administration, USA). Electric companies and businesses with power plants burn coal to make the steam that turns turbines and generates electricity.

Coal Cleaning

When coal burns, it releases carbon dioxide and other emissions in flue gas, the billowing clouds you see pouring out of smoke stacks. Some clean coal technologies purify the coal before it burns. One type of coal preparation; coal washing, removes unwanted minerals by mixing crushed coal with a liquid and allowing the impurities to separate and settle.

The sulfur content of the coal can determine the quality of coal. Therefore cleaning off sulfur is considered desirable in this regard and in the minimization of sulfur based gas emissions. Washing and magnetic separation (Cooper B R, 1978) removes impurities like iron that binds sulfur. Therefore separating iron would reduce sulfur as well.

Another system is to control the coal burn to minimize emissions of sulfur dioxide, nitrogen oxides and particulates. Wet scrubbers, or flue gas desulfurization systems, remove sulfur dioxide, a major cause of acid rain, by spraying flue gas with limestone and water (Dowdey S, 2016). The mixture reacts with the sulfur dioxide to form synthetic gypsum, a component of drywall (Dowdey S, http://science.howstuffworks.com/, accessed, 20/12/16). This process is done before the coal is burned. Sulphur is removed enabling lesser amounts burned, resulting in lesser sulfur dioxide.

Combustion Technologies

Basic science of combustion is when something burns, oxygen is used in the process, and some of the concerned by products produced are carbon dioxide (CO_2) and nitrogen oxides (NO_x). The lesser oxides the better it is for the environment. Therefore a system that combusts coal with less oxygen is better. Modification of combustion technologies are usually done to remove nitrogen oxides.

Dowdey S (2016) discussed a technology to decrease the emission of nitrogen oxides. This is done by restricting oxygen and manipulating the combustion process. Electrostatic precipitators remove particulates that aggravate asthma and cause respiratory ailments by charging particles with an electrical field and then capturing them on collection plates. Again, this process is done prior to burning, after the coal is pulverized.

Dowdey S (2016) further discussed the Gasification process which avoids burning coal altogether. With integrated gasification combined cycle (IGCC) systems, steam and hot pressurized air or oxygen combine with coal in a reaction that forces carbon molecules apart. The resulting syngas, a mixture of carbon monoxide and hydrogen, is then cleaned and burned in a gas turbine to make electricity. The heat energy from the gas turbine also powers a steam turbine. Since IGCC power plants create two forms of energy, they have the potential to reach a fuel efficiency of 50 percent (source: -U.S. Department of Energy). According to Mhatt M. S, 2012, the IGCC is limited to high grade coal with less ash, and suggested hybridizing with a technique known as the ultra-supercritical cycle (USC).

Cleaning Emissions

The so called smoke from coal power plants are mixtures of products discussed as pollutants herein this report. Scientists are constantly researching into technologies to purify this by taking out poisonous and harmful wastes to humans and environment. Technically the exhaust gas from the power plant can be referred to as flue gas, with the primary gases being carbon dioxide, water vapour and oxygen (not utilised in the combustion process).

Carbon Capture & Storage

Carbon capture and storage (CCS) (or carbon capture and sequestration) is the process of capturing waste carbon dioxide (CO2) from large point sources, such as fossil fuel power plants, transporting it to a storage site, and depositing it where it will not enter the atmosphere, normally an underground geological formation (Dowdey S, 2016; Wikipedia, accessed 19/01/2017).

The two storage options, geologic and oceanic, must contain the CO_2 until peak emissions subside hundreds of years from now. Geologic storage involves injecting CO_2 into the earth. Depleted oil or gas fields and deep saline aquifers safely contain CO_2 while unminable coal seams absorb it. A process called enhanced oil recovery already uses CO_2 to maintain pressure and improve extraction in oil reservoirs.

Ocean storage, a technology still in its early stages, involves injecting liquid CO_2 into waters 500 to 3,000 meters deep, where it dissolves under pressure. However, this method would slightly decrease pH and potentially harm marine habitats. All forms of CO_2 storage require careful preparation and monitoring to avoid creating environmental problems that outweigh the benefits of CO_2 containment.

A power plant with CCS can reduce CO2 emission into the air by 80-90 % (Wikipedia, accessed 19/01/2017) compared to a plant with no CCS.

Flue gas cleaning

Flue gas as stated herein (above under "pollution") contains CO2, H20 and O2.
Flue-gas separation removes CO2 with a solvent, strips off the CO2 with steam, and condenses the steam into a concentrated stream. Flue gas separation renders commercially usable CO2, which helps offset its price. Another process, oxy-fuel combustion, burns the fuel in pure or enriched oxygen to create a flue gas composed primarily of CO2 and water -- this -sidesteps the energy-intensive process of separating the CO2 from other flue gasses.

Various chemical processes and scrubbers discussed in Wikipedia (https://en.wikipedia.org/wiki/Flue_gas, accessed 19/01/2017) treats flue gas and other particulates ;
Electrostatic precipitators or fabric filters removes particulates
Flue gas desulfurization captures sulfur dioxide (SO2)

Flue gas concentrations control is also maintained by have flue gas stacks or chimney, similar to the one in image 1 below.

Benefits of Clean Coal
There is greater benefit on reducing emission of gaseous and other particulates that is harmful to humans and to the environment. There are other benefits to it, and some are listed below;
Cleaning coal and sequestering its emissions significantly raises the per-BT-U price of what would otherwise be an inexpensive fuel.
By products such as gypsum and carbon dioxide can be sold to industries. For example CO_2- for sodas and dry ice can offset the price of clean coal technologies; a charge on carbon could make emission-reduction financially realistic.

COAL IN PNG
Coal is present in the Gulf, Western, Madang and the Sepik provinces. What started as a collaborative scientific research project between MRA and Waterford Ltd in 2010, which resulted in a comprehensive coal report, has now progressed to a stage where Mayur Resources Ltd has acquired the tenement interests of the other coal explorers and is almost at a feasibility stage to mine, export and/or harness energy from PNG coal.

The Depot Creek project in the Gulf Province; approximately 280km northwest of Port Moresby city, (the Nation's capital), is considered the likely host to PNG's first coal mine. There has been a long history of coal prospecting and exploration in the Gulf Province although coal mining has never been developed in PNG. Mayur Resources now has a portfolio of tenements that cover the main coal-bearing geology in the region.

The most advanced project at Depot Creek is in a relatively remote part of Gulf Province. Following the completion of an exploration programme and associated coal quality test works, a maiden resource of 11.4 Mt was delineated.

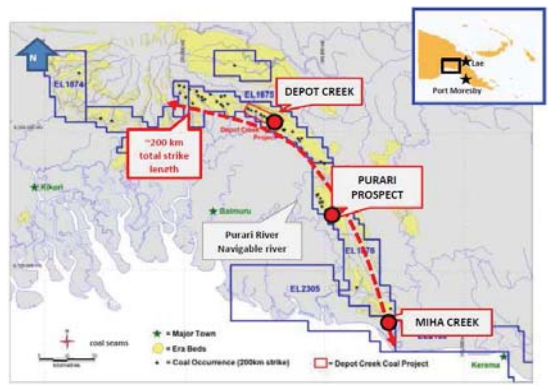


Figure X - Map showing Mayur's exploration licences within the Gulf region and Depot Creek project. The yellow shaded outline represents the location of the coal-bearing Era Beds Formation.

The drilling program intersected a coal seam more than 4.1m thick. Approximately, 4.5km along strike this coal seam thickens to over 6m. The coals that have been sampled are similar to typical Indonesian (Kalimantan-style) coals but with very low in-situ ash (sub 8% ash), low sulphur at 0.5%, low rank thermal coals with a CV (energy content) from drilling averaging around 4,700 kcal/kg GAR. The exploration target along strike from Depot Creek was estimated by an independent resource geologist to be around 210Mt (Mayur believes estimates are potentially much more than this now that more coal has recently been discovered on company licences around the Kikori region). However, proven JORC standard resource estimates are awaited.

Papua New Guinea's third largest river, the Purari, flows to the south of the Depot Creek Resource and provides a solution for barging the product downstream and onward via sea transport for use domestically in Mayur Power projects (refer next section) or potentially for export to overseas customers.

In addition to Depot Creek, Mayur has undertaken a number of coal exploration programmes across the wider portfolio. This has included reconnaissance trips and mapping exercises in 2017/2018. Along this zone, coal sub crops and outcrops have been located and mapped within the unit known as the Shu Coal Measures, with coal seam widths up to 6m. Hence there remains significant future potential for further JORC resources.

Figure X Face of coal outcrop in the Deport Creek Tenement area.

The company has recently secured an environmental permit for coal bulk sampling and extraction from EL1875 including the Depot Creek project – this first of its kind in PNG. Subject to tenement approvals from the Mineral Resources Authority being granted, the Permit enables the provision of bulk samples of coal for market and end user testing. The objectives of which would be to secure bankable and legally binding off-take contracts with various Asian markets that have been seeking to secure coal for power generation from PNG as an alternative supply jurisdiction with the benefit of the coal being low in environmental contaminants.

MRA has expressed concerns over significant quantities of coal extraction by way of bulk sampling under exploration licences, rather than through the proper process of a mining lease, and continues its discussions with Mayur over these concerns. The bulk sampling test works will also help to confirm suitability of the coal for use in domestic power generation as further explained in the following sections.

VALUE PROPOSITION:

Mayur's Vertically Integrated Power Generation

Following the delineation of PNG's first domestic coal resources at Depot Creek, and the fact that PNG continues to suffer from acute power supply issues, the Company decided to pursue a strategy of vertically integrated power generation to improve the reliability and cost of domestic power supply. Mayur's approach has been to initially develop smaller-scale power projects, backed by its own domestic coal supply, in sizes and locations that have an immediate fit in the PNG market.

The Company's first proposed power generation project is proposed to be developed in Lae - PNG's industrial capital and second largest city. Lae currently suffers from chronic power supply issues and has significant reliance on burning diesel and HFO for its power needs. The Lae project aims to provide a new supply of baseload power and help the PNG government achieve its electrification targets of 70% by 2030 (currently just 13%).

The Lae project comprises a proposed 52.5MW (net) power generation facility being developed as an 'Enviro Energy Park' (EEP) for which a Definitive Feasibility Study has been completed together with indicative Engineering, Procurement and Construction (EPC) bids. Power Purchase Agreement (PPA) proposal is currently under assessment by PNG Power, having already been reviewed by independent consultants. Moreover, for context, at 50MW the Lae power project is also very small by world standards and would only require around 300,000 tonnes of coal per annum.

Despite these proposals as another energy option for PNG and specifically in Lae, the government is tending towards more traditional hydro and gas sourced energy to meet its needs. Therefore, the debate referenced above in relation to energy policy and potential energy sources, is certainly required to be concluded to provide direction and certainty to those involved.

The international seaborne market is dominated by the likes of Australia (exporting over 200 million tonnes per year) and Indonesia (exporting over 350 million tonnes per year). The Lae EEP is designed to employ proven, state-of-the-art, low emission Circulating Fluidized Bed Combustion (CFBC) technology for power generation. This will enable the use of multi-fuel sources in the form of renewables (biomass) and conventional high quality, low ash, low sulphur coal to be sourced domestically via the development of the Company's captive coal resources (proposed to be transported by ship from Gulf Province to Lae), or alternatively from international seaborne markets as back up supply.

These matters still require to be outlined in terms of mine planning and relevant logistic chains, settling landowner and other interests within the proposals for development yet to be submitted to MRA as part of a mining lease application.

The Company plans to further assess the opportunity to integrate other renewable energy sources (including solar) into the engineering design of the Lae EEP. This is aligned with the terms of reference it has entered into with the Lae University of Technology (UNITECH) to establish a sustainable energy research institute.

As a result of Lae's growing industrial sector, the Lae EEP also plans to provide co-generation capability via the production of electricity and steam for industrial use. This co-generation facility should not only provide far more affordable and reliable base load power and steam supply for Lae and its surrounding industries, but also a superior environmental outcome via reduced sulphur dioxide and nitrogen dioxide emissions. The use of biomass, solar and co- generation (steam) has been designed to offset the greenhouse gas footprint compared to the current situation in Lae that is reliant upon the use of diesel / liquid fuel.

Whilst other developing Asian nations continue to significantly increase coal consumption, PNG and Mayur are looking to use a very small amount of its own superior quality coal to help create a sustainable power sector. This may help PNG lift its people out of poverty, improve health, quality of life, create jobs, economic growth, achieve net improvements to CO2 and ambient air quality, set new best in class environmental emissions standards (that are potentially better than its first world neighbour Australia) and provide a transitional pathway to renewables that is seen as reliable and realistic by the international community and its own people.

SUMMARY

Since alternative forms of energy cannot yet replace a power source as cheap and plentiful as coal, clean coal technology promises to mitigate the increasingly severe climactic effects of coal emissions. Utility companies and businesses do not, however, always accept technology purely for the sake of the environment; the technology must first make economic sense.

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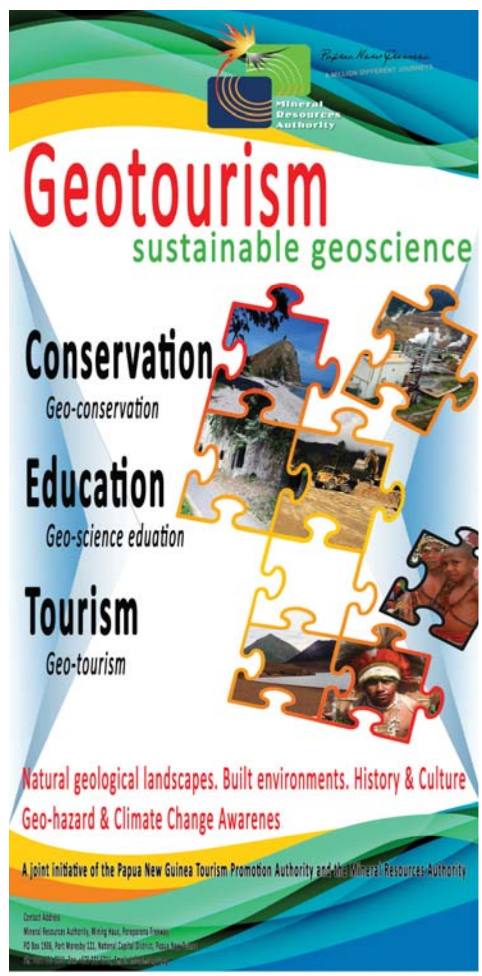


OK TEDI COPPER GOLD MINE		
LOCATION	Mount Fubilan	Western Province
OWNERSHIP	PNG Sustainable Development Program	PNG Government
	100%	
Operator	OK Tedi Mining Limited (OTML)	
STATUS	EL 581 (254km2)	SML 2 (2079 ha)
YEAR GRANTED	1985	28.05.81
EXPIRY DATE	03.11.03	03.11.09 (under renewal)

Ok Tedi Mining Limited (OTML) is a State-owned company that operates an open-pit copper, gold and silver mine located in the Star Mountains of Western Province, Papua New Guinea (PNG). The company holds a large portfolio of exploration leases in the vicinity of its Mt Fubilan mining operations and is actively undertaking near mine exploration.

In September 2013, The State of Papua New Guinea (the State) increased its direct ownership in the company to 87.8%.

The Ok Tedi mine is an open-cut operation in which about 78,000 tonnes of ore and 80,000 tonnes of overburden (waste rock) are mined each day from a pit covering about 2.6 square kilometers.

OPERATIONS

Ok Tedi has reopened in March after suspending operations in August 2015.

The re-opening came after statutory safety approval from the Mineral Resources Authority was granted, following the closure of the mine due to

Loading ore oncentrate at Ok Tedi

drought conditions, which impacted hydro power and transport of supplies and copper concentrate on the Fly River.

Ok Tedi has also made a further 15% reduction in direct jobs by outsourcing some work.

PRODUCTION

Since Ok Tedi mine returned to production at the end of March, the operation is serving as a valuable source of liquidity to the local foreign currency market.

Before the crippling drought in Papua New Guinea forced a seven month closure of the copper gold silver mine in Western Province, it contributed about K121 million ($US40 million) in foreign exchange every month.

Since returning to operation, both the mill and mine have performed reliably and this has allowed the completion of a number of export shipments.

COMMUNITY AFFAIRS

More than K40 million has been paid out to the Community Mining Continuation Agreement (CMCA) communities under the extension agreements, according to OTML.

The CMCA regions include North Ok Tedi, Highway (Tutuwe), Lower Ok Tedi, Middle Fly, Suki Fly Gogo, Manawete, Kiwaba and Dudi. They have set up trusts to control the use of the funds allocated for development, investments, and women and children.

According to the company by the end of this year, over K80 million will have been paid out to the CMCA communities and mine villages under the various compensation and benefit sharing agreements between the communities, landowners and the company.. This includes K15 million paid out in April 2016 under the Ok Tedi Restated Eight Supplementary Agreement General Compensation to the communities." Ok Tedi Mining Limited community relations manager Kuam Sanewai said apart from funds going into the trusts, a large portion was paid in cash to more than 18,000 family accounts covering 127,000 people. Sanewai said the cash payments were made last week and families were now enjoying their funds.

A severe El Nino weather pattern, or "big dry", occurred in the second half of 2015. From August 2015 the resultant lack of rain in the Fly River catchment area halted the movement of the barges that resupply the operation with fuel and mine consumables. In normal weather the barges also move the concentrates to a silo vessel in the Gulf of Papua from where they are shipped to international markets. All production was suspended for seven months, eventually resuming in early March of 2016. The first export vessel for 2016 loaded and sailed out of Port Moresby, PNG on the 25th of March.

LIHIR GOLD			
LOCATION	Lihir Gold Mine	New Ireland Province	
OWNERSHIP	Newcrest Mining Limited	Mineral Resources Lihir	Institutions & Public
	16.3 %	6.8%	76.9%
OPERATOR	Newcrest Mining		
STATUS	EL 458 (254 KM²	SML 6 (1739 ha)	
YEAR GRANTED	1983	17.03.95	
EXPIRY DATE	31.03.04	17.03.35	

The Lihir Gold Mine is one of the world's largest. By capitalization, it is the third largest gold producer.

It presently has an employee population of 2,180. Ninety percent are PNG Nationals. Local Lihirian comprise 33 percent of that figure. Female workers make up 13 percent of the total workforce.

The Lihir deposit was discovered in 1982 by a joint venture; Kenecott Exploration and Niugini Mining. It has an expected mine life of 40 years with exploration for new deposits still ongoing.

Lihir is an epithermal low-sulphidation ore body in an extinct volcanic crater. The Lihir mine has three open pit mines; Minifie, Kapit and Lientez. Minifie was the first pit to be mined in 1997 when production at the mine started.

Lihir is estimated to have a total mineral resource of 150 million ounces of gold. This includes the estimated ore reserves. Lihir has produced over 10 million ounces of gold since production began in 1997.

OPERATIONS

Lihir presently has an employed population of 2,200. External contractors and casual employees bring the workforce to a total of 4,500 personnel.

In 2017, the company's benefits to the PNG government and other parties included K156 million in taxes, K86 million in royalties of which landowners received K15 million, K23million for tax credit scheme (infrastructure) and an additional K43 million paid for Lihir roads, schools etc.,.

PRODUCTION

Mining is currently undertaken in the Minifie and Lienetz open pits whilst feasibility studies in the Kapit area are being carried out. Newcrest's June report stated that their gold production in the June quarter was 10% higher primarily as a result of higher grade, increased autoclave throughput and improved recoveries. Higher grade was due to mine grade performance delivering higher grades than block models anticipated and slightly higher grade from stockpiles. Improved autoclave throughput resulted in less material being sent via flotation which positively impacted recoveries.

AS at June this year, the mine has reported producing 955koz of gold. In its annual report, Lihir stated that this year's annual production exceeded its tar-

get sustainable milling rate of 14mtpa. This is its third consecutive year of record gold production.

In its 2018 YTD report, Newcrest reported changes in the mineral resources and ore reserves at Lihir have been depleted by 0.5 million ounces of gold.

ENVIRONMENT

Lihir Gold Limited is focused on maintaining a safe and healthy workplace for its employees. In 2017, Newcrest joined the International Council on Mining and Metals (ICMM), an international organisation dedicated to safe, fair and sustainable mining and metals industry.

Newcrest's mining operations are subject to operating risks and hazards in the environment, infrastructure or community and/or security issues.

In addition, the success of Newcrest at some of its operations, including the Lihir operation, depends, in part, upon the implementation of Newcrest's engineering solutions to particular hydrological and geothermal conditions. At Lihir, for example, significant removal of both groundwater and sea water inflow and geothermal control is required before and during mining.

Mining and ore refining processes at Newcrest sites also generate waste by-products such as tailings to be managed. Lihir manages this through deep sea tailing placement and permitted barge dumping locations. Appropriate management of waste is a key consideration.

COMMUNITY AFFAIRS

Newcrest's reputation or social license to operate is dependent upon responsible, lawful and ethical business conduct. Particular challenges in community relations include increasing expectations regarding the level of benefits that communities receive and the level of transparency regarding the payment of compensation and the provision of other benefits to affected landholders and the wider community. The community agreements in place with customary landowners in relation to Lihir's operation in Papua New Guinea are the subject of a regular review process. The duration of the review process is a result of the important and complex issues covered by the agreements and the competing interests of different landowner groups.

PORGERA GOLD MINE		
LOCATION	Porgera Valley	Enga Province
OWNERSHIP	Barrick Niugini Limited	Mineral Resources Enga
	95 % *Barrick Gold Corporation (47.5 %)* *Zijin Mining Group (47.5%)*	*5%* *Enga Provincial government (2.5%)* *Porgera landowners (2.5%)*
OPERATOR	Barrick	
STATUS	EL 454 (196 km^2	SML 4 (2227 ha)
YEAR APPLIED / GRANTED	04.01.1988	17.08.1989
EXPIRY DATE	16.08.2019	

The Porgera mine is located in the Enga Province at an altitude of 2,000-2,700 meters above sea level. Located in a geographically challenging place, the company has managed to meet its daily operational challenges to be placed in a position where it has been a major contributor to Papua New Guinea's economy apart from the Ok Tedi and Lihir mines.

Both an open pit and underground mining methods are employed. The mine has an employment population of 2,755. From this figure, about 93 percent are nationals, majority coming from the Porgera area where the mine is situated.

Porgera has a preferential system of employment, giving priority to the locals from the area.

Since its first gold pour on August 5,1990, it contributed about 12 percent to the country's gross domestic product (GDP).

OWNERSHIP

Since its first ownership by Placer Dome and r Isa Mines, the mine has had a number of owners and joint venture arrangements from Placer of Highlands Gold to Aurion Gold to Emperor Gold and Barrick.

I August last year (2015) , Barrick Gold Corporation announced the formation of a strategic joint venture with Zijin Mining Group Co. Ltd,, including the sale of a 50 percent interest in Barrick (Niugini) Limited (BNL), for a total cash consideration of US$298 million.

BNL is the 95 percent owner and manager of the Porgera Joint Venture gold mine in Papua New Guinea. The remaining five percent participating interest is held by Mineral Resources Enga Limited and is divided between the Enga Provincial Government (2.5%) and local landowners (2.5%).

As a first step, Zijin will acquire 50 percent of Barrick which owns 95 percent of Porgera Joint Venture gold mine in Papua New Guinea. Under the new structure, Barrick and Zijin will jointly control BNL.

PRODUCTION

Barrick's gold production in 2015 was 436,000 ounces. Barrick's share of proven and probable mineral reserves as of December 31, 2015, was 1.97 million ounces of gold3 (14.5 million tonnes, grading 4.24 grams per tonne).

Barrick in March expected its 47.5 per cent share of Porgera production to yield 230,000-255,000 ounces of gold this year, putting total yield below the roughly 900,000 ounces the mine produced during peak years when it was regarded as one of the world's foremost deposits.

ENVIRONMENT

Mining has resumed and power has been restored at the Porgera gold mine in Papua New Guinea's remote highlands run by Barrick Gold Co, four months after an earthquake disrupted production, the mine's operator said.

"The mine has resumed full operations and power has been restored," Barrick (Niugini) Ltd, which operates the mine on behalf of co-owners Barrick and China's Zijin Mining Group Co Ltd, said in a statement.

Mains power was restored at Porgera on June 1 and mine production resumed on Monday, the statement said, adding this was "five months ahead of the original estimated repair schedule."

A deadly earthquake struck Papua New Guinea's remote highlands on Feb. 26, killing 100 people and knocking out the power plant that supplied the Porgera mine, which is some 600 km (370 miles) northwest of the country's capital, Port Moresby.

COMMUNITY AFFAIRS

Operating in a socially responsible manner is critical to maintaining PJV's license to operate in PNG. The Special Mining Lease agreement which is the basis for any mining in Porgera is still valid until next year. The Special Mining Lease was granted on 12 May 1989 and is up for renewal on the 12 May next year.

However, the National Court on November 15th, issued a restraining order stopping the PNG Government from issuing a renewal to PJV's SML renewal application until April 2109 until it consults with landowners as required under the law.

The Justice Foundation for Porgera Limited lodged the challenge two years ago.

Interestingly, after 30 years of operations, Porgera Mine operator, Barrick Niugini agreed to be a party to the project's memorandum of agreement in October this year.

The party agreed to calls by landowners and the state to be a party; having been an observer since 2006 when it took over from Placer Dome.

The agreement means that the company is now obliged to honour its commitments listed in the MOA.

Despite not being a party these past years, the company has delivered benefits like training and business spin-offs under the mining development contract.

HIDDEN VALLEY GOLD MINE		
LOCATION	Hidden Valley	Morobe Province
OWNERSHIP	Harmony Gold	Morobe Consolidated Goldfields
	50%	50%
OPERATOR	Morobe Mining Joint Venture	
STATUS	ML 151	
YEAR GRANTED	04.03.2005	
EXPIRY DATE	03.03.2025	

The Morobe Mining Joint Venture (MMJV) project is a jointly funded and operated project by Australia's Newcrest and South Africa's Harmony Gold mining companies.

Since it official commissioning and opening in September 2010, the mine has claimed its position as one of Papua New Guinea's major gold produces like Lihir and Porgera.

The project operates two open pit mines in Morobe Province; Hidden Valley and Hamata. Hidden Valley is located in a place long associated with gold mining in the country since the 1930s.

Both Hidden Valley and Hamata are estimated to contain about 5.6 million ounces of gold, 102 million ounces of silver and over 9 million tonnes of copper.

MMJV has a workforce of 2000, including contractors, mainly accommodated in a mining camp in

Hidden Valley. More than 90% of the workforce is Papua New Guinean, with over 50 per cent drawn from the local community.

Of this, 14 per cent of the employee population is female. The company also places a strong focus on training and development of local employees.

The Hidden Valley mine supports a program to encourage local landowner business opportunities and a range of community development projects in infrastructure, water supply, health and education designed to deliver sustainable benefits to local communities

OPERATIONS

With an expected lifespan of 14 years, the Hidden Valley project is expected to produce more than 200 - 250,000 ounces of gold and 2.5 - 3 million ounces of silver.

Ore is transported by truck to the Hamata and Hidden Valley crusher stations. Crushed ore is transported by an overland conventional conveyor over a distance of 4.5 kilometers to the primary stockpile and processing plant. Two jaw crushers are used in series to prepare the ore for transport and feed to the SAG mill. The overland conveyor is a vital link between the mine and processing plant enabling the transportation of ore from Hidden Valley to be fed straight to the SAG mill.

The processing plant utilises conventional gravity and Carbon In Leach circuits for gold and a Merrill Crowe circuit for silver.

Tailings from the processing plant are treated and stored in a purpose built Tailings Storage Facility (TSF). Hidden Valley is the first major mine in Papua New Guinea to build a TSF. All mine tailings, the residues of the gold recovery process, are permanently stored in this facility.

PRODUCTION

In October the Mine in Wau-Bulolo District announced a recorded increase in gold production for the 2018 fiscal year.

In the four quarters of 2018, the company saw a steady increase in gold production output.

The company reported an annual tonnes mined record of 28 million, which was 6 million tonnes higher than the previous record.

The overland conveyor delivered 324,403 tonnes during June 2018 which meant a sharp increase of gold production as well.

Hidden Valley Mine on average converts US$187 million of foreign exchange per year into kina to the benefit of the national economy with on schedule commercial levels of production achieved in the June 2018 with fatality free or no lost time injuries in Fiscal Year 2018.

COMMUNITY AFFAIRS

Harmony Gold has also paid K421 Million in royalties and taxes and has been active in PNG for over 15 years, during which time they have developed one mine (Hidden Valley).

Direct benefit streams (average annualised):

- Total employee salaries (excluding tax) K73 million;
- Salary and wage tax K35 million;
- Royalties and production levy K24 million;
- Total Procurement (excluding PNG Power) K404 million; and
- Power purchased from PNG Power (PNG) K55 million

Total annual average contribution of K591 million.

SIMBERI GOLD PROJECT		
LOCATION	Simberi Island	New Ireland Province
OWNERSHIP	St. Barbara	100%
STATUS	EL 609 (228KM²	Ml 136 (26KM²)
YEAR GRANTED	1985	03.12.1996
EXPIRY DATE	05.06.2005	13.12.2008
PRODUCTION START	13.02.2008	

Simberi is the northern most island in the Tabar Group of islands in the New Ireland Province, about 900km away from Port Moresby, the nation's capital.

The island, 10km long and 8km wide is home to 1500 people. The Tabar Group of islands is located along the 'Pacific Rim of Fire'.

Seven gold deposits have been defined in mining lease 136 (ML 136), which covers the central and eastern portion of Simberi Island, and other prospects have been identified.

OWNERSHIP

The Mine is currently owned and operated by St. Barbara, an Australian company. St Barbara was established in 1969, and is one of Australia's larger and more profitable gold produces, developers and explorers listed on the Australian Stock Exchange (ASX).

The previous owner, Allied Gold took over ownership in 2004 from Nord Resources. In 1982, Kennecott, Nord Resources and Niugini Mining formed a joint venture, Tabar JV to explore for gold on Simberi. In 1993 Nord acquired all the interests and undertook exploration and in 1996 commissioned a feasibility study which led to the grant of a Mining Lease (ML 126) in December 1996. As gold prices fell in 1997 the project was put on hold.

Allied Gold became involved in 2004 and reinstituted a feasibility study and by 2006 mine and mill construction commenced.

RESOURCES

In 2009, Allied Gold the former owner/operator of the mine reported that the total resources are 4.7 million ounces (Moz) gold, being oxide gold resources of 1.4 Moz and sulphide gold resources of 3.3 Moz together with 10.2 Moz silver.

OPERATIONS

In November 2007 mining operations began at the Samat East deposit and the first ore was processed in February 2008. On September 7, 2012, St Barbara gained control of the Allied Gold Mining PLC group and the Pacific Operations of Simberi in Papua New Guinea, and Gold Ridge in the Solomon Islands.

Ore is delivered to the processing facilities on the eastern coast near Pigiput Bay by a 2,665 m long aerial conveyor that can deliver 600 tonnes of ore per hour. The process plant is a conventional carbon-in-leach (CIL) gold process plant capable of treating 2.2 million tonnes of ore per year.

The project is a conventional open pit operation with a new SAG mill, existing ball mill and standard carbon-in-leach circuit. Following optimization, gold production is expected to be 100,000 ounces per year.

Current mining occurs on the eastern half of the island covered by a 2,560 hectare Mining Lease (ML136). Ore at Simberi is sourced from a number of open pits. The Sorowar Pit is currently the largest defined oxide pit.

Current mining plans of the oxide cap suggest a strip ratio of 1:1. Ore from the pits is delivered to the ROM pad (Sorowar feeder) where it is crushed and conveyed down an innovative and energy-efficient 2.7 km rope conveyor that transports the ore to a stockpile in front of the process plant.

Mine tailings are disposed of in the form of a slurry that has been pre-diluted with seawater using a deep sea tailings pipeline.

The pipeline is 528 m long with the discharge point at a depth of 130 m. The tailings flow down a steep submarine slope and are deposited at a depth of more than 3 kilometers.

PRODUCTION

Simberi had an outstanding performance in 2018 and an improved understanding of the orebody has led to a further one-year extension of mine life to 2021 after a record production year.

The mine produced 135 koz of gold in FY 18 with the remaining oxide project life extended to FY 21.

A number exploration programs are presently underway at Simberi and on the neighbouring islands of Tatau and Big Tabar. Drilling results to date have been very encouraging and we expect the drill program to be complete in the March 2019 quarter.

COMMUNITY AFFAIRS

At Simberi Operations in Papua New Guinea in the Pacific, significant contributions have been made to the local people of Simberi Island, New Ireland province and, more broadly to PNG. I

n addition to employing over 500 local people, and creating business opportunities for local businesses and suppliers, St Barbara has paid more than K8 million in royalties since the start of production in 2012. This has allowed for the funding of medical facilities, improved education, transport, communication, infrastructure and community services.

Royalties paid in Papua New Guinea are 2.25% of gold revenues earned from the Simberi mine. The increase in royalty expenses in 2016 was attributable to increased gold revenue from Leonora and Simberi.

RAMU NICKEL MINE			
LOCATION	Krumbukari	Madang Province	
OWNERSHIP	MCC Ramu Nico Ltd Ramu Nickel Limited Mineral Resources Ramu Mineral Resources Madang Ltd		85% 8.56% 3.94% 2.5%
OPERATOR	Ramu NiCo Management Limited		
STATUS	SML 8 (54.4km^2)		
YEAR APPLIED/ GRANTED	24.06.1999	26.07.2000	
EXPIRY DATE	26.07.40	Area	5440 Hectares

The US$2.1bn Ramu nickel project near Madang, on the north coast of PNG, is one of the largest and most ambitious mining and processing projects to have been successfully brought into production in PNG during the past decade.

It is also China's largest outside investment project.

Construction was completed by 2012 and the plant has since been progressively brought into production.

The Kurumbukari nickel and cobalt laterite mine is connected by a 135km pipeline from the Kurumbukari plateau, to the Basamuk process plant which is 75km east of the provincial capital of Madang, along the Rai Coast of the Vitiaz Basin.

The Ramu mine and Basamuk process plant is a joint venture between Highlands (8.56%), the PNG Government and Landowners (6.44%) and MCC Ramu Nico Ltd (85%). MCC holds a 61% interest in MCC Ramu Nico Ltd, with the remaining 39% held by a number of other Chinese entities .

OPERATIONS

Mining and Beneficiation Plant

The Kurumbukari nickel deposit is a low strip ratio, free digging open pit mine. Face shovels and backhoe configured excavators mine the average 12 meter thick ore-body and load into trucks for delivery to the beneficiation plant. The plant removes the chromite and creates a correctly sized and consistent slurry feed for overland pipeline transport to the Basamuk process plant.

Slurry Pipeline

A 135km slurry pipeline runs from the Kurumbukari mine/beneficiation plant to the Basamuk refinery, with a drop in elevation of about 680m.

The majority of the pipeline has been buried and has road access for ease of checking and maintenance.

Basamuk Process Plant

The Basamuk process plant incorporates three High Pressure Acid Leach (HPAL) trains (autoclaves) and is designed to produce 78,000 tonnes (dry) of mixed hydroxide product containing 31,150 tonnes of nickel and 3,300 tonnes of cobalt per annum.

The plant has a two train acid making facility as well as a limestone processing plant for making the key reagents used in the making of the mixed hydroxide product.

Exports and Sales

Since production started in 2012 mixed nickel cobalt hydroxide intermediate product has been exported to China where contracts are in place to receive the product.

Up until the end of 2014 a total of 36,440 t of nickel and 3,521 t of cobalt in an intermediate form has been sold.

Environment and Deep Sea Tailings

Based on advice from international experts received during the study and permitting stages it was decided to dispose of the tailings from the operation into the 1500 meter deep sea canyons as this represented the most appropriate and safe method of disposal.

Reasons for this decision include the fact that the area has among the highest rainfalls in the region and land based tailing storage could be disturbed in a highly active volcanic and high-rainfall region while impinging on agriculture and landholder customary land.

PRODUCTION

RAMU NiCo Management Limited, the developer of the country's first nickel, cobalt mining project last Thursday, announced expansion plans investing over US$1.5 (K4.8) billion into the project.

The Madang project expansion is expected to provide an additional one thousand plus job opportunities for locals when construction and production starts.

The announcement was made at the Ramu Project Update meeting organized by the Mineral Resources Authority (MRA), which was attended by project stakeholders, government department representatives, and landowners from four impacted areas.

Feasibility studies of the expansion project had already been completed which is covering new areas in the Kurumbukari plateau in Usino-Bundi district in Madang.

The product matrix in the expansion still remains the same as nickel/cobalt hydroxide (MHP). Furthermore, the expansion is expected to increase production and reduce operation costs.

The updated Mineral Resource estimate, as at 15 June 2018, is a total of 136 million tonnes at an average grade of 0.9% nickel and 0.1% cobalt.

This compares with the previous estimate, as at December 2016, of 124 million tonnes at 1.0% nickel and 0.1% cobalt, which has been depleted by mining and increased by drilling in the intervening period.

The updated Ore Reserve estimate, as at 15 June 2018, is a total of 56 million tonnes at an average grade of 0.9% nickel and 0.1% cobalt.

This compares with the previous estimate, as at 31 December 2016, of 49 million tonnes at 1.0% Ni and 0.1% Co, which has been depleted by mining and increased by drilling in the intervening period.

COMMUNITY AFFAIRS

In July this year, Ramu Nico paid a total of K25 million in royalties to the national and provincial government and landowners.

This was after issues around calculations was sorted out . The monies were for the period from 2013 – 2016 and half of 2017.

Of this amount, K17.6 million went to landowner groups, K7.9 to the government.

Advanced Exploration

Name	Orokolo Bay Project
Location	Kerema, Gulf Province
Ownership	100 % Mayur Resources Ltd
Operator	Mayur Resources Ltd
Exploration Licenses	EL 2150; EL 2304; EL2305 Others in Country: EL 2095, EL2266, EL2267, EL2268, EL2269, EL2297, EL2303, EL2304, EL2305
Total Area	1,139.5 sqkm (EL 2150; EL 2304; EL2305)

INTRODUCTION

Mayur has been operating since 2011 with the purpose of acquiring, exploring and developing mineral and energy development opportunities in Papua New Guinea (PNG). Mayur listed on the Australian Stock Exchange (ASX: MRL) in late 2017 and the current portfolio of projects comprises the following:.

Table 1: Overview of Mayur's business in PNG.

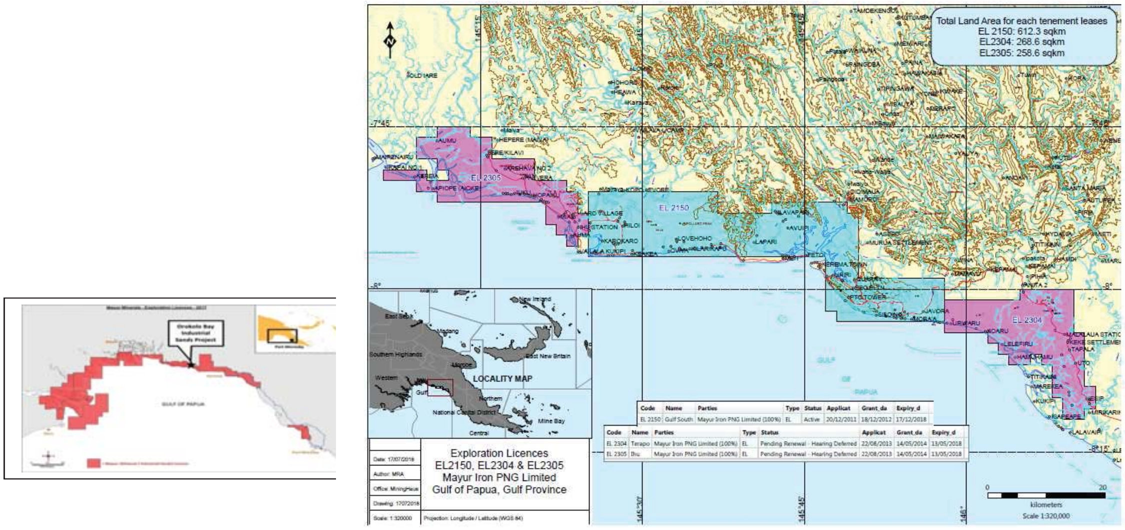
Mineral / commodity group	Summary Overview
Industrial mineral sands	Orokolo Bay Industrial Sands Project (*construction sands, vanadium titanomagnetite, heavy mineral sands*) and pipeline of other exploration projects
Lime + Cement	Port Moresby Lime project (development of Mayur's captive limestone resource for downstream Clinker/Cement + Quicklime plant)
Coal + Power Generation	Depot Creek coal project (thermal coal resource development) with opportunity for captive downstream integration with the Lae Power Project (50MW)
Copper + Gold	Drilling and further resource definition

Mayur's raw material inventory of limestone, industrial minerals and coal are located at surface in the coastal and lowland regions of Gulf, Western and Central Provinces. Furthermore these mineral resources provide a unique opportunity to develop associated downstream vertically integrated industry. These include the manufacture of clinker / cement and quick lime, and potentially iron and steel – all of which are currently imported. Mayur's power generation project in Lae aims to provide a new low-cost source of electricity, vital to enable PNG to unlock its manufacturing potential, improve access to electricity for its population and provide a reliable energy back bone for economic growth.

LOCATION

The Orokolo iron sands project is approximately 275 kilometer in a straight line, northwest of Port Moresby city, and approximately 50 km west of Kerema town, headquarters of Gulf Province. It's at the same area that the company has tenements for coal prospecting.

Figure 1: Location of Orokolo Bay – Mayur's mineral sands tenements in the Gulf of Papua.



MINERAL RESOURCE

The Orokolo Bay Industrial Sands project area consists of iron-rich, unconsolidated beach sands which are located between 1km and 5km inland from the current shoreline in the Gulf Province of southern Papua New Guinea. Geologically, the project comprises a complex series of strand lines of Holocene age, which outcrop in part, or otherwise occur under a thin, sandy and organic rich soil profile.

Over recent years the Company has conducted various exploration Programmes in relation to the Orokolo Bay project which have included geophysics (aeromagnetic and ground magnetic surveys), surface/grab sampling, drilling Programmes, and bulk pit sampling, together with all associated assaying and metallurgical test works.

The Orokolo Bay project hosts a JORC Resource of 173 million tonnes at 9.2% iron, 86 million tonnes of construction sand and 107,000 tonnes of zircon. Based on the results of test pitting, auger and auger sludge drilling, and which, when integrated into the airborne and ground magnetic surveys, suggests the site can be broken into two broad zones of mineralisation (western and eastern separated by the Vailala River), with the currently delineated resource summarized below;

Table 2: Orokolo Bay Total Resource Summary

Western	Mt = Million Tonnes, ppm = Parts Per Million, t = tonnes						Fe cut off 5.25%	
Category	Mt	Fe%	Ti%	Zircon ppm	Fe Mt	Ti Mt	Zircon t	Density t/m³
Indicated	23.8	10.12	1.38	622	2.41	0.33	14,800	2.00
Inferred	115.4	9.08	1.19	538	10.47	1.37	62,000	1.96
Total	**139.2**	**9.26**	**1.22**	**552**	**12.89**	**1.70**	**76,800**	**1.97**
Eastern	Mt = Million Tonnes, ppm = Parts Per Million, t = tonnes						Fe cut off 7%	
Category	Mt	Fe%	Ti%	Zircon ppm	Fe Mt	Ti Mt	Zircon t	Density t/m³
Indicated	7.0	9.33	1.44	923	0.65	0.10	6,500	1.98
Inferred	26.5	9.00	1.39	921	2.39	0.37	24,400	1.97
Total	**33.5**	**9.07**	**1.40**	**921**	**3.04**	**0.47**	**30,900**	**1.97**

Table courtesy of Mayur Resources Ltd

In summary, the metallurgical test work demonstrated the below recoveries are achievable, accurate and repeatable:

- 57% to 61% Fe, 9% to 12% TiO_2 titano-magnetite product can be achieved using Davis Tube Recovery;
- Al_2O_3 and SiO_2 in the range of 1.5% to 3%, which is considered very low;
- Low phosphorus of 0.05%; and
- Low sulphur.

PROJECT DEVELOPMENT.

The metallurgical test work further concluded that a simple flow sheet combining spirals with magnetic separation would enable beneficiation without a grinding circuit.

As the ore does not require grinding, the process circuitry is also much simpler. A typical processing plant is comprised of wet drum magnets, spirals, slurry pumps and screens. As ore has minimal slimes (small size particles), thickeners are not needed and chemicals are not required in any of the processes and are therefore environmental risks are significantly reduced compared to other mining methods.

Once extracted the magnetite concentrate can be simply stockpiled to allow excess water to drain away, the product is then loaded onto transshipping barges by conveyor or truck/front end loader and transported to ocean going vessels waiting offshore for onward transport to customers.

The project would produce various products including Industrial sands, DMS, titano-magnetite, zircon/ heavy mineral concentrate.

Figure 2: Mineral Sand Mining Flow Chart

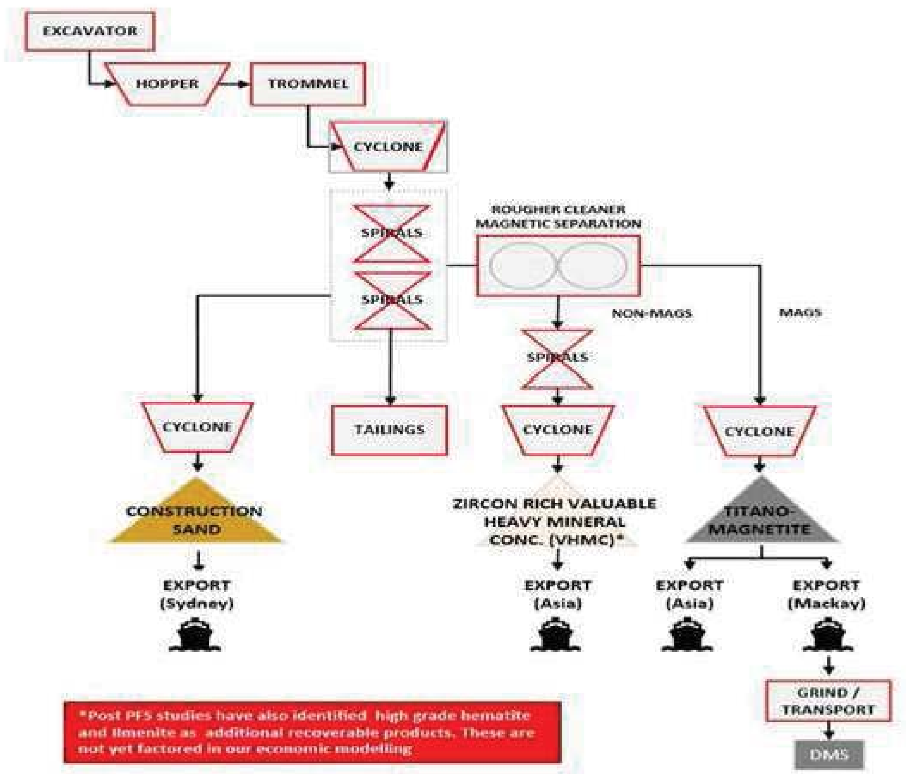


Illustration courtesy of Mayur Resources Ltd

Trial Production Plant

Following the listing on the ASX the Company is currently undertaking a definitive feasibility study (DFS). During 2018 the company has conducted extensive ground based geophysics and shallow auger drilling Programmes. As part of the DFS the company is implementing a small-scale trial production plant that will comprise a scaled down version of the full operation. The purpose of this initiative is to de-risk the project, provide proof of concept and also provide customers and end users of the product with bulk samples of product for acceptance testing. This would provide valuable mining and processing data for the design of the full-scale operation and represent the first mining operation in the Gulf region

"Following the completion of the infill drilling programme in the bulk sample pilot test area earlier in the year, we now look forward to re-validating the product specification, and the finalisation of the pilot plant equipment procurement.

"We are continuing to progress the design and implementation of the pilot trial production plant in close coordination with the Mineral Resources Authority (MRA) under the environmental permit that was issued for the bulk sampling programme at Orokolo Bay, as we progressively develop the Orokolo Bay resource as a new mineral province for PNG," Mulder said.

EXPLORATION

Exploration field works activities are ongoing across other targets in the rest of the mineral sands portfolio in the Gulf of Papua. This has included geophysics, geomorphological mapping and surface sampling (both terrestrial and off shore using grab samplers from vessels) at selected locations across the portfolio. Auger drilling Programmes have also been completed.

Mayur's exploration activities in the other tenements is also progressing, with one already having JORG compliance resources completed, the limestone project in Lealea and Kido, just outside (30 km from) Port Moresby. The others are;

- Limestone project in the Central Province
- Coal in the Gulf Province
- Mayur's energy integrated park (feature in coal article; this issue) planned in Lae, PNG's second largest city.
- Copper Gold project on Feni Island, New Ireland Province and;
- Copper Gold projects on Basilaki and Sideia Islands, Milne Bay Province

Limestone Project: Lealea & Kido, Central Province.

The limestone project, EL2303 in Lealea & Kido of Central Province, has completed its exploration programs that included mapping, diamond drilling and pitting is completed, and a maiden JORG resources of 382 million tonnes of high grade limestone is declared. The resource is in two prospects, the Lealea and the Kido.

Figure 3: 3D section of Kido & Lealea drill holes 2018

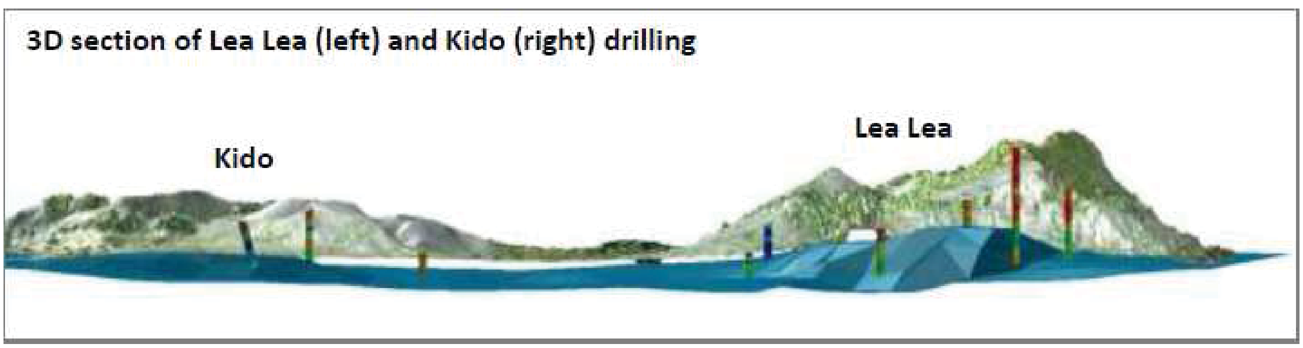


Image courtesy of Mayur Resources Ltd 2018.

Table 2: Limestone resources in Lealea & Kido

A. MEASURED MINERAL RESOURCE ESTIMATE						
Area	Category	CaO cut off %	Tonnes	CaO %	Al_2O_3 %	SiO_2 %
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
Total	**Measured**	**52%**	**205,000,000**	**53.5**	**0.61**	**1.73**
B. INDICATED MINERAL RESOURCE ESTIMATE						
Area	Category	CaO cut off %	Tonnes	CaO %	Al_2O_3 %	SiO_2 %
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
Total	**Indicated**	**50%**	**128,000,000**	**51.8**	**0.9**	**2.6**
C. INFERRED MINERAL RESOURCE ESTIMATE						
Area	Category	CaO cut off %	Tonnes	CaO %	Al_2O_3 %	SiO_2 %
Lea Lea	Inferred	48%	7,000,000	48.1	1.1	2.5
Kido	Inferred	48%	42,000,000	48.4	1	1.8
Total	**Inferred**	**48%**	**49,000,000**	**48.3**	**1**	**1.9**

Following the delineation of the aforementioned maiden JORC Resource in early 2018 and a subsequent capital raise on the ASX by the Company in April 2018, a definitive feasibility study has commenced on the commercialization of the lime resource to initially produce 250,000 tonnes of quicklime and 1,500,000 of clinker/cement. This will be PNGs first quicklime and cement / project and will help provide a key piece of industrial 'nation building' infrastructure adjacent to the US$19 Billion PNG LNG facility, just outside Port Moresby city.

The company has completed preliminary engineering design, including topographic, bathymetric surveys. In addition to this the company has secured an environmental permit for quarrying of limestone and processing into quicklime, clinker and cement. The permit conditions and associated environmental management documents shall guide the project development activities that include the extraction (i.e. conventional quarrying) of limestone, processing of this material and the manufacture of quicklime, clinker and cement, together with the associated transport, utilities and other infrastructure.

Copper Gold Project: **Feni Island, New Ireland Province; Basilaki & Sidea Islands, Milne bay Province**

The Company holds three copper gold Exploration Licenses and has collated and analysed a vast amount of historic exploration data in addition to undertaking various exploration and reconnaissance trips to verify and augment this geological database.

Feni Island, New Ireland Province

The Company's Feni Island project is strategically located along the Lihir volcanic arc that is home to the Simberi and Lihir operating gold mines to the northwest and the massive Bougainville copper deposit (historically mined by Rio Tinto) to the southeast.

The Company has delineated a shallow Inferred JORC Resource cap (650,000 Oz of gold) from collation and analysis of the large amount of historical drilling that has taken place on the island since the 1980s. This historic work has identified widespread gold and copper mineralisation, the main feeder system at depth however remains undiscovered.

Exploration potential is considerable and consists of relatively shallow lateral extensions of gold mineralisation north, north east and south of the newly defined resource. Significant widths of low grade copper (Cu) mineralisation, of nominal 0.1 to 2% Cu grade, are spatially associated with the main gold resources and appear open to the south. This copper mineralisation may be a peripheral part of a large porphyry copper mineral system either at depth or to the south of the current gold

MINERALISATION.

Mayur's strategy is to conduct infill drilling of the main targets and expand upon the historic works to develop a multi-million-ounce JORC compliant gold resource.

Basilaki and Sideia Islands, Milne Bay Province

The Basilaki and Sideia projects are two separate projects currently located within the same Exploration License (EL2095). Basilaki Island in Milne Bay Province hosts the Tunawada Cu-Au (gold) Project. Following on from historic exploration showed highly prospective Cu & Au anomalies the Company has conducted a large exploration program. This has included a diamond core drilling program of up to 8 holes

(totaling approximately 1,500m) to pursue both copper and gold targets that have been identified by a combination of surface mapping, sampling, induced polarization (IP) and previous magnetic surveys.

Sideia Island encompasses a 10km long zone of high-grade, narrow vein mineralized structures with three separate prospects along the zone which are high in copper, gold & silver. High-grade (>10% with up to 40%) copper samples have been collected at Yamaloi & Magipota prospects. With rock chips up to 40.3% Cu, 3.92 g/t Au, and 397 ppm Mo (molybdenum). A narrow vein copper mine was operated in the late 1800's with shafts and adits located by Mayur. A potential porphyry system at depth is indicated by anomalous Mo assays in multiple samples and presence of magnetite in some veins.

Figure 4: Drilling at Basilaki, EL2095, copper gold project

Picture courtesy of Mayur Resources Ltd 2018.

VALUE PROPOSITION

This is another project with its own value proposition from it iron & coal in Gulf Province and limestone in Central Province, and its ambition to build a coal fired power plant in Lae, with future considerations towards transition to renewable & more sustainable energy sources such as solar and biofuel.

According to Mayur's research PNG's cement consumption is very low at just 60kg per capita, placing PNG at the bottom of the global curve. The link between CGP and cement has been well documented and as PNG's economy grows, even to keep pace with other similar low to middle income South East Asian countries there would likely be a 5 to 10 fold increase in consumption per capita of Clinker/Cement in PNG. It has long been known, as mentioned previously, that growth in demand for cement is closely linked to a nation's economic growth, providing long term investment and employment stability. Various studies have found the cement industry has a significant 'multiplier effect' on economies on wages, employment and economic output

Direct access to key raw materials required for clinker / cement manufacture within its portfolio in PNG (including marl, silica sands (either at Kido or alternatively from its Orokolo Bay Industrial Sands Project in Gulf Province) and coal (Depot Creek Coal project in Gulf Province) that would provide huge cost savings in the total cost of quicklime and clinker/cement production

ADVANCED PROJECT-APPLICATION FOR SPECIAL MINING LICENSE

Name:	**Frieda River**
Location:	**Frieda River Area, East & West Sepik Provinces**
Operator:	**PanAust**
Ownership:	**Frieda River Ltd 80 %; Highlands Pacific Ltd 20 %:**
Status:	**Application for Special Mining Lease #9 (SML 9)**

PanAust, the managing company of Frieda River project calls it as a "Nation Building Project", a term synonymous to large projects who may have significant impacts on development and service delivery to communities and governments, i.e. Local Level Governments (LLG), Provincial Government and National Government. The Sepik people (East & West Sepik) are anxious to see positive developments in these two Provinces, thus a challenge to the project managers and owners.

PanAust delivered the final feasibility studies reports, including the Environment Impact Statement (EIS) in 2016, with an application for a Special Mining Lease (SML). These are been reviewed by respective state agencies of the Government. Meanwhile key stakeholders are preparing for relevant meetings i.e. Development Forum and MOA, and discussions around the State's interest in taking up equity. The government of PNG can take up to 30 % equity in any projects.

The two key government agencies facilitating the evaluation processes are Mineral Resources Authority (MRA) and Conservation Environment Protection Authority (CEPA). In PNG, the issuance of the Mining License (ML) or Special Mining Lease (SML) is dependent on the grant of the Environment Permit (EP)

LOCATION

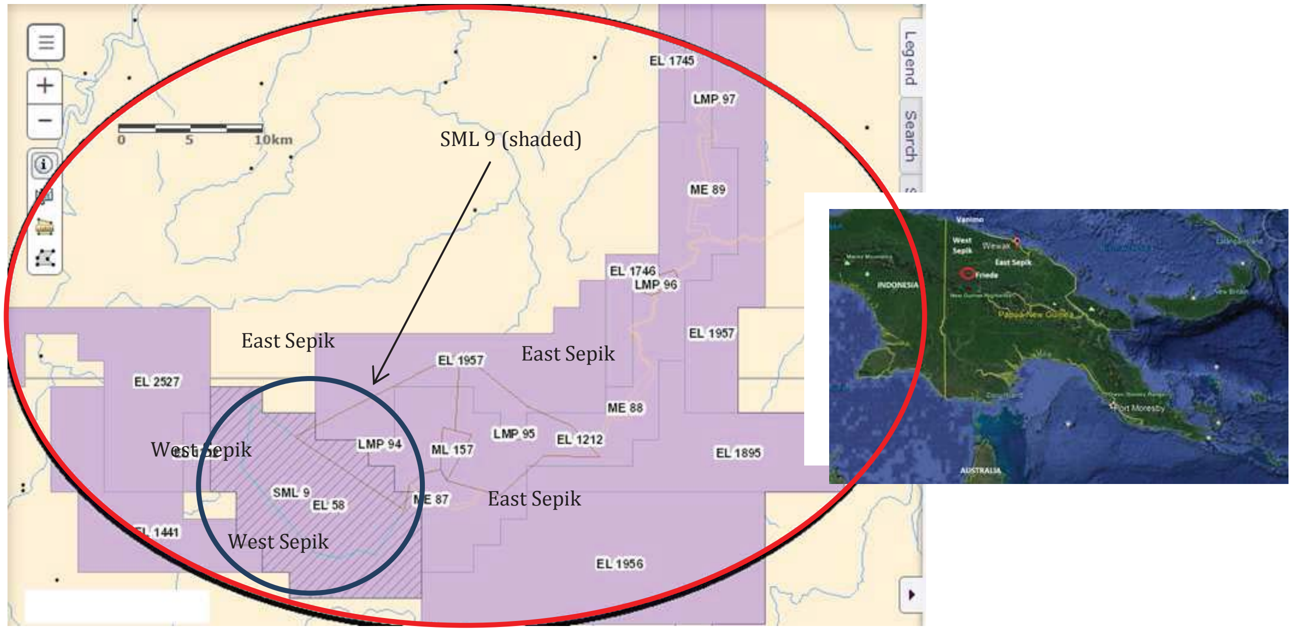
The project is 200 km from the mouth of the Sepik River, 244 km (straight line) from Wewak, the capital of East Sepik, and 230 km (straight line) from Vanimo, the capital of West Sepik. The project is easily serviceable by ships, barges and water transport from the 70 km of the Sepik River.

The SML area is located in Telefomin District of West Sepik, however almost all of the activities & infrastructures for extraction of the mineral resources and export will be concentrated in the Ambunti District of the East Sepik Province, which in itself entails challenges in managing expectations from communities and governments of the two Provinces.

GEOLOGY

The Frieda River prospect is located between the Frieda and Lagaip fault zones, two major structural features of the New Guinea Mobile Belt in the West Sepik District, Papua New Guinea. The deposits are part of the Frieda River Igneous Complex (FRIC) located in the southern part of the New Guinea Thrust Belt. They were formed during the Miocene age through extensive thrusting and faulting.

The prospect can be subdivided into three spatially and geologically different areas: Frieda Complex, Mianmin area, and Nena Diorite area. The Frieda Complex is the remnant volcanic edifice of an island stratovolcano interstratified in the mid-Miocene Wogamush Formation. Intrusive and volcanic units in the complex are texturally similar andesitic hornblende-plagioclase porphyries and are probably



comagmatic. Pyritic replacement copper-gold and porphyry copper deposits are associated with early and late phases, respectively, of extensive district-scale advanced argillic alteration along the central axis of the Frieda Complex.

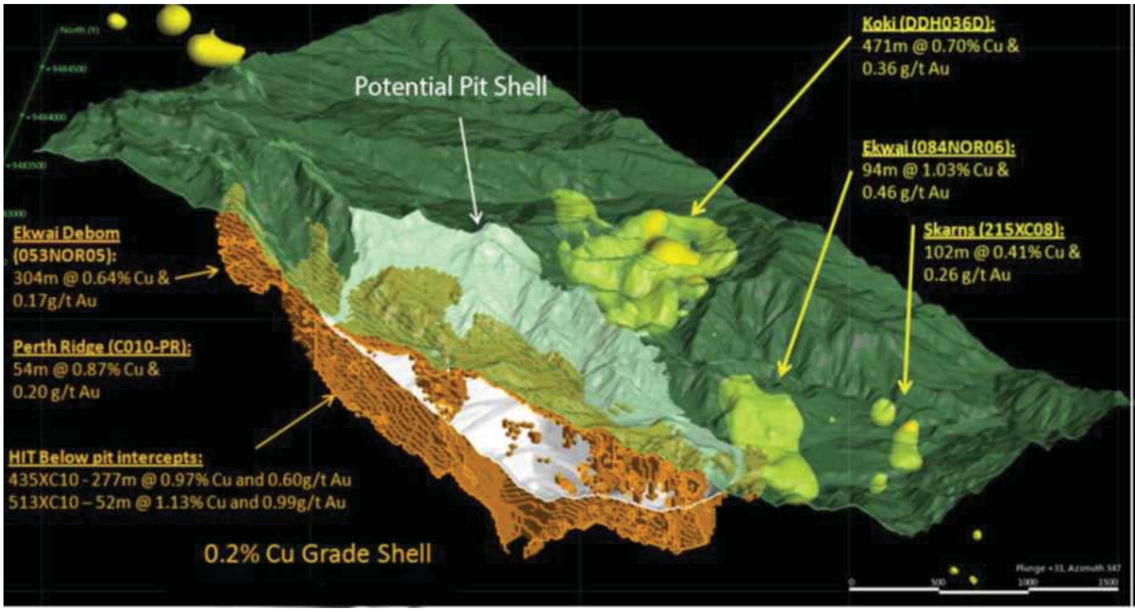
The Nena Diorite, a composite, holocrystalline, intermediate to mafic body, intrudes Upper Cretaceous- to Eocene-age basement rocks. It is located north of and separated from the Frieda Complex by, the Frieda Fault. Igneous activity in the Frieda River prospect extended over an interval of at least 4 million years. On the basis of field relations and K-Ar ages, this igneous activity is subdivided into early intrusion and at later alteration events. K-Ar ages on alunite appear to be too young to be those of formation of this mineral, and the oldest (13.0 + or - 0.4 m.y.) is interpreted as a minimum age for the Nena pyritic replacement copper-gold deposit.

The Frieda porphyry copper-gold mineralisation is associated with multiphase intrusives in the form of chalcopyrite, bornite and chalcocite. High grade mineralisation is found to occur in steep northwest trending structures.

Nena is a high sulphidation epithermal deposit hosted by andesitic lapilli tuffs. The mineralised area forms a 1,200m long sub-horizontal cigar shaped structure with a diameter of 300m. The main copper minerals occurring in the deposit are chalcocite, covellite, enargite / luzonite and minor stibioluzonite.

RESOURCES

The resources as reported in 2016 are contained in HITEK (Horse Ivaal-Trukai-Ekwai-Koki) prospects, the basis on which the final feasibility report was completed. It has 2.7 billion tonnes (Bt) of resources @ 0.42 % copper and 0.23g/t gold; containing 12Mt of copper, 19Moz of gold and 49Moz of silver. Its annual production when in operation and producing is expected at 175,000 tonnes of copper and 250,000 ounces of gold.



Courtesy of PanAust 2014.

MINE DEVELOPMENT

The mine is an open pit mine, processing into concentrates and shipping out of the site via barges and to ocean liners docked at a port facility in Wewak.

The following, herein stated below, are the stages contained and reported in the 2016 edition of this bulletin. However the company has alerted in the PNG Mining Conference, 2017, on rethinking these activities.

As reported in 2016, PanAust will develop a mine in several stages, with a large open pit mine over the mine's initial mine life of seventeen (17) years. The open pit mine will feed a process plant taking in ore at forty million tonnes per annum (40 Mtpa).

Table 1: Summary of feasibility study project physicals (courtesy PanAust, 2016)

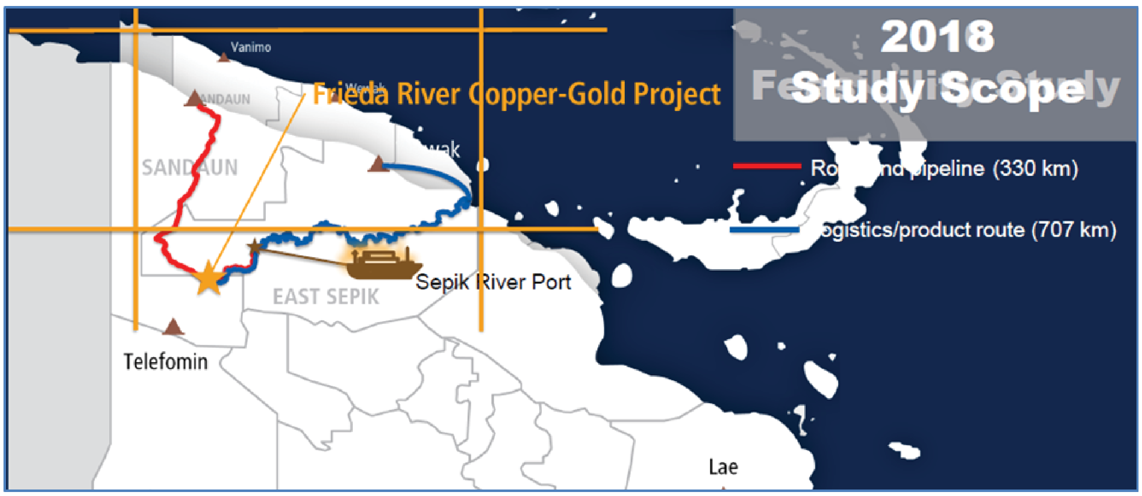
Area	Scope
Mineral Resources	Horse-Ivaal-Trukai, Ekwai and Koki porphyry copper-gold deposits
Mining method	Large-scale conventional open-pit, truck and shovel operation
Total material mined	1,170 million tonnes (700Mt mill feed; 470Mt waste)
Mining rate	Peak total material movement 85Mtpa
Mill throughput	Average 41Mtpa (5,000tph)
Concentrate	Average 670,000dmt per annum; peak 860,000dmt
Metal production	Average steady state (after initial ramp-up) 175kt copper, 250koz gold
Integrated storage facility	Subaqueous deposition; embankment height up to 171m; 875Mm^3 storage (1,210Mt)
Power supply	IFO/hydroelectric power; peak 140MW; hydroelectric generation up to 102MW
Site access road	110km unsealed road from Sepik River port to concentrator
Peak workforce numbers	Construction: 3,720; Operations, Year 1-9: 3,025 and Year 10-17: 1,960
Project life	6 years implementation (4 years construction) 17 years operation

Since the project is remotely located the first stages of mine development will include infrastructure development in the area, including roads and an airstrip capable of taking a Dash 8 aircraft. Power supply is by way of intermediate fuel oil (IFO) on modular generating sets; with plans for hydroelectric systems and as the project progressed over its fifth year of operations.

The new look thoughts, for a 30 years mine life from the original 17 years mine life, includes the following;

- building of a 400 MW hydro power plant which will also be a underwater storage of tailings and wastes; and storage of water for power generation;
- construction of access roads to the mine sites, including a 707 km road from Frieda to Pagwi, thereby taking away the massive usage of the Sepik River.
- a 300 km road and concentrate pipeline to Vanimo from Frieda.

Image courtesy of PanAust 2017.



This 50 years power plant and the infrastructure development is the company's efforts to partner with the government and other development partners to open up this part of the country to modern efficient services and development.

COMMUNITY AFFAIRS

High on the agenda of the company in mine development and during its operations is the environment and its communities in the various zoning groups which the company will zone after close liaison with various stakeholder groups.

People of East and West Sepik provinces stand to benefit greatly from this project. The development of mining infrastructures and supporting services will bring accessibility and services to this remote part of the country; and other benefits as per benefit sharing agreements that will be drafted, as the project progress into constructions and operations.
The two provincial governments will also have revenue flowing into their coffers for their budgets.

VALUE PROPOSITION

World class projects of this magnitude with huge capital costs can be expected to bring out greater economic values. For the Sepik Provincial governments, Frieda could be the catalyst they have been waiting to grow and develop their provinces.

The company have stated in various meeting platforms, including at the 2017 Mining Conference that, it wants to partner with the various levels of government and private companies & organisation to create a new Sepik economic corridor thereby bringing positive and tangible economic benefits to local and Sepik wide communities.

Name	Wafi Golpu Project
Location	Bulolo, Morobe Province
Ownership	50:50 % Harmony Gold Ltd & Newcrest Ltd
Operator	Morobe Mining Joint Venture Ltd
Status	Application for Special Mining Lease # 10 (SML 10)

The Wafi Golpu project has now progressed to an application for a special mining lease (SML), with feasibility studies reports with the government of Papua New Guinea for evaluation and grant of a SML. The stages of development stated herein this update is based on a presentation delivered by the developers in the 2017 PNG Mining and Petroleum conference, Port Moresby.

When developed, this world class mine will be one of the largest under-ground mines in PNG, producing at the initial stages an average of 102,000 tonnes of copper and 198,000 ounces of gold. It will have an initial mine life of 28 years, with the possibility of further expansion to extend the initial operation beyond 40 years.

LOCATION

The Wafi Golpu project is approximately 65 km, west of PNG's second largest city of Lae. It is one of the few projects in PNG at close proximity to existing services and infrastructure, i.e., power grids, roads, airports and wharf.

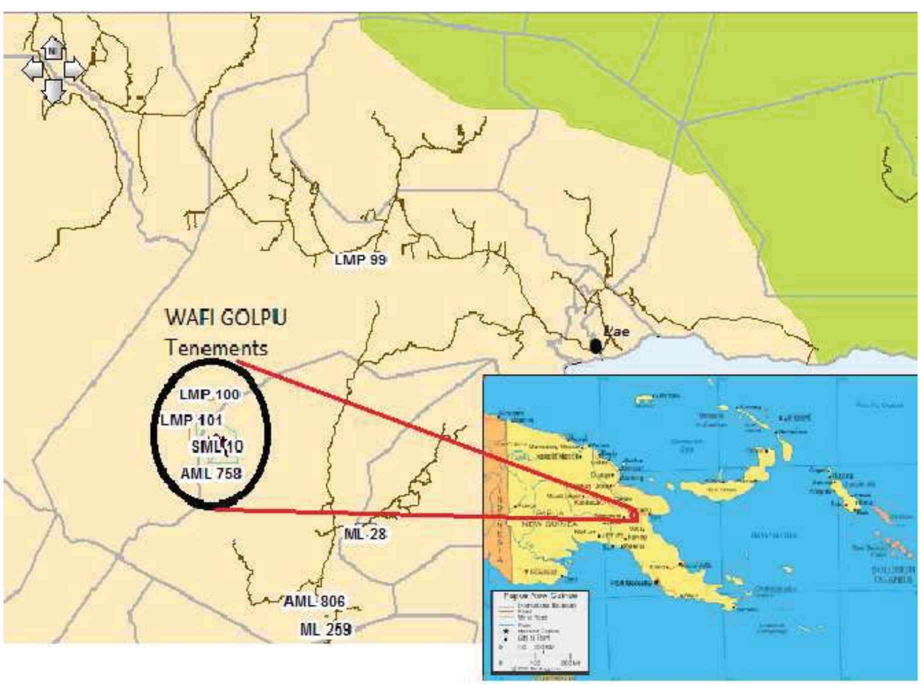


Figure 1: Wafi regional location

The project's various infrastructure easements and tenements will extend beyond the SML area to as far as Demakwa and Lae.

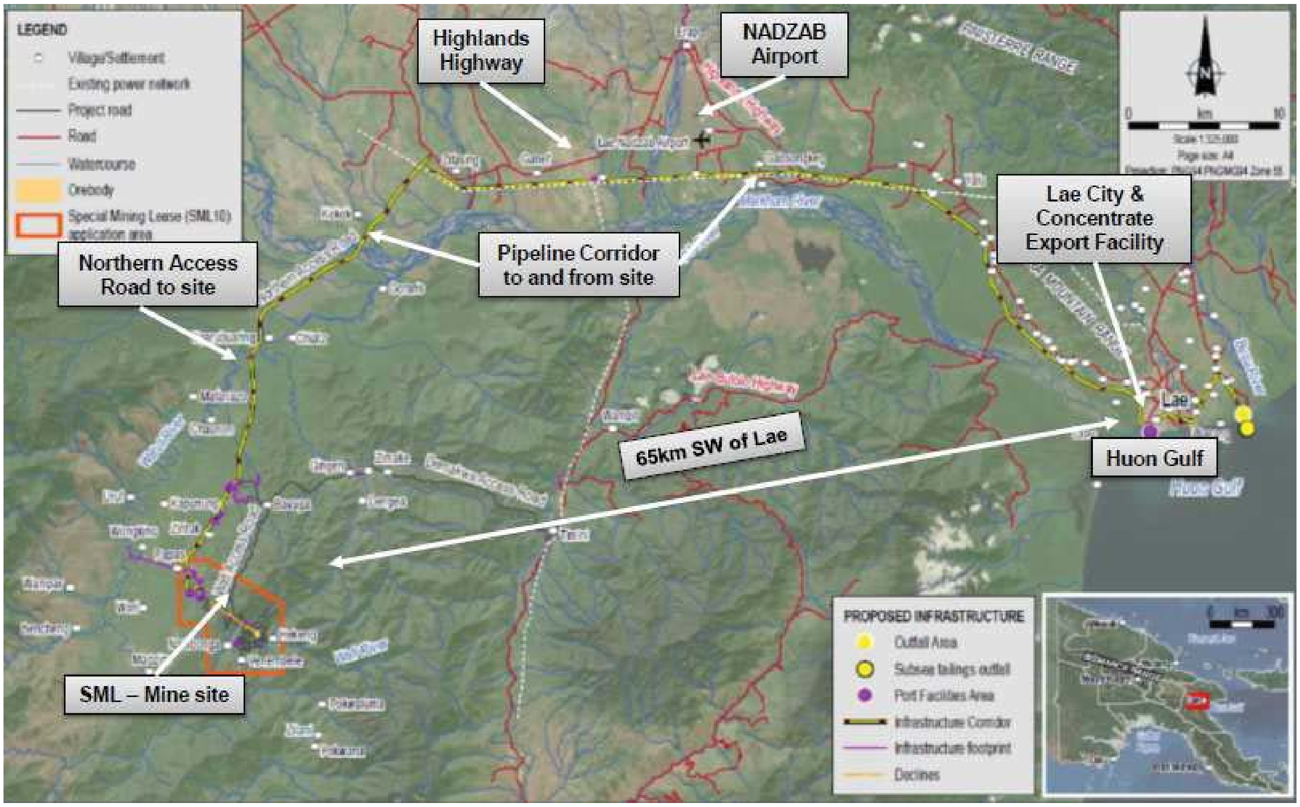


Image courtesy of Wafi-Golpu Joint Venture Ltd.

GEOLOGY

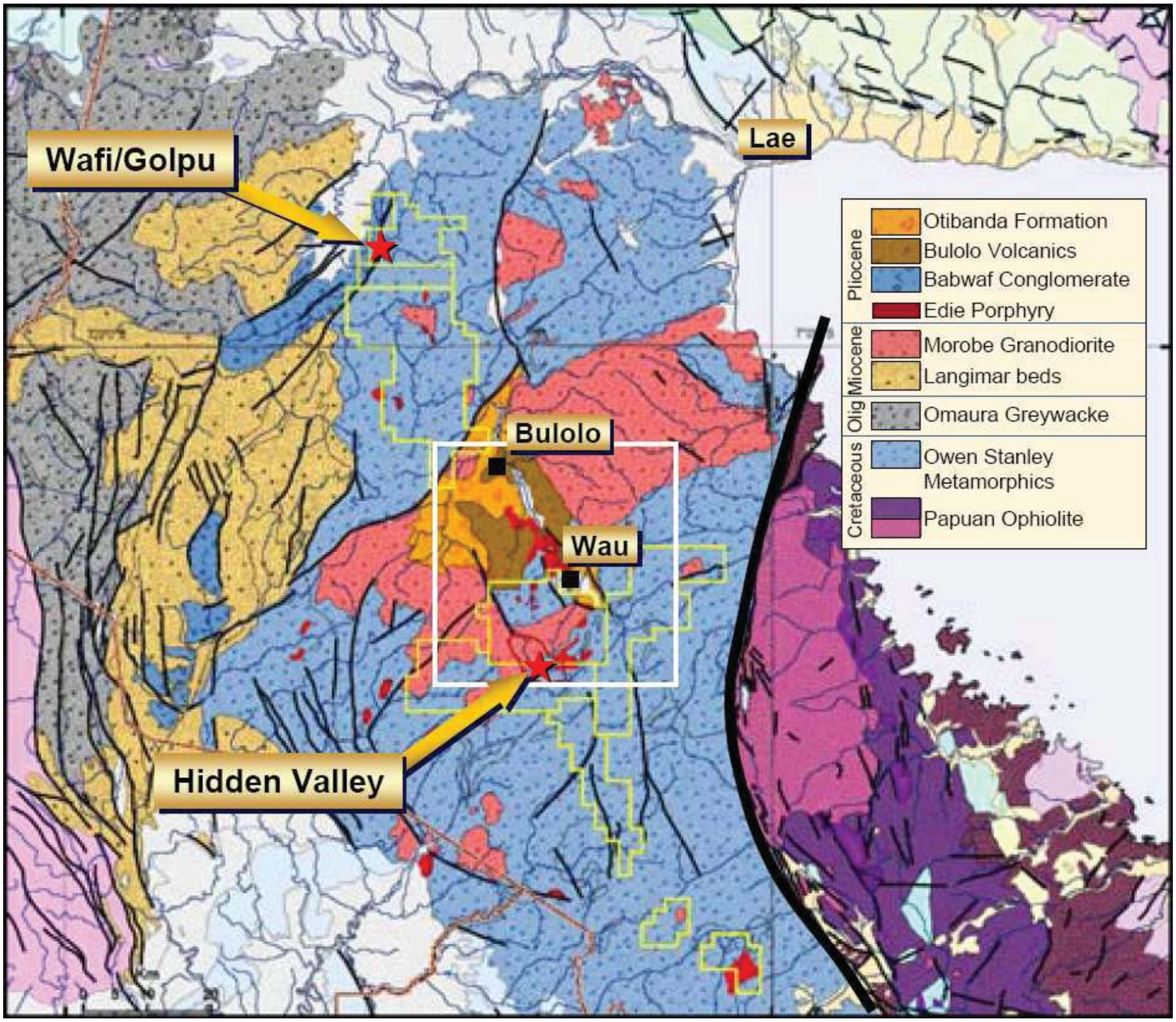
The area is intruded by the late Cretaceous Mt. Victor Granodiorite to the northwest, the Mid-Miocene Morobe Granodiorite to the east and by numerous diorite and Granodiorite bodies including those at the Wamum and Idzan Creek prospects and the Golpu diatreme.

The area is crossed by west-northwest-south-southeast arc-parallel faults of the New Guinea Thrust Belt and by orthogonal north-northeast-south-southwest transfer faults, such as the Victor Transfer, the Wafa Transfer and the Wafi Transfer, which together comprise part of the Aure Deformation Zone.

Such transfer zones are regarded as fundamental controls in the emplacement of porphyry bodies on a global scale and have played the same role in localization of the Wafi-Golpu deposit and epithermal gold and porphyry Cu-Au deposits elsewhere in Papua New Guinea.

The Wafi system is a structurally controlled epithermal gold deposit with oxide base, and the Golpu is a large copper gold porphyry system.

It is a high sulphidation epithermal system with complex zonation of hydrothermal alteration assemblages around central diatreme core intruded by suite of dioritic and dacitic porphyries. Gold is associated with fine-grained arsenical pyrite.



RESOURCES

The over 2 billion tons of resources Golpu deposit has a JORC compliant mineral resource of 824Mt at 1.05% Copper, 0.70g/t Gold, 1.25g/t Silver and 90ppm Molybdenum.

These resources are the basis for the mine development plan drawn up in the feasibility studies current under review and evaluation by relevant Government Authorities.

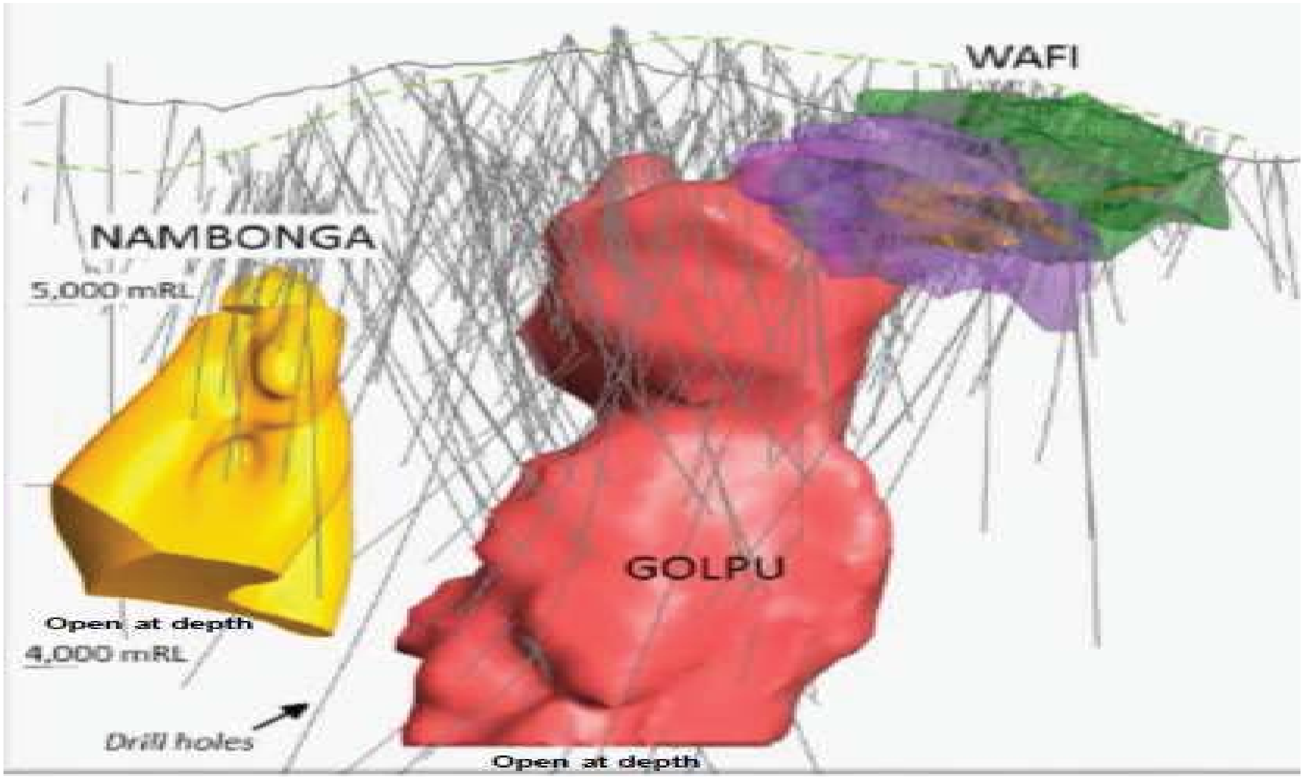
The Project comprises a number of economically significant deposits, namely the Golpu copper and gold porphyry deposit, the Nambonga porphyry deposit and the Wafi epithermal gold deposit.

Due to the style of these resources, exploiting these will be in phases, with phase 1 an open pit followed by the next phases as underground mining.

MINE DEVELOPMENT

According to its 2015 and 2016 reports, mining the wafi-golpu gold and copper will start with an open pit mine, mining the Wafi gold cap and copper resources at the top.

The next mining option is underground mining to access deeper Golpu resources (figure 2), with a series of multi-leveled block cavings (figure 3). With much of the mining happening underground, there will be less surface footprint hence lesser environmental impact.



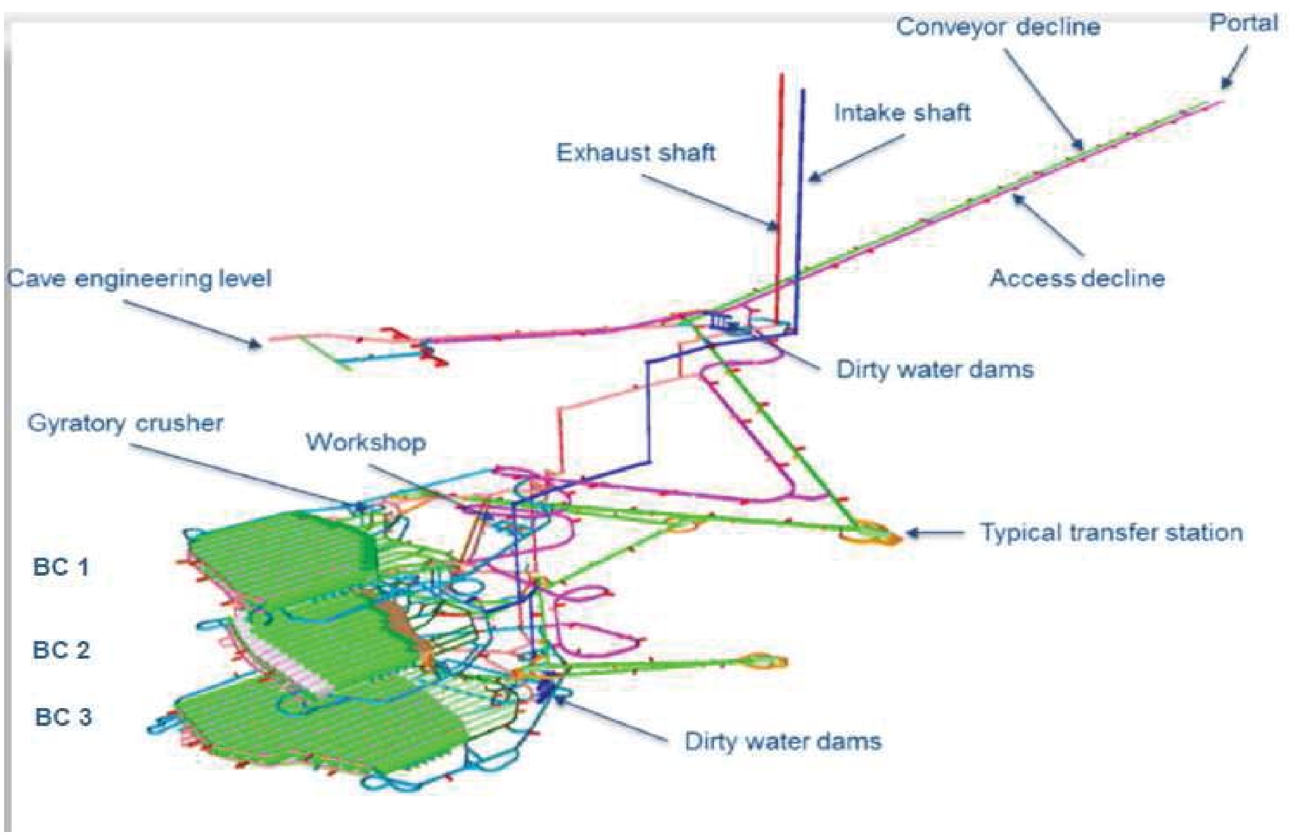


Image courtesy of Wafi-Golpu Joint Venture Ltd.

A surface processing plant is proposed to process the ore into concentrated slurry to be piped down to Lae port facility. Dewatering, drying, storage and loading for export as a concentrate will be at the Lae Port.

FEASIBILITY STUDIES ASSESSMENT

The completed feasibility studies report was submitted to the government of PNG through the mineral resources authority (MRA) in August, 2016. The process of evaluating these studies by various key government agencies is progressing well.

The engagement with the company and state agencies on various aspects of the project development is part of the ongoing evaluation and review process. Should there be any deviations on the plan in the feasibilities studies report, the company and the state agencies will address this, as part of the evaluation process.

The Environment Impact Statement (EIS) is concurrently evaluated by PNG CEPA (Conservation Environment & Protection Authority). CEPA then issues an Environment Permit. Following this the MRA issues the Special Mining Lease (SML) MRA.

Because this is an SML application, the National Executive Council (NEC) deliberates on the applications after all the evaluations and make a decision to grant or otherwise, the permits.

COMMUNITY AFFAIRS

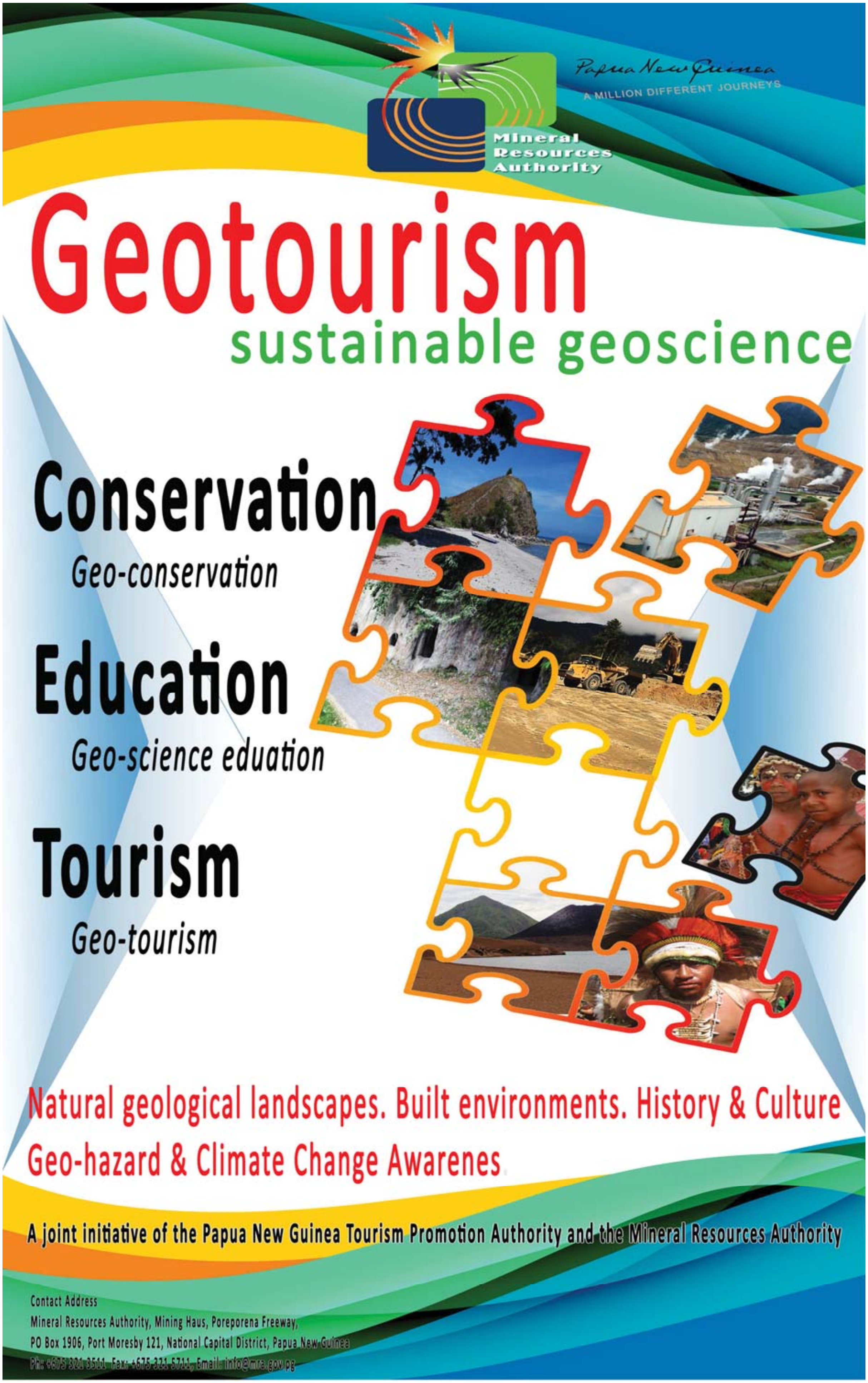
Whilst the assessment of the feasibility studies progresses, land owners and Local Level Governments plus the Morobe Provincial Government, are preparing for the Development Forum.

These stakeholders see this as a significant part to mine development and an operation, as it deals with benefits sharing discussions towards an eventual MOA draft and signing. The mineral resources Authority (MRA) will be the principle facilitator of these meetings.

The company has initiated community programs during the project's exploration stages and has plans to further these projects.

One such project is the Agribusiness involving communities in the Wafi-Golpu area. They have provided the following;

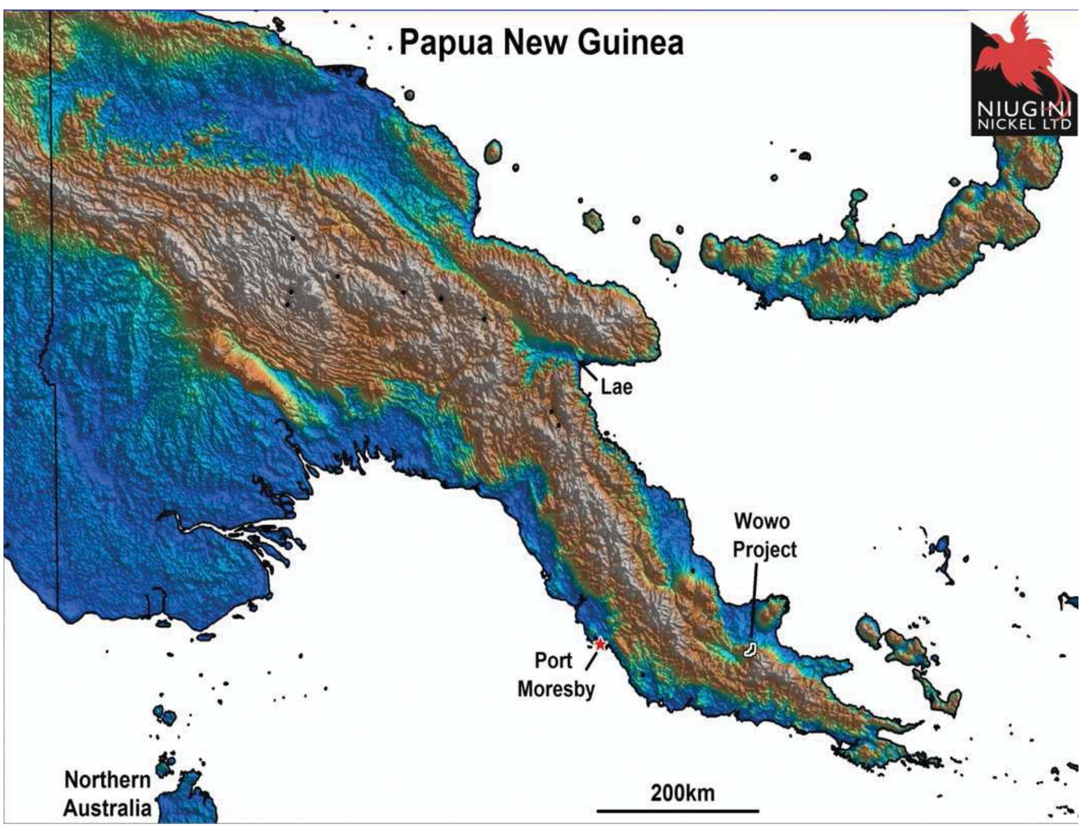
- Aided creation of a vibrant cocoa industry
- Development of nurseries for high yielding cocoa seedlings
- Crop husbandry training
- Provision of fermenting and drying training
- Provision of quality training and marketing
- Supplied 8 dryers to produce higher quality beans.
- Developing a new bud-wood garden to supply 100,000 seedlings per quarter
- Cocoa farmers have won cocoa quality
- Facilitated a partnership between the Lower Watut Farmers' Cooperative Society and Queen Emma Chocolates


Papua New Guinea
A MILLION DIFFERENT JOURNEYS
Mineral
Resources
Authority
Geotourism
sustainable geoscience
Conservation
Geo-conservation
Education
Geo-science eduation
Tourism
Geo-tourism
Natural geological landscapes. Built environments. History & Culture
Geo-hazard & Climate Change Awarenes
A joint initiative of the Papua New Guinea Tourism Promotion Authority and the Mineral Resources Authority
Contact Address
Mineral Resources Authority, Mining Haus, Poreporena Freeway,
PO Box 1906, Port Moresby 121, National Capital District, Papua New Guinea
Ph: +675 321 3511 Fax: +675 321 5711, Email: info@mra.gov.pg

Name	Wowo Gap Nickel Project
Location	Wowo Gap, Oro Province
Ownership	100% Resource Mining Corporation (RMC) Ltd
Operator	Niugini Nickel Ltd (100% subsidiary of RMC)
Exploration Licenses	EL 1165
Total Area	150.7 km^2

Niugini Nickel Ltd is a wholly owned subsidiary of Resource Mining Corporation Limited (ASX:RMI). Niugini Nickel Ltd is incorporated in Australia and is registered in Papua New Guinea as an overseas company.

Niugini Nickel Ltd holds tenement EL 1165 which is the Wowo Gap Nickel Project and tenement EL 1749 which is the Cape Vogel Project.



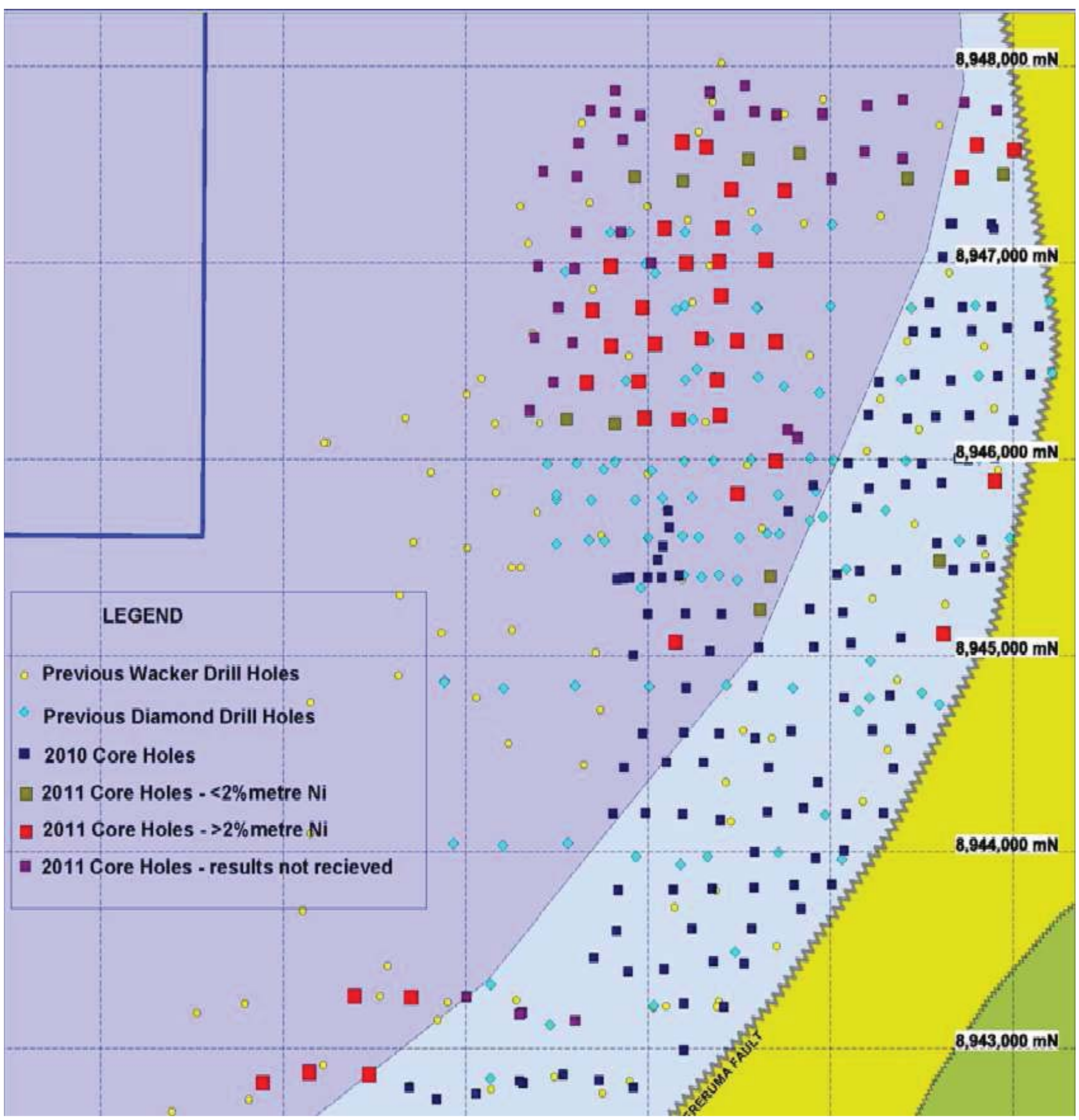
Wowo Gap Nickel Cobalt project is a large low grade laterite system, with resources at near surface, and mining will be by open cut operations. Further work in 2011, on the project had seen the resources increasing by at 52 % in 2012. The contained nickel and indicated resources also increased, respectively by 60 % and 85 %.

GEOLOGY

Wowo Gap is the physiographic expression of a young north easterly striking major fault system which in general separates the meta sediments and meta volcanics of the Gorupu mountains on the east from the ultramafic and basic rocks of the Didana range to the west (Smith & Green, 19610 and (Thompson, 1958). The rocks are believed to be of the Mesozoic and Paleozoic age, deformed then metamorphosed by the overthrusting of a slab of oceanic ultramafic and igneous rocks from the east, which is part of the current Papuan Ultramafic Belt. The ultramafic rocks are the source rocks for supergene nickel enrichments, and where intruded by younger plutonic rocks, as a possible source of nickel sulfides.

RESOURCES

Further work at Wowo Gap's saw its total resources increasing from 85 Mt @ 1.0 % Ni in 2009, to 125 Mt @ 1.06 Ni and 0.06 % Co, containing 1.32 Mt of nickel, in 2012.



2011 Mineral Resource Estimate	*Mt*	*Nickel (%)*	*Cobalt (%)*
Indicated	72	1.03	0.07
Inferred	53	1.09	0.06
Total	125	1.06	0.07
Contained Metal (kt)		1325.00	83.00

2009 Mineral Resource Estimate	*Mt*	*Nickel (%)*	*Cobalt (%)*
Indicated	39	1.00	0.05
Inferred	43	1.01	0.06
Total	82	1.01	0.06
Contained Metal (kt)		828.00	47.00

Percentage Increase from 2009	*Mt (%)*	*Nickel (%)*	*Cobalt (%)*
Indicated	85	3.00	23.00
Inferred	23	8.00	5.00
Total	52	5.00	16.00
Contained Metal (kt)		60.00	76.00

The resources are contained in both the limonite and saprolite layers of the laterite system. The company is research new organic leaching technology for processing.

"This new estimate confirms the significance of the resource at Wowo Gap in a global context, and coupled with research on our new organic leaching technology, make the project very attractive to potential joint venture partners," (Warwick Davies, MD RMC, 2011).

EXPLORATION

The increase in the resources was an indicative outcome of a successful drilling program in 2011. Drilling was efficient and effective with the use of a custom made (by RMC personal) mobile drill. With this drill, mobility and time management on sites was made economically effective.

WAY FORWARD

RMC will start the scoping study to assess the economic viability of the project using the green technology leaching process, whilst drilling and further metallurgy to improve the resources.

Community affairs commitments of the company is an ongoing process, and the company had and will continue to assist the communities. Their training and education programs in better hygiene, good health and in effective cassava production, is well received by the communities.

Mineral Resources Authority
Small Scale Mining Branch Publication

SMALL SCALE MINING TRAINING CENTRE - WAU

GENERAL INFORMATION

Small Scale Mining Training Centre is Papua New Guinea's only Institution that offers skills training to the small scale miners. The Institution was established in 2009 through the Mining Support Sector Program and managed by European Union until it was handed over to the Mineral Resources Authority in 2010.

The Institution began training its first batch of small scale miners in October 2009. The mining school offers Level 1, Level 2, Level 3, Level 4 and an Extension Program to its participants. The Institution also conducts Outreach Training Programs in remote areas. Upon completion of the courses participants are awarded Certificate in Small Scale Mining in Papua New Guinea.

BUSINESS ADDRESS

Smal Scale Mining Training Centre
P O Box 126, Wau, Morobe Province

Phone: (+675) 474 6699 / 71922394
Fax (+675) 474 6600
Email: ltomain@mra.gov.pg sjackson@mra.gov.pg

Name	Yandera Project
Location	Bundi, Madang Province
Ownership	100 % Sentient Group
Operator	Era Resources
Exploration Licenses	1335,
Total Area	389 km^2

INTRODUCTION

Yandera an advanced project in hibernation is waking up and ready to flex its wings into further development with a change of management and board, under the group known as Era Resources, registered on the Toronto Stock Exchange. The significant shareholding group, with 22 % is Sentinel, with the rest held by private (individual & organizational) shareholders. Era Resources have taken over the management of the Yandera project from Marengo Ltd.

LOCATION

The project is approximately 95 kilometer southwest of Madang town, Madang Province, closer to the borders of Chimbu (Simbu) and Jiwaka Provinces.

Figure 1: EL 1335

GEOLOGY

Copper mineralization at Yandera is associated with low-K tholeiite-calc-alkaline porphyry intrusives into the middle Miocene Bismark Intrusive Complex. Three episodes of porphyry emplacement are recognized, the youngest generating intrusive breccia pipes. A broad area of secondary biotite alteration with peripheral epidote-chlorite is superimposed upon the igneous terrain, postdating all igneous events within it. It is Fracture-controlled with calcic and phyllic/argillic alteration zones, symmetrically disposed about an elongate central core of sulfide-barren quartz veining overprinting the secondary biotite and epidote-chlorite. Copper mineralization was found on both sides of the two main centers of quartz veining within the central core and is also localized into breccia pipes.

MINERALISATION & RESOURCES

Yandera is an igneous-hosted, structurally-controlled Cu-Mo-Au porphyry system comprised of a series of adjacent deposits along recognized structural trends. Mineralization is related to multiple pulses of intrusive rock and hydrothermal alteration. Grade has spatial correlation with late dacite intrusions and polymictic breccias with over-printing phyllic alteration. Broad tabular zones of copper mineralization extend from surface to depths of over 500 meters and have been drill-defined to a strike length of over 5 kilometers.

Figure 2: Yandera porphyry system.

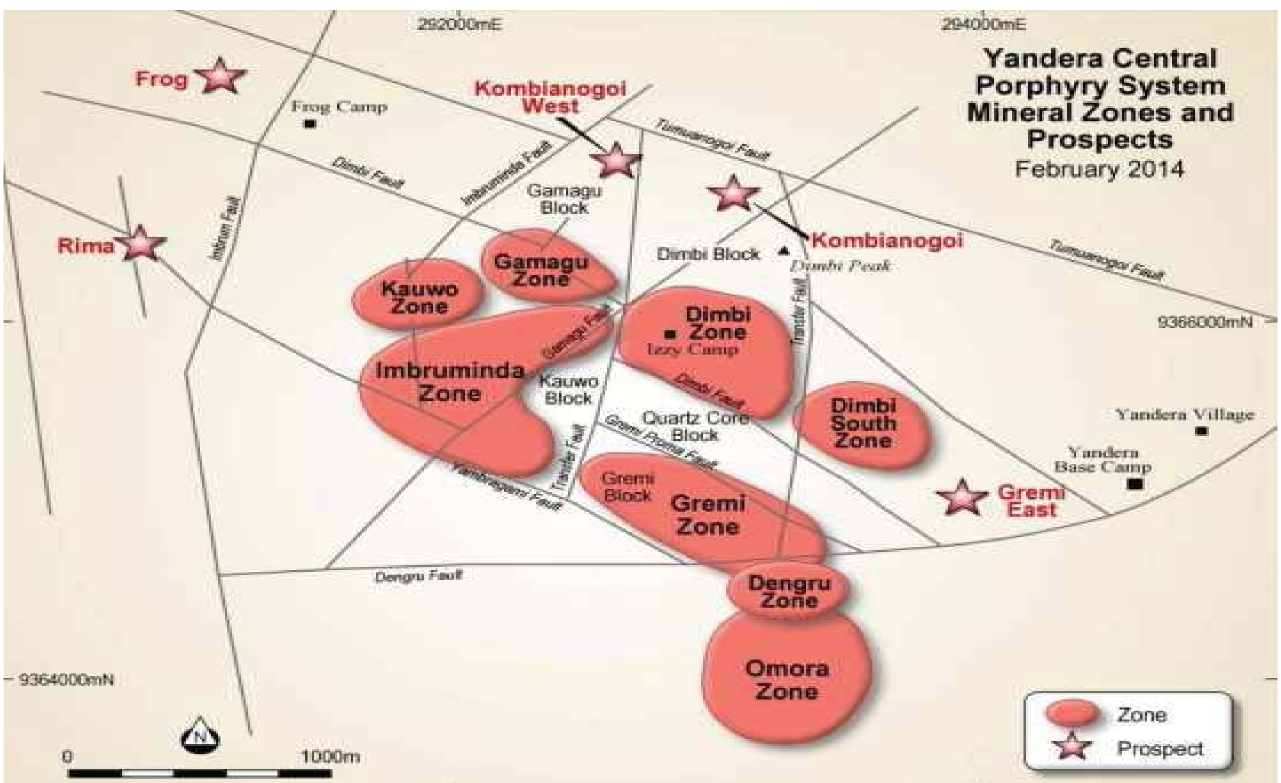


Image courtesy of Era Resources Inc (accessed http://eraresources.com/wpcontent/uploads/2015/05/fig-yandera_regional_fig2-201406.pdf, July 2018).

Table 1: Mineral resources as of May 2015

Zone	Classification	Mass (kt)	Metal Grades				Contained Metal				
			Cu (%)	Mo (%)	Au (ppm)	CuEq (%)	Cu (kt)	Mo (kt)	Au (kg)	Au (koz)	CuEq (kt)
Total Resource	Measured	195,267	0.37	0.013	0.076	0.46	723	25	14,803	476	890
	Indicated	434,874	0.32	0.008	0.069	0.38	1,379	37	29,940	963	1,663
	Measured & Indicated	**630,142**	**0.33**	**0.010**	**0.071**	**0.41**	**2,103**	**62**	**44,743**	**1,439**	**2,554**
	Inferred	117,474	0.30	0.005	0.052	0.34	348	6	6,055	195	401
Oxide Resource	Measured	22,426	0.38	0.00	0.000	0.38	86	0	0	0	86
	Indicated	38,715	0.33	0.00	0.000	0.33	127	0	0	0	127
	Measured & Indicated	**61,141**	**0.35**	**0.00**	**0.000**	**0.35**	**212**	**0**	**0**	**0**	**212**
	Inferred	10,765	0.28	0.00	0.000	0.28	30	0	0	0	30
Non-oxide Resource	Measured	172,841	0.37	0.014	0.086	0.47	638	25	14,803	476	805
	Indicated	396,160	0.32	0.009	0.076	0.39	1,253	37	29,940	963	1,537
	Measured & Indicated	**569,001**	**0.33**	**0.011**	**0.079**	**0.41**	**1,890**	**62**	**44,743**	**1,439**	**2,342**
	Inferred	106,709	0.30	0.006	0.057	0.35	318	6	6,055	195	371

Table courtesy of Era Resources Inc, (accessed: http://eraresources.com/, June 2016)

According to the Era Resources' website (accessed: http://eraresources.com/, June 2016) their target resource is one billion tonnes which should have triggered a feasibility study, in 2017-2018. The new resources now stands at 959 Mt @ 0.37 % copper, inclusive of the 728 Mt of measured and indicated resources @ 0.39 % copper equivalent.

EXPLORATION

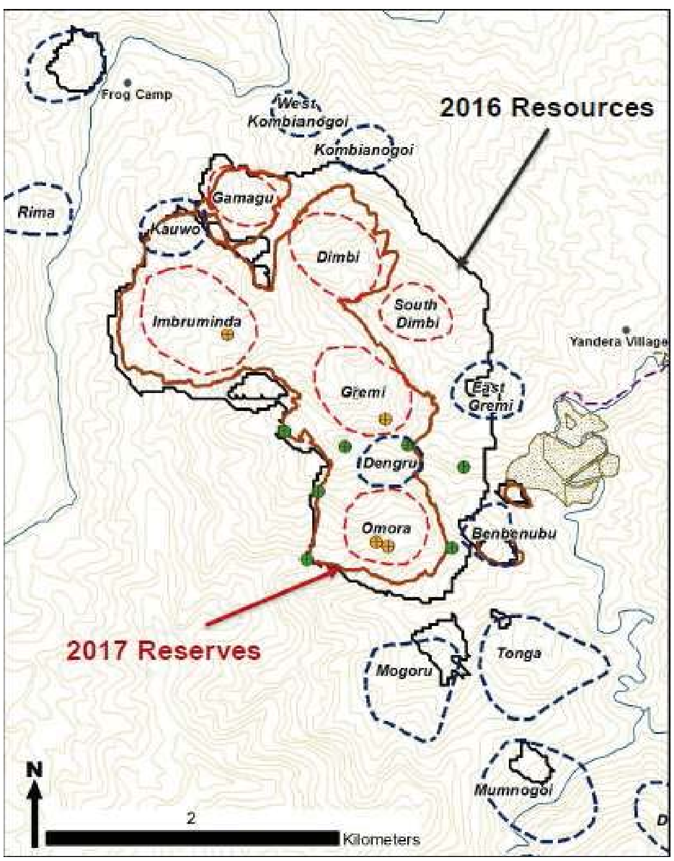


Figure 2: Yandera exploration camp.

Exploration activities and desk top re-evaluation of the Yandera resources recommenced in 2016 after the acquisition of the project by Era Resources, the managing subsidiary of Sentient Group of companies. Era Resources presentation in the 2017 Mining Conference revealed an addition of over 1 billion lbs of copper to previous records, a 20 % increase in contained copper.

MINING DEVELOPMENT

The proposed timeline for Yandera to start mining is pre-feasibilities in 2017, feasibility studies in 2018, application for an SML in 2019 -20 and mine construction starting 2022, with production commencing in 2024. It will be a copper mine.

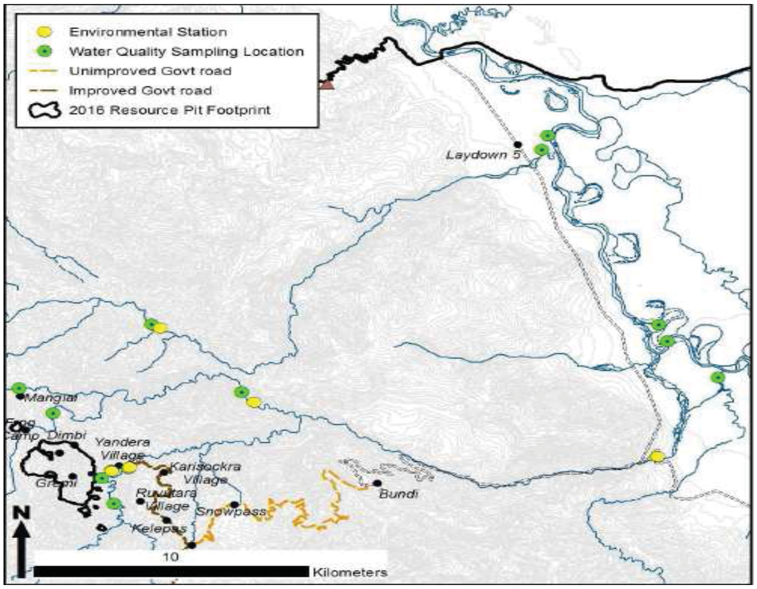


Image courtesy of Era Resources Inc. 2017.

Image courtesy of Era Resources Inc 2017.

A prefeasibility mine development plan involves open pit mines with a processing plant on site where crushing and milling and preparation of ore slurry is done. The slurry is piped through a 146 km pipeline to the concentrator in Cape Rigny along the south east coast of Madang town. The dry copper molybdenum concentrate is loaded to ocean tankers for export. Based on current resources, annual export load is forecasted at 334 ktpa of copper concentrate @ 27 % containing approximately 91 kt of copper and 45 Koz of gold; 4 ktpa of molybdenum concentrate containing 2 kt molybdenum.

VALUE PROPOSITION

Due to the project location, the impact could be felt by five Provinces, i.e. Madang, Chimbu, Eastern Highlands, Western Highlands and Morobe. Intergenerational wealth will be created through the construction of new & upgrades of existing roads, power generation and other infrastructures such as the port facility and communication stations. It will open up a new economic zone at the periphery of the mine within the provincial boundaries of the provinces herein stated.

The national government of PNG has the opportunity to buy up to 30 % equity into this project.

DATASHEET
OF
EXPLORATION LICENCES
EXPLORATION LICENCE RENEWALS
EXPLORATION LICENCE APPLICATIONS

GrantedEL

ID	Field2	Field3	Field4	Field6	Field8	Field9
1	GRANTED EXPLOR					
2	LeaseNo	Location	Parties	Status	GrantDate	ExpiryDate
3	EL 58	Frieda River	Frieda River Limit	Active	19680320	20191114
4	EL 440	Wafi	Newcrest PNG 2 L	Active	19800311	20200310
5	EL 470	Kainantu	K92 Mining Limite	Active	19820705	20190204
6	EL 609	Mapua	Nord Australex N	Active	19850506	20190505
7	EL 609	Mapua	Nord Australex N	Active	19850506	20190505
8	EL 609	Mapua	Nord Australex N	Active	19850506	20190505
9	EL 677	Waria River	Harmony Gold (P	Active	19861027	20190217
10	EL 693	Kainantu	K92 Mining Limite	Active	19861229	20190204
11	EL 1103	Zilani	Newcrest PNG 3 L	Active	19991213	20191212
12	EL 1105	Wafi Mt	Newcrest PNG 2 L	Active	19950126	20190125
13	EL 1172	Kulumadau	Woodlark Mining	Active	19971128	20191127
14	EL 1212	Frieda	Frieda River Limit	Active	19970530	20190529
15	EL 1212	Frieda	Frieda River Limit	Active	19970530	20190529
16	EL 1279	Kulumadau	Woodlark Mining	Active	19990826	20190825
17	EL 1335	Yandera	Yandera Mining C	Active	20031120	20191119
18	EL 1465	Kulumadau	Woodlark Mining	Active	20081222	20181221
19	EL 1677	Kauwol	Ok Tedi Mining Li	Active	20090325	20190324
20	EL 1704	Obura	Newcrest PNG Ex	Active	20091125	20191124
21	EL 1705	Obura	Newcrest PNG Ex	Active	20091125	20191124
22	EL 1747	Misima Island	Gallipoli Explorati	Active	20110321	20190320
23	EL 1761	Esa!ala	Highlands Pacific	Active	20120312	20200311
24	EL 1761	Esa!ala	Highlands Pacific	Active	20120312	20200311
25	EL 1854	Lila Village	Yandera Mining C	Active	20110729	20190728
26	EL 2001	Benstead	Highlands Pacific	Active	20121220	20181219
27	EL 2040	Mt Hagen	Mayur Exploratio	Active	20120927	20180926
28	EL 2051	Mt Nambom	Aries Mining Limit	Active	20120927	20180926
29	EL 2150	Gulf South	Mayur Iron PNG L	Active	20121218	20181217
30	EL 2156	Tabubil	Ok Tedi Mining Li	Active	20121220	20181219
31	EL 2256	Tabubil	Ok Tedi Mining Li	Active	20130520	20190519

ID	Field2	Field3	Field4	Field6	Field8	Field9
32	EL 2289	Tabubil	Ok Tedi Mining Li	Active	20131119	20191118
33	EL 2289	Tabubil	Ok Tedi Mining Li	Active	20131119	20191118
34	EL 2289	Tabubil	Ok Tedi Mining Li	Active	20131119	20191118
35	EL 2302	Bulolo	Canterbury Resou	Active	20140225	20200224
36	EL 2313	Wau	Harmony Gold (P	Active	20141224	20181223
37	EL 2314	Bulolo	Canterbury Resou	Active	20151102	20191101
38	EL 2321	Kau Creek	Pacific Niugini Mi	Active	20150216	20190215
39	EL 2325	Rambusa-Sudest I	Sudest Island Mini	Active	20141219	20181218
40	EL 2328	Yangoru and Kuba	West Coast Minin	Active	20161010	20181009
41	EL 2330	Ningerum	Apollo Mineral Re	Active	20141027	20181026
42	EL 2349	Hukim/Ningerum	Aus PNG Mining L	Active	20161115	20181114
43	EL 2366	Subutuya	Solway Group Mi	Active	20151217	20191216
44	EL 2379	Simuku and Ismin	Copper Quest PN	Active	20150911	20190910
45	EL 2391	Doma Village	Papuan Minerals	Active	20151217	20191216
46	EL 2396	Manus	Cheroh Mining PN	Active	20160309	20200308
47	EL 2406	Sulovat, Kimbe W	GMG Global Mini	Active	20161202	20181201
48	EL 2407	Takis Village	Ballygowan Limite	Active	20180118	20200117
49	EL 2409	Roku/Ulpuna	Sagittarius Mining	Active	20161115	20181114
50	EL 2460	Kompiam	Property New Gro	Active	20161115	20181114
51	EL 2461	Mt Andewa	Baldoyle Limited (	Active	20161115	20181114
52	EL 2461	Mt Andewa	Baldoyle Limited (	Active	20161115	20181114
53	EL 2461	Mt Andewa	Baldoyle Limited (	Active	20161115	20181114
54	EL 2466	Metewoi	Rio Tinto Explorat	Active	20170912	20190911
55	EL 2467	Mount Abemh	Highlands Pacific	Active	20161202	20181201
56	EL 2472	Tabubil	Ok Tedi Mining Li	Active	20170318	20190317
57	EL 2478	Ilam river	Highlands Pacific	Active	20170825	20190824
58	EL 2479	Kwikila Station	Combuco Limited	Active	20170629	20190628
59	EL 2485	Mapamoiwa	Pacific Arc Resour	Active	20170912	20190911
60	EL 2491	Sehulea	Reekara Limited (	Active	20170912	20190911
61	EL 2502	Pakapuna	LogiKon Corporati	Active	20170912	20190911
62	EL 2503	Mt Kuta	Kraip Energy Limit	Active	20170912	20190911
63	EL 2504	Sehulea	Baldoyle Limited (	Active	20180404	20200403
64	EL 2509	Tapini	Canterbury Resou	Active	20180829	20200828

66	EL 2511	Opa	Munga River Limit	Active	20170912	20190911
67	EL 2512	Kubor Range	Munga River Limit	Active	20170912	20190911
68	EL 2514	Makmak	Copper Quest PN	Active	20170912	20190911
69	EL 2517	Star Mountains	Highlands Pacific	Active	20170726	20190725
70	EL 2518	Kasuma, Garaina,	Pacific Niugini Mi	Active	20180404	20200403
71	EL 2521	Bitoi, Wau Morob	Terra Resources Li	Active	20170912	20190911
72	EL 2523	Aiyura, Eastern Hi	W & M Industry Li	Active	20170913	20190912
73	EL 2524	Krisa, Vanimo	Pacific Energy Con	Active	20171024	20191023
74	EL 2525	Wabo, Gulf Provin	Pacific Energy Con	Active	20171024	20191023
75	EL 2526	Poroi, Gulf Provin	Pacific Energy Con	Active	20180829	20200828
76	EL 2527	Hotmin, West Sep	Niuminco (ND) Li	Active	20180404	20200403
77	EL 2528	Pomio, East New	PCP Minerals Limi	Active	20171024	20191023
78	EL 2530	Kubuna, Central P	Rio Tinto Explorat	Active	20171024	20191023
79	EL 2537	New Ireland	Nautilus Minerals	Active	20180118	20200117
80	EL 2540	Sibia - Oro Provin	LogiKon Corporati	Active	20180207	20200206
81	EL 2542	Fagobip, Kopiago	Anglo American E	Active	20180829	20200828
82	EL 2543	Ambenop	Pacific Arc Holdin	Active	20180207	20200206
83	EL 2544	Bulolo, Morobe	Wabu Alluvials Li	Active	20180829	20200828
84	EL 2545	Lower Watut, Mo	Wabu Alluvials Li	Active	20180829	20200828
85	EL 2546	Gameta, Fergusso	Ballygowan Limite	Active	20180829	20200828
86	EL 2548	April River	Footprint Resourc	Active	20180829	20200828
87	EL 2549	Wapolu	Pacific Arc Aurum	Active	20180404	20200403
88	EL 2558	Kainantu	Pacific Energy Con	Active	20180829	20200828
89	EL 2559	Southwest Kainan	Pacific Energy Con	Active	20180829	20200828
90	EL 2560	Doma	Papuan Minerals	Active	20180829	20200828
91	EL 2561	Fagobip	Anglo American E	Active	20180829	20200828
92	EL 2562	Maramuni	Coral Sea Venture	Active	20180829	20200828
93	EL 2571	Keplar Point	Highlands Pacific	Active	20180829	20200828

Application

ID	Field2	Field3	Field4	Field6	Field7
1		EXPLORATION LICENCE APPLICATION - SEPTEMBER 2018			
2	LeaseNo	Location	Parties	Status	ApplDate
3	EL 59\Reg Code	Aiyura	Zhong Bao Jin Ye (PNG) Reality Co. Ltd. (100%)	Application	20180822
4	EL 60\Reg Code	Purari	Waterford Limited (100%)	Application	20180830
5	EL 2113	Karkar Island	RG Pacific Limited (100%)	Application - On Hold	20111024
6	EL 2124	Rabaul	RG Pacific Limited (100%)	Application - On Hold	20111108
7	EL 2153	Keba Creek	Heritage Manda Gold Limited (100%)	Application - On Hold	20120105
8	EL 2222	Talasea	Kuth Energy (PNG) Limited (100%)	Application - On Hold	20120615
9	EL 2225	Iamalele	Kuth Energy (PNG) Limited (100%)	Application - On Hold	20120621
10	EL 2226	Salamo	Kuth Energy (PNG) Limited (100%)	Application - On Hold	20120621
11	EL 2429	Mt Kare	GMG Global Mining Group Limited (100%)	Application - On Hold	20160114
12	EL 2445	Mt Kare	New Britain Lime & Cement Limited (100%)	Application - In Time	20160125
13	EL 2446	Mt Kare	ACM Contract Mining (PNG) Limited (100%)	Application - In Time	20160223
14	EL 2447	Mt Kare	Summit Development Limited (100%)	Application - In Time	20160301
15	EL 2448	Bulolo	Niwasa Limited (100%)	Application - In Time	20160329
16	EL 2450	Mt Kare	PNG Resources Corporation Limited	Application - In Time	20160414
17	EL 2455	Wide Bay	Raffcu Resources Limited (100%)	Application - Assessmen	20160502
18	EL 2464	Mt Daum	Kawari Pacific Limited (100%)	Application - Registratio	20160628

19	EL 2471	Mt Kare	South PGR Ltd (100%)	Application - In Time	20160825
20	EL 2473	Mt Kare	Golden Heart Mining Corp Limited (100%)	Application - In Time	20160929
21	EL 2480	Othona	Highlands Pacific Resources Limited	Application - In Time	20161103
22	EL 2482	Basima	Solway Group Mining (PNG) Limited (100%)	Application - Matter wit	20161103
23	EL 2483	Mapamoiwa	Pacific Arc Resources (Niugini) Limited (100%)	Application - In Time	20161103
24	EL 2484	Basima	Highlands Pacific Resources Limited	Application - In Time	20161106
25	EL 2500	Bosalewa	Solway Group Mining (PNG) Limited (100%)	Application - In Time	20161103
26	EL 2505	Esa'ala Station	Kalang Limited (100%)	Application - In Time	20161103
27	EL 2506	Sehulea	Dansar Mining 1 Limited (100%)	Application - In Time	20161103
28	EL 2507	Sehulea	Frontier Copper (PNG) Limited (100%)	Application - In Time	20161103
29	EL 2513	Kol Mountains	Frontrunner Exploration PNG Ltd	Application - Matter wit	20161215
30	EL 2516	Sinivit, ENB	Munga River Limited (100%)	Application - On Hold	20161219
31	EL 2519	Kusi, Garaina, Morobe	Munga River Limited (100%)	Application - In Time	20170103
32	EL 2520	Kasuma, Garaina, Morobe	Pacific Arc Resources (Niugini) Limited (100%)	Application - In Time	20170103
33	EL 2522	Wapenamanda	GMN 6768 (PNG) Limited (100%)	Application - Assessmen	20170227
34	EL 2529	Mt Sinivit	Frontier Copper (PNG) Limited (100%)	Application - In Time	20170502
35	EL 2531	Tolukuma, Central Province	Frontier Copper (PNG) Limited (100%)	Application - Matter wit	20170504
36	EL 2532	Sinivit, East New Britain	Gleneden Resources Limited (100%)	Application - In Time	20170508
37	EL 2534	Fane	Tolukuma Gold Mines Limited (100%)	Application - In Time	20170530

38	EL 2535	Fane Station	Tolukuma Gold Mines Limited (100%)	Application - In Time	20170530
39	EL 2536	Fane Station	Tolukuma Gold Mines Limited (100%)	Application - Hearing Co	20170530
40	EL 2538	Woitape Station	Tolukuma Gold Mines Limited (100%)	Application - In Time	20170613
41	EL 2539	Belevista	Tolukuma Gold Mines Limited (100%)	Application - Hearing Co	20170613
42	EL 2541	Salamaua	Anglo American Exploration (PNG)	Application - Matter wit	20170616
43	EL 2547	Tembin Village	Ballygowan Limited (100%)	Application - Matter wit	20170818
44	EL 2550	Wapolu	Ballygowan Limited (100%)	Application - In Time	20170915
45	EL 2551	Wapolu	Solway Group Mining (PNG) Limited (100%)	Application - In Time	20170915
46	EL 2552	Sivitatana	Combuco Limited (100%)	Application - Assessmen	20170922
47	EL 2553	Tolukuma, Central Province	Mobile Works Limited (100%)	Application - In Time	20171013
48	EL 2555	Jimi, WHP	Mobile Works Limited (100%)	Application - Matter wit	20171026
49	EL 2556	Kupiano	Mayur Iron PNG Limited (100%)	Application - Assessmen	20171101
50	EL 2557	Laloki River	Torrens Mining (PNG) Limited (100%)	Application - Matter wit	20171116
51	EL 2563	Kompiam	Abundance Valley (PNG) Limited (100%)	Application - Hearing Sc	20180115
52	EL 2565	Londol	Viva Gold (PNG) Limited (100%)	Application - Hearing De	20180102
53	EL 2566	Abau	Munga River Limited (100%)	Application - Matter wit	20171220
54	EL 2567	Buso	Munga River Limited (100%)	Application - Matter wit	20171220
55	EL 2568	Salus	Solway Group Mining (PNG) Limited (100%)	Application - Hearing Co	20180116
56	EL 2569	Sichala	Kallow Limited (100%)	Application - Matter wit	20180124

57	EL 2570	Suabi	Gama Projex Limited (100%)	Application - Matter wit	20180131
58	EL 2572	Salamo	Ballygowan Limited (100%)	Application - Hearing Co	20180212
59	EL 2573	Yangoru	Alexander Mining Limited (100%)	Application - Hearing Co	20180222
60	EL 2574	Maprik	West Coast Mining Limited (100%)	Application - Hearing Co	20180222
61	EL 2575	Magarima	ESDA PETROMINING LIMITED (100%)	Application - Registratio	20180312
62	EL 2576	Bulolo	Cavalier Resources Limited (100%)	Application - Registratio	20180312
63	EL 2578	Kori River	Copper Quest PNG Limited (100%)	Application - Matter wit	20180320
64	EL 2579	Kurumbukari	MCC Ramu NiCo Limited (100%)	Application - Hearing Co	20180329
65	EL 2580	Kurumbukari	Croke Limited (100%)	Application - In Time	20180329
66	EL 2581	Kurumbukari	Coral Sea Venture Limited (100%)	Application - In Time	20180329
67	EL 2582	Wau	New Leaf Development Limited (100%)	Application - Registratio	20180406
68	EL 2583	Yawawa	Croke Limited (100%)	Application - Hearing Co	20180409
69	EL 2584	Sumwari	Zhong Rui Kuang Ye (PNG) Co. Limited	Application - Hearing Co	20180416
70	EL 2585	Vanimo	Chams Consulting Limited (100%)	Application - Registratio	20180418
71	EL 2586	Salumei	Aiabba Minerals (PNG) Limited (50%), Salumei	Application - Hearing Co	20180423
72	EL 2587	Korosameri	Salumei Korosmeri Ltd (50%), Aiabba Minerals	Application - Hearing Co	20180423
73	EL 2588	Waratau	Jin Gui Jin Ye (PNG) Reality Co. Limited	Application - Hearing Co	20180507
74	EL 2589	April River	Zhong Rui Jin Ye (PNG) Reality Co. Limited	Application - Registratio	20180507
75	EL 2590	East Normanby	WNB Resources Limited (100%)	Application - Registratio	20180516

76	EL 2591	Konos	Mayur Exploration PNG Limited (100%)	Application - Registratio	20180528
77	EL 2592	Wabo	Pacific Energy Consulting Limited	Application - Matter wit	20180615
78	EL 2593	Fore	Cheroh Mining PNG Limited (100%)	Application - Registratio	20180625
79	EL 2594	Rambutyo	Mayur Exploration PNG Limited (100%)	Application - Registratio	20180720
80	EL 2596	Namatanai	B2GOLD CORP (100%)	Application - Registratio	20180814
81	EL 2600	Babase Island	SRMI Bougainville Limited (100%)	Application - Registratio	20180903
82	EL 2601	Ioma	Xianda Trading Limited (100%)	Application - Registratio	20180904

RenewlEL

ID	Field2	Field3	Field4	Field6	Field8	Field9
1		RENEWAL EXPLORATIO				
2	LeaseNo	Location	Parties	Status	GrantDate	ExpiryDate
3	EL 1	Kieta	CRA Minerals (PNG) Limited (100%)	Pending Renewal - On Hold	19650402	20150301
4	EL 2	Kieta	CRA Minerals (PNG) Limited (100%)	Pending Renewal - On Hold	19650402	20150401
5	EL 3	Kieta	CRA Minerals (PNG) Limited (100%)	Pending Renewal - On Hold	19650402	20150401
6	EL 4	Kieta	CRA Minerals (PNG) Limited (100%)	Pending Renewal - On Hold	19650402	20150401
7	EL 4	Kieta	CRA Minerals (PNG) Limited (100%)	Pending Renewal - On Hold	19650402	20150401
8	EL 5	Kieta	CRA Minerals (PNG) Limited (100%)	Pending Renewal - On Hold	19650402	20150401
9	EL 6	Kieta	CRA Minerals (PNG) Limited (100%)	Pending Renewal - On Hold	19650402	20150401
10	EL 7	Kieta	CRA Minerals (PNG) Limited (100%)	Pending Renewal - On Hold	19670204	20150203
11	EL 7	Kieta	CRA Minerals (PNG) Limited (100%)	Pending Renewal - On Hold	19670204	20150203
12	EL 454	Porgera	Barrick (Niugini) Limited (100%)	Pending Renewal - Registration Complete	19800331	20180824
13	EL 485	Londolovit	Lihir Gold Limited (100%)	Pending Renewal - Matter with Minister Grant	19830619	20180331
14	EL 485	Londolovit	Lihir Gold Limited (100%)	Pending Renewal - Matter with Minister Grant	19830619	20180331
15	EL 485	Londolovit	Lihir Gold Limited (100%)	Pending Renewal - Matter with Minister Grant	19830619	20180331
16	EL 497	Wau	Harmony Gold (PNG) Exploration Limited (100%)	Pending Renewal - Hearing Scheduled	19840301	20180825
17	EL 497	Wau	Harmony Gold (PNG) Exploration Limited (100%)	Pending Renewal - Hearing Scheduled	19840301	20180825
18	EL 497	Wau	Harmony Gold (PNG) Exploration Limited (100%)	Pending Renewal - Hearing Scheduled	19840301	20180825
19	EL 858	McNicoll Range	Barrick (Niugini) Limited (100%)	Pending Renewal - Registration Complete	19880525	20180824
20	EL 1043	Nakru	Copper Quest PNG Limited (100%)	Pending Renewal - Registration Complete	19921208	20181207
21	EL 1043	Nakru	Copper Quest PNG Limited (100%)	Pending Renewal - Registration Complete	19921208	20181207

22	EL 1115	Mt Crater	Anomaly Limited (100%)	Pending Renewal - Hearing Scheduled	19940926	20180925
23	EL 1165	Safia Embessa &	Niugini Nickel Limited (100%)	Pending Renewal - Assessment Complete	19960301	20180228
24	EL 1170	Mahur Island	Lihir Gold Limited (100%)	Pending Renewal - On Hold	19960621	19980620
25	EL 1196	Namatanai	Nautilus Minerals Niugini Limited (100%)	Pending Renewal - MAC Deferred	19971128	20171127
26	EL 1196	Namatanai	Nautilus Minerals Niugini Limited (100%)	Pending Renewal - MAC Deferred	19971128	20171127
27	EL 1312	Nong River	Highlands Pacific Resources Limited (100%)	Pending Renewal - Hearing Complete	20020920	20180919
28	EL 1316	Mumeng	Newcrest PNG 3 Limited (50%), Morobe Exploration	Pending Renewal - Registration Complete	20020920	20180919
29	EL 1341	Yonki	K92 Mining Limited (100%)	Pending Renewal - Registration Complete	20040621	20180620
30	EL 1369	Tsile Tsile	Newcrest PNG Exploration Limited (100%)	Pending Renewal - Registration Complete	20041123	20181122
31	EL 1369	Tsile Tsile	Newcrest PNG Exploration Limited (100%)	Pending Renewal - Registration Complete	20041123	20181122
32	EL 1369	Tsile Tsile	Newcrest PNG Exploration Limited (100%)	Pending Renewal - Registration Complete	20041123	20181122
33	EL 1374	Namatanai	Nautilus Minerals Niugini Limited (100%)	Pending Renewal - Registration Complete	20040910	20180909
34	EL 1374	Namatanai	Nautilus Minerals Niugini Limited (100%)	Pending Renewal - Registration Complete	20040910	20180909
35	EL 1374	Namatanai	Nautilus Minerals Niugini Limited (100%)	Pending Renewal - Registration Complete	20040910	20180909
36	EL 1390	Kokoda	Oro Nickel Limited (100%)	Pending Renewal - Matter with Minister Grant	20050610	20170609
37	EL 1392	Tifalmin	Highlands Pacific Resources Limited (100%)	Pending Renewal - Matter with Minister Grant	20050610	20170609
38	EL 1462	Kimbe	Sagittarius Mining Limited (100%)	Pending Renewal - Matter with Minister Grant	20070918	20170917
39	EL 1595	Bulago River	Frontier Gold (PNG) Limited (100%)	Pending Renewal - Registration Complete	20080707	20180706
40	EL 1611	Angiki	Regional Resources (PNG) Limited (100%)	Pending Renewal - Pending Transfer	20081128	20181127
41	EL 1611	Angiki	Regional Resources (PNG) Limited (100%)	Pending Renewal - Pending Transfer	20081128	20181127
42	EL 1629	Garaina	Morobe Consolidated Goldfields Limited (50%),	Pending Renewal - Registration Complete	20081103	20181102
43	EL 1744	Iniok	Frieda River Limited (80%), Highlands Frieda Limited (20%)	Pending Renewal - Hearing Complete	20100621	20180620

44	EL 1745	Magleri	Frieda River Limited (80%), Highlands Frieda Limited (20%)	Pending Renewal - Hearing Complete	20100621	20180620
45	EL 1746	Magleri	Frieda River Limited (80%), Highlands Frieda Limited (20%)	Pending Renewal - Hearing Complete	20100621	20180620
46	EL 1748	Mumeng	Newcrest PNG Exploration Limited (100%)	Pending Renewal - Registration Complete	20120927	20180926
47	EL 1781	Munbil	Anglo American Exploration (PNG) Limited (51%),	Pending Renewal - Hearing Complete	20120312	20180311
48	EL 1873	Kabarau	Waterford Limited (100%)	Pending Renewal - Hearing Scheduled	20120515	20180514
49	EL 1874	Kare	Waterford Limited (100%)	Pending Renewal - Hearing Deferred	20120515	20180514
50	EL 1875	Wabo	Waterford Limited (100%)	Pending Renewal - Hearing Scheduled	20120515	20180514
51	EL 1876	Kare	Waterford Limited (100%)	Pending Renewal - Hearing Scheduled	20120515	20180514
52	EL 1877	Lihir South	Bismarck Mining Corporation (PNG) Limited (100%)	Pending Renewal - Registration Complete	20121008	20181007
53	EL 1877	Lihir South	Bismarck Mining Corporation (PNG) Limited (100%)	Pending Renewal - Registration Complete	20121008	20181007
54	EL 1895	Wabia	Frieda River Limited (80%), Highlands Frieda Limited (20%)	Pending Renewal - Hearing Complete	20120515	20180514
55	EL 1956	Ok Isai	Frieda River Limited (80%), Highlands Frieda Limited (20%)	Pending Renewal - Hearing Complete	20120515	20180514
56	EL 1957	Paupe	Frieda River Limited (80%), Highlands Frieda Limited (20%)	Pending Renewal - Hearing Complete	20120515	20180514
57	EL 1957	Paupe	Frieda River Limited (80%), Highlands Frieda Limited (20%)	Pending Renewal - Hearing Complete	20120515	20180514
58	EL 1966	Wabag 1	Viva No. 20 Limited (100%)	Pending Renewal - Assessment Complete	20130627	20170626
59	EL 1967	Wabag 2	Viva No. 20 Limited (100%)	Pending Renewal - Hearing Deferred	20131128	20171127
60	EL 1968	Wabag 3	Viva No. 20 Limited (100%)	Pending Renewal - Hearing Deferred	20131128	20171127
61	EL 2095	Sideia	Mayur Exploration PNG Limited (100%)	Pending Renewal - Registration Complete	20120927	20180926
62	EL 2096	Warambif	Mayur Exploration PNG Limited (100%)	Pending Renewal - Registration Complete	20140805	20180804
63	EL 2203	Crater Mountain	Anomaly Limited (100%)	Pending Renewal - Matter with Minister Refusal	20150911	20170910
64	EL 2212	Dagua	West Coast Mining Limited (100%)	Pending Renewal - Assessment Complete	20140202	20180201
65	EL 2212	Dagua	West Coast Mining Limited (100%)	Pending Renewal - Assessment Complete	20140202	20180201

66	EL 2249	Gwasa	Anomaly Limited (100%)	Pending Renewal - Matter with Minister Refusal	20131111	20171110
67	EL 2266	Kiwai Island	Mayur Iron PNG Limited (100%)	Pending Renewal - Hearing Complete	20140514	20180513
68	EL 2267	Segero	Mayur Iron PNG Limited (100%)	Pending Renewal - Registration Complete	20161202	20181201
69	EL 2268	Dibiri	Mayur Iron PNG Limited (100%)	Pending Renewal - Registration Complete	20161202	20181201
70	EL 2269	Baimuru	Mayur Iron PNG Limited (100%)	Pending Renewal - Hearing Complete	20140514	20180513
71	EL 2297	Daru	Mayur Iron PNG Limited (100%)	Pending Renewal - Registration Complete	20161202	20181201
72	EL 2303	Pinu Village	Mayur Iron PNG Limited (100%)	Pending Renewal - Pending Transfer	20140514	20180513
73	EL 2304	Terapo	Mayur Iron PNG Limited (100%)	Pending Renewal - Hearing Complete	20140514	20180513
74	EL 2305	Ihu	Mayur Iron PNG Limited (100%)	Pending Renewal - Hearing Deferred	20140514	20180513
75	EL 2306	Kompiam Station	Khor ENG Hock & Sons (PNG) Limited (100%)	Pending Renewal - Hearing Deferred	20151214	20171213
76	EL 2309	Tsile Tsile	Rio Tinto Exploration (PNG) Limited (100%)	Pending Renewal - Registration Complete	20140910	20180909
77	EL 2310	Hauwindi	Harmony Gold (PNG) Exploration Limited (100%)	Pending Renewal - Hearing Scheduled	20140524	20180523
78	EL 2318	Haia Village	Anomaly Limited (100%)	Pending Renewal - Matter with Minister Refusal	20150911	20170910
79	EL 2322	Ulpuna	Sagittarius Mining Limited (100%)	Pending Renewal - Matter with Minister Grant	20150911	20170910
80	EL 2324	Tambu Bay	Komomoa Energy Resources PNG Limited (100%)	Pending Renewal - Hearing Deferred	20150522	20170521
81	EL 2331	Port Moresby,	New Britain Lime & Cement Limited (100%)	Pending Renewal - Hearing Complete	20151102	20171101
82	EL 2331	Port Moresby,	New Britain Lime & Cement Limited (100%)	Pending Renewal - Hearing Complete	20151102	20171101
83	EL 2332	Port Moresby,	New Britain Lime & Cement Limited (100%)	Pending Renewal - Hearing Complete	20151216	20171215
84	EL 2334	Ubaigubi	Anomaly Limited (100%)	Pending Renewal - Matter with Minister Refusal	20150522	20170521
85	EL 2335	Maimafu	Anomaly Limited (100%)	Pending Renewal - Matter with Minister Refusal	20150522	20170521
86	EL 2356	Muller Range	Frontier Copper (PNG) Limited (100%)	Pending Renewal - Hearing Deferred	20151231	20171230
87	EL 2356	Muller Range	Frontier Copper (PNG) Limited (100%)	Pending Renewal - Hearing Deferred	20151231	20171230

88	EL 2356	Muller Range	Frontier Copper (PNG) Limited (100%)	Pending Renewal - Hearing Deferred	20151231	20171230
89	EL 2357	Dumpu	MB Transport Limited (100%)	Pending Renewal - Hearing Complete	20151111	20171110
90	EL 2372	Green River Station	Telemu No.92 Limited (100%)	Pending Renewal - Hearing Scheduled	20160711	20180710
91	EL 2375	Ala River	Frontrunner Exploration PNG Ltd (100%)	Pending Renewal - Matter with Minister Grant	20151214	20171213
92	EL 2375	Ala River	Frontrunner Exploration PNG Ltd (100%)	Pending Renewal - Matter with Minister Grant	20151214	20171213
93	EL 2376	Basamuk	MCC Ramu NiCo Limited (85%), Ramu Nickel Limited	Pending Renewal - Registration Complete	20160526	20180525
94	EL 2378	Lorengau	Finny Limited (100%)	Pending Renewal - Matter with Minister Grant	20151218	20171217
95	EL 2384	Gerepo	Solway Group Mining (PNG) Limited (100%)	Pending Renewal - Hearing Complete	20160711	20180710
96	EL 2384	Gerepo	Solway Group Mining (PNG) Limited (100%)	Pending Renewal - Hearing Complete	20160711	20180710
97	EL 2385	Ononge/Siguf e	Tolukuma Gold Mines Limited (100%)	Pending Renewal - Registration Complete	20160526	20180525
98	EL 2386	Kuabini	Harmony Gold (PNG) Exploration Limited (100%)	Pending Renewal - Matter with Minister Grant	20151231	20171230
99	EL 2390	Lorengau	Finny Limited (100%)	Pending Renewal - Matter with Minister Grant	20151217	20171216
100	EL 2401	Amanab	EL Dorado Mining and Energy Limited (100%)	Pending Renewal - Hearing Complete	20160528	20180527
101	EL 2405	Kupiano	Kavra Maah Limited (100%)	Pending Renewal - Registration Complete	20160309	20180308
102	EL 2408	Sikut Goverment	Ballygowan Limited (100%)	Pending Renewal - Hearing Complete	20160528	20180527
103	EL 2413	Leron Plains	Rio Tinto Exploration (PNG) Limited (100%)	Pending Renewal - Matter with Minister Grant	20160309	20180308
104	EL 2415	Maprik	West Coast Mining Limited (100%)	Pending Renewal - Registration Complete	20160906	20180905
105	EL 2418	Bulolo	Canterbury Resources (PNG) Limited (100%)	Pending Renewal - Hearing Complete	20160711	20180710
106	EL 2419	Tamo	EL Dorado Mining and Energy Limited (100%)	Pending Renewal - Hearing Complete	20160528	20180527
107	EL 2420	Kwikila	Property New Group Limited (100%)	Pending Renewal - Hearing Complete	20160526	20180525
108	EL 2421	Amboin	Aiabba Minerals (PNG) Limited (100%)	Pending Renewal - Hearing Complete	20160528	20180527
109	EL 2426	Keman	GMN 6768 (PNG) Limited (100%)	Pending Renewal - Registration Complete	20160528	20180527

110	EL 2430	Meriamanda	GMN 6768 (PNG) Limited (100%)	Pending Renewal - Registration Complete	20160528	20180527
111	EL 2431	Tamo	EL Dorado Mining and Energy Limited (100%)	Pending Renewal - Hearing Scheduled	20161202	20181201
112	EL 2432	Sinua	Footprint Resources Pty Ltd (100%)	Pending Renewal - Registration Complete	20160711	20180710
113	EL 2432	Sinua	Footprint Resources Pty Ltd (100%)	Pending Renewal - Registration Complete	20160711	20180710
114	EL 2444	Tamo	EL Dorado Mining and Energy Limited (100%)	Pending Renewal - Hearing Scheduled	20160906	20180905
115	EL 2462	Mapua	Nord Australex Nominees (PNG) Limited (100%)	Pending Renewal - Registration Complete	20161115	20181114

PNG MINERAL INFORMATION - MAPS & PUBLICATIONS
GEOLOGY

PNG MINERAL INFORMATION — MAPS AND PUBLICATION

GEOLOGY

	PNG 1:1 million map comprising four (4) sheets (NW, NE,SE, SW)	K80.00
	It provides the general overview of the geology of Papua New Guinea	
	PNG 1:2,500 000 geology map of Papua New Guinea	K60.00

PNG 1:250,000 00 GEOLOGICAL SERIES MAPS WITH EXPLANATORY NOTES, 1ST EDI-

Handbook of small scale mining for Papua New Guinea ***Mike Blowers***	**K25.00** scan version	
ENGLISH VERSION · Introduction to small scale mining techniques Health and safety in small scale alluvial gold mining	PIDGIN VERSION ❑ BOOKLETS · Sampela ol isipela wei bilong wok gol	**K10.00** each
· Introduction to mechanized small scale gold mining	· Mekuri - lukautim yu yet taim yu wok gol	
· Mercury - safe uses in small scale alluvial gold mining · Occupational	· Soim wei bilong yusim ol masin long liklik wok gol	
· Restoration of the landscape and the environment	· Lukautim wara, bus na graun bihain long yu wok gol na pinisim wok gol	
- Gold from gold pans and sluice boxes to bars & jewelry	· helt na sefti long liklik wok gol bisnis	
	· Wei bilong ronim gut liklik wok gol bisnis	
	· Old rowing na piksa bilong wok gol	

DIGITAL DATA		
(1) 1:250 000 digital geological coverage of PNG mainland and New Guinea Islands, produced by Australian Geoscience for (with free explanatory notes) Papua New Guinea Geological Survey in July 01, 2002.		**K1, 100.00**
(2) PNG 1: 1million geological map comprising four (4) sheets (NW, NE, SE, SW). It provides the general overview of the geology of Papua New Guinea. Geo-referenced in MapInfo format		**K300.00**
(3) 1:100,000 Topography, scan map Image		**K65.00**
1:100,000 Topography, geo-reference in	MapInfo format	**K250.00**
1:250,000 Topographic JOG Sheet, scan map Image		**K65.00**
1:250,000 Topographic JOG Sheet, geo-referenced		**K250.00**
(4) 1:100 000 digital drainage vectors, MapInfo format	per map sheet	**K55.00**
1:250 000 digital contour vectors, MapInfo format	per map sheet	**K55.00**
1: 250 000 Topography vectors of PNG	per layer, e.g. Road, etc	**K55.00**
(5) 1: 250 000 geological series map sheets with accompanying explanatory notes		
(First Edition). Geo-referenced MapInfo format 1:100 000 Geology of Central Highlands of PNG by GEOMAP— Area 1		**K110.00**
(16) PNG Gravity Map		**K50.00**
(17) PNG Gravity Points by Province		**K550.00**
(18) PNG Aeromagnetic compilation Map		**K50.00**
PDF version		**K55.00**
1:100 000 GEOMAP, MapInfo Tab files		**K110.00**
(6) Geochemistry Data compilation (by Terra Search),	30 elements	**K5, 500.00**
MapInfo Tables		
- PNG 100k drainage		
- PNG_Topo250		
- Location (GFh_Loc) - Streams (GFs_Seds) - Rocks (GFs_RC)		
- Soils (GFs_Soils)		
Documents		
- PNG URS Disk		
- Report Library		
-Template		
-Tables in Excel Format		
- Tables in Note Pad Format		
- Read me; word document		
(7) Geochemistry Data compiled by Terra Search (by Province),	30 elements	**K1, 100.00**

(8) Gold in PNG	Image file	**K55.00**
Layers files	MapInfo Tab	**K65.00**
Au Labels		
Au Occurrence		
Au Regions Au Base		
Colour Sea		
(9) PNG Minerals classified by mode of formation	Image file	**K55.00**
Layers files	MapInfo Tab	**K75.00**
General Label General Model Base General		
(10) Exploration Licence map (exclusive of PNG Topography) file	Image	**K35.00**
Layers files	MapInfo Tab	**K45.00**

(10) Exploration Licence map (exclusive of PNG Topography)	Image file	**K35.00**
Layers	MapInfo Tab files	**K45.00**
EL Labels		
Base Map		
EL Renewal		
Current EL		
EL Applications		
Reserve		
(11) Mining Projects map	Image file	**K45.00**
Layers	MapInfo Tab files	**K110.00**
Locations City Labels Project Box Grid		
PNG Base		
(12) Flightline Index (250K)	MapInfo Tab files	**K45.00**

GEOPHYSICS DATASETS		
(13) GEOMAP Aeromagnetic Datasets, Area 1 & 2,	2011	**K10, 000.00**
GEOMAP Geochemistry Datasets, Area 1,	48 elements	**K10, 000.00**
(14) Western PNG Airborne Geophysical Survey,	2015	**K30, 000.00**
(15) All PNG Aeromagnetic Datasets		**K11, 000.00**
OTHER DIGITAL PRODUCTS		
(19) PNG DTM Tiles processed from GEOSAR (13.8km x 13.8km)	per tile	**K500.00**
(20) 10m Contours from GEOSAR DTM	per tile	**K200.00**
(21) 20m SRTM Contours, per 100K Index tile	per tile	**K55.00**
(22) 1: 250,000 Metallogenic map: **Ramu** and **D'Entrecasteaux**	each	**K55.00**
(23) SRTM processed Landform backdrop dataset		**K330.00**
(24) SRTM Image Backdrop with Exploration License (EL) Map		**K220.00**
OTHER SERVICES		
PNG BLOCKS AND SUB-BLOCKS		**K100.00**
PNG Blocks and Sub-Blocks Creation of Sketch Map and boundary description for new EL		**K150.00**
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A4 (210 x 297mm) size document (Color)		**K5.00**
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AO (841 x 1189mm) size maps (Color)		**K30.00**

LAMINATION	
A4 (210 x 297mm) map sheet	**K10.00**
A3 (297 x 420mm) map sheets	**K15.00**
A1 (594 x 841mm) map sheet	**K50.00**
AO (841 x 1189mm) map sheet	**K60.00**
PRINTING	
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A3 (297 x 420mm) map sheet (B/W)	**K15.00**
A1 (594 x 841mm) map sheet (color)	**K40.00**
A1 (594 x 841mm) map sheet (B/W)	**K30.00**
AO (841 x 1189mm) map sheet (color)	**K60.00**
AO (841 x 1189mm) map sheet (B/W)	**K50.00**

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