



GEOTHERMAL RESOURCE POLICY

Papua New Guinea

AUGUST 2020





PHOTOGRAPH:

A drilling operation undertaking a 'work-over' of a geothermal well at the Lihir Gold Mine Project on Lihir Island, New Ireland Province, Papua New Guinea. This operation is the only existing geothermal project in Papua New Guinea.

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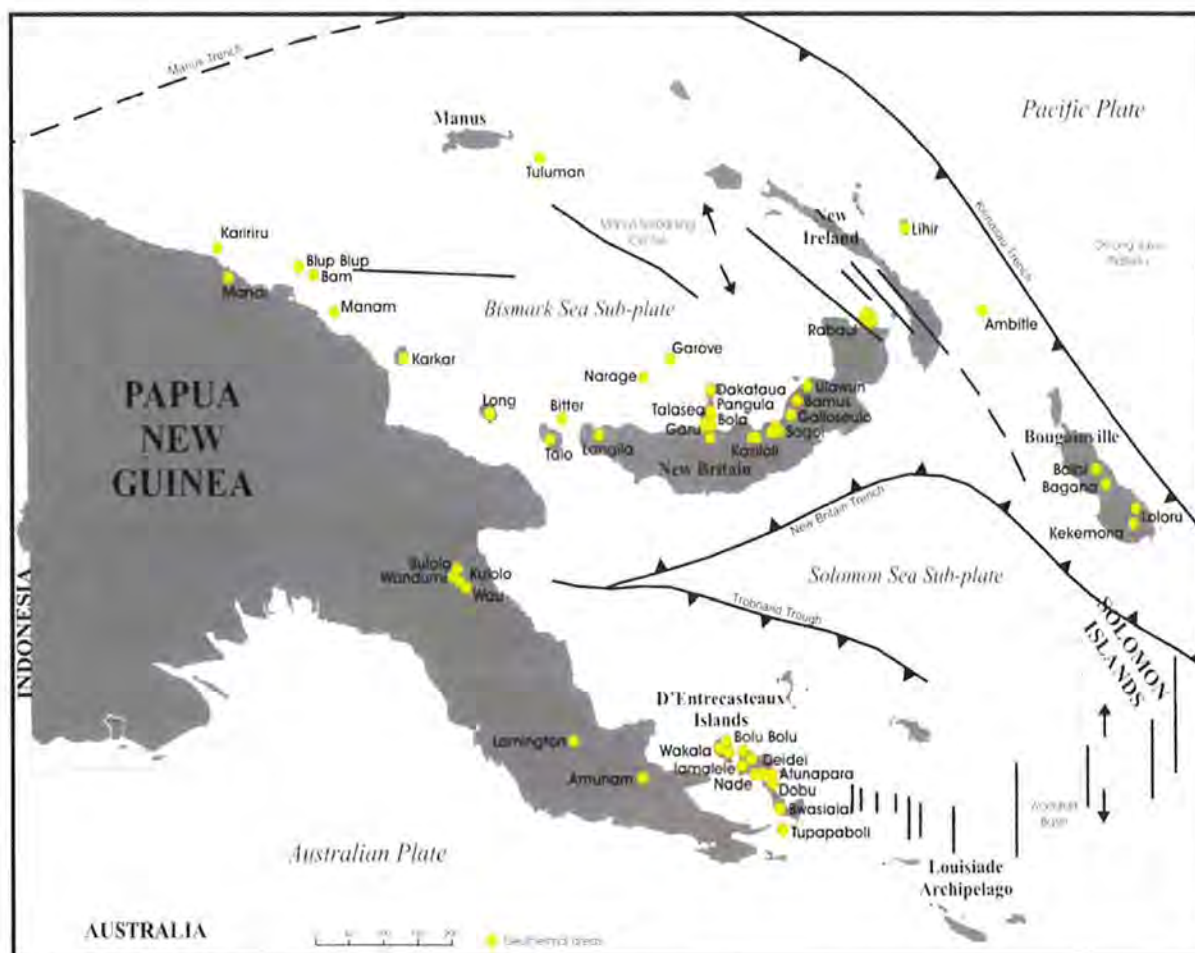
ACRONYMS

CA	Compensation Agreement
CDM	Clean Development Mechanism
CDPP	Conceptual Decommissioning Power Plant
CEPA	Conservation and Environment Protection Authority
DJAG	Department of Justice and Attorney General
DMPGM	Department of Mineral Policy and Geohazards Management
DPE	Department of Petroleum and Energy
DPLLGA	Department of Provincial and Local-Level Government Affairs
ICCC	Independent Consumer and Competition Commission
IRC	Internal Revenue Commission
IRSP	Institutional Resource Sector Planning
LMP	Lease for Mining Purposes
MAC	Mining Advisory Council
ME	Mining Easement
ML	Mining Lease
CDA	Community Development Agreement
MRA	Mineral Resource Authority
NEC	National Executive Council
NGDP	National Goals and Development Principles
CCDA	Climate Change and Development Authority
PPL	PNG Power Limited
SNT	State Negotiation Team

BACKGROUND

Papua New Guinea (PNG) is located on the 'Pacific Ring of Fire' where tectonic plate movements and associated volcanic activity occur. The northern zone which extends from Madang to New Britain, New Ireland and Bougainville, and the southern zone which extends from Mt. Lamington in the Northern Province to Milne Bay Province's D'entrecasteaux Islands have been identified as areas in the country having the potential for geothermal resource extraction and development.

The following map shows the locations of known geothermal areas in Papua New Guinea.



Map of Papua New Guinea showing the locations of known geothermal areas from Mosusu (2008) and Heming (1969). The plate/micro-plate boundaries are modified from Williamson and Hancock (2005).

Geothermal resources in Papua New Guinea mostly occur in isolated locations remote from large population centres. Little scientific information is available in relation to much of these geothermal resources. However, the potential exists for a range of uses of geothermal resources principally for electricity generation, but could also include other uses such as direct heat applications and the development of tourism attractions based on the existence of surface geothermal features.

A geothermal resource is classified as a mineral pursuant to the *Mining Act* 1992 and is regulated under the mining regulatory framework.

PART ONE: GEOTHERMAL RESOURCE POLICY

1. APPLICATION

- (a) This Policy relates specifically to the exploration, development, production, use and management (including preservation) of geothermal resources in Papua New Guinea and needs to be read with reference to the *Mining Act* 1992, the Mineral Policy Handbook 2004 and the *Mining (Safety) Act* 1977.
- (b) This Policy is consistent with the *Mining Act* 1992 in relation to geothermal resources and for any associated approvals required under the *Environment Act* 2000, the *Mining (Safety) Act* 1977 and such other relevant legislations. The Mineral Resources Authority and the Conservation and Environment Protection Authority shall apply this Policy as part of their assessment of any applications for the exploitation of geothermal resources.
- (c) References to the *Mining Act* 1992, the *Mining (Safety) Act* 1977 and any other legislations including the Mineral Policy Handbook 2004 also includes any subsequent amendments or enactments to these legislations and policy and is inclusive of the regulations unless stated otherwise.

2. TRANSITIONAL PERIOD

This Policy shall apply to all existing and new geothermal resource projects as provided for in the *Mining Act* 1992.

3. INTERPRETATION

The interpretation of this Policy shall be in its liberal sense specifically for geothermal resources with reference to the *Mining Act* 1992 and the Mineral Policy Handbook 2004, and with the following specific definitions:

‘Cascade use’ means any activity that productively uses ‘waste’ geothermal energy or water following on from another use of that geothermal energy or water.

“Environment” has the same meaning as set out in Section 2 of the *Environment Act* 2000.

“Exploitations” means the various phases from exploration, development, production, use and management (which includes the preservation of a geothermal system) of a geothermal resource.

“Geothermal energy” means energy derived or derivable from and produced within the earth by natural heat phenomena and geological activity.

“Geothermal features” means surface manifestations of underlying geothermal processes or discharges, including steam-fed features, geothermal water-fed features, and remnant features such as hydrothermal eruption craters and ancient sinters. Examples of geothermal features include but are not limited to:

- (a) Geysers; and
- (b) Boiling pools of water or mud; and
- (c) Fumaroles; and
- (d) Heated or steaming ground; and
- (e) Geothermally altered ground; and
- (f) Geothermal collapse pits; and
- (g) Geothermal springs or seeps; and
- (h) Ancient sinter.

“Geothermal System” means an individual body of geothermal energy and water not believed to be hydrologically connected to any other system. The system includes material containing heat or energy surrounding any geothermal water, and all plants, animals and other features dependent on the body of geothermal energy and water.

NOTE: Where there is insufficient information available to define the extent of a geothermal system, an appropriately sized ‘Geothermal Management Area’ (being the best approximation as to the likely extent of the geothermal system in question) shall be identified for the purposes of any application for a mineral tenement relating to geothermal resources or any other related application (e.g. an application under the *Environment Act* 2000). In these circumstances, any reference in this Policy to a ‘geothermal system’ shall be deemed to be a reference to such an identified corresponding ‘Geothermal Management Area’.

“Geothermal Resources” are classified as renewable resources, in the form of:

- (a) All products of geothermal processes, including geothermal water and geothermal energy; and
- (b) Steam and other gases, hot water heated within the earth by natural phenomena to a prescribed temperature and hot brines resulting from water, gas or other fluids artificially introduced into geothermal formations; and
- (c) Heat or associated energy found in geothermal formations; and

(d) Any by-product derived from any or all of the above.

“Production” means the extraction of geothermal energy and/or water from the earth for domestic or industrial use or for any other commercial purposes.

4. POLICY MISSION

To establish a framework that guides and promotes the exploration, development, production, use and management of geothermal resources in Papua New Guinea in a safe and sustainable manner for the benefit of the nation.

5. POLICY OBJECTIVE

To encourage, allow and facilitate the exploration, development, production, use and management (including preservation) of geothermal resources in Papua New Guinea in a safe and sustainable manner consistent with this Policy.

6. UNDERLYING PRINCIPLES

The following principles underlies the policy objectives-

(1) Encourage Investment

To encourage and promote investment in the exploration, development, production, use and management of geothermal resources, particularly as a renewable source of electricity generation, as well as for a wide range of other potentially beneficial uses including cascade uses of geothermal energy.

(2) Identification of Landholders

- (a) Any application for an ML, ME, or LMP for geothermal resources shall include information relating to landholder identification and social mapping requirements which correctly identify the landholders and communities potentially affected by the proposed activities the subject of the application.
- (b) In the case of an application for an EL, the MRA Managing Director may require the tenement holder to prepare and submit such social baseline plans as he deems necessary during the exploration stage.

(3) Benefits to Local and/or Affected Landholders and Communities

Opportunities shall be identified and provided for local and/or affected landholders and communities to be involved in projects associated with the exploitation of geothermal resources.

The exploitation of any geothermal resources is expected to translate into tangible benefits to the local and/or affected landholders and communities. This requirement is applicable even to a project being undertaken by a local landholder.

(4) Health and Safety

The developer shall comply with the *Mining (Safety) Act 1977*.

The developer shall adopt the best industry technology, practice, standards and codes into its health and safety management regime.

(5) Environmental Protection and the Management

The developer shall comply with the *Environment Act 2000*. The requirements in this Policy relating to the management of the environment are given effect through the Environment Permit application process under the *Environment Act 2000* for the proposed geothermal exploration or development proposal.

The developer shall adopt the best industry technology, practice, standards and codes into its environmental management regime.

An application shall specify the identified geothermal features within an application area. The applicant shall provide the financial modelling of the project specifying the values associated with any geothermal features identified within the area.

The exploration and exploitation of geothermal resources shall be undertaken in a manner that minimises any adverse effects on valuable geothermal features.

As part of any development, production, use and management of geothermal resources, a Discharge Strategy forming part of a System Management Plan shall be prepared with the focus:

- (a) on the sustainable management of the geothermal resource;
- and

- (b) to avoid discharges of geothermal water to fresh surface water bodies, fresh ground water, or the coastal marine environment.

Adverse effects on the natural and physical environment (including overlying buildings, structures, and important and significant features) resulting from subsidence of land or land instability, arising from the production, use and discharge of geothermal energy or water are to be avoided, or effectively remedied or mitigated where avoidance is not practicable.

Activities in relation to exploitation of geothermal resources that may result in a significant risk of serious and material environmental harm within Wildlife Management Areas, Conservation Areas, National Parks and Protected Areas or any area declared to be protected under the provisions of any International Treaty to which Papua New Guinea is a party which has been ratified under Section 117 of the *Constitution of the Independent State of Papua New Guinea*, shall be subjected to the requirements of the *Environment Act 2000*.

(6) Exploration Phase - Identification and Characterisation of Geothermal Systems

An application for an EL under the *Mining Act 1992* in relation to a geothermal resource shall include in its work program, amongst others, the following information:

- (a) Specification of the extent of the EL area and a description of the known geothermal system at the time, including the inventory and mapping of any known geothermal features and the values placed on those features. Where there is insufficient information available to define the extent of a geothermal system, an appropriately sized 'Geothermal Management Area' (being the best approximation as to the likely extent of the potential geothermal system in question) shall be identified for the purposes of an application; and
- (b) The objectives of the proposed exploration; and
- (c) A description of the nature of the proposed exploration including the extent of any well drilling; and
- (d) A description of the ways in which the proposed exploration, including any well drilling, will be managed to avoid, mitigate or remedy any adverse effects on the environment; and

- (e) A proposed exploration program including timeframes and milestones; and
- (f) A description of how the proposed exploration will be undertaken pursuant to the objectives of this Policy.

(7) Production Management Phase - Management of Geothermal Systems

The exploitation of geothermal resources shall be undertaken in a manner that allows for the controlled depletion of the energy in a geothermal system through a staged production/production scheduling based on reservoir modelling that;

- (a) Considers the capacity and sustainable yield of the geothermal system as a whole; and
- (b) Considers the reasonably foreseeable needs of present and future generations; and
- (c) Promotes the efficient management and use of the geothermal system; and
- (d) Adopts best industry technology, practice, standards and codes.

(8) Production Management Phase - System Management Plan

Any application for a ML, LMP, or a ME in relation to geothermal resources involving the production of geothermal water and/or steam to a level as prescribed shall include in the proposal for development a System Management Plan which shall address the following matters:

- (a) A description of the geothermal system including:
 - (i) Identification of the extent of the tenement area(s) and description of the known characteristics of the geothermal system at the time of application, including an inventory and mapping of any known geothermal features; and
 - (ii) A financial model of the value of the geothermal feature(s); and
 - (iii) Confirmation and explanation as to the appropriateness of the proposed Geothermal Management Area where the extent of the geothermal system of interest is not known.

- (b) A description of the proposed use and the method of development of the geothermal system including:
 - (i) Plans showing the location of proposed wells, pipelines, buildings and other surface infrastructure; and
 - (ii) A production strategy and discharge strategy including the reinjection/injection of geothermal water; and
 - (iii) Operational flexibility and adaptive management including provision for subsequent or cascade uses.
- (c) Reservoir modelling (demonstrating the sustainability of the proposed production and reinjection/injection regime) and subsidence modelling; and
- (d) Measures to ensure that adverse effects on the environment will be avoided, minimised, remedied or mitigated; and
- (e) Mechanism(s) to ensure coordination and promote cooperation between all holders of mineral tenements relating to the same geothermal system; and
- (f) Research, monitoring and reporting; and
- (g) Periodic review of the System Management Plan; and
- (h) Explanation of how the System Management Plan gives effect to the objective and policy principles in this Policy.

The System Management Plan shall incorporate all other requirements of relevant agencies, including the CEPA pursuant to the *Environment Act* 2000 prior to approval.

The System Management Plan shall be updated and amended as and when a variation is sought under the *Mining Act* 1992 or when the prescribed production levels are exceeded.

The proposed development and use of the geothermal system shall be undertaken in accordance with the approved System Management Plan.

A Peer Review Panel may be established for purposes of providing an oversight to manage the geothermal system in accordance with the

System Management Plan, as well as to provide advice on any review of the System Management Plan where necessary.

(9) Production Management Phase - Decommissioning of a Geothermal Power Plant and Rehabilitation

The project developer shall be required to produce a Decommissioning Power Plant Plan (DPP Plan) at the time of the lodging of an application for a ML associated with a development that includes a geothermal power station. This DPP Plan should take into consideration the health, safety, socio-economic and environmental aspects of the impacted project area and incorporate effective rehabilitation measures consistent with the geothermal project rehabilitation and closure plan.

(10) Monitoring, Reporting, and Auditing

- (a) Monitoring, reporting and auditing will be in accordance with the terms and conditions of the mineral tenements as prescribed in the *Mining Act* 1992.
- (b) The project developer shall make available a detailed quarterly progressive report to, and meet with the MRA consistent with the reporting requirements of the *Mining Act* 1992 and as directed by the MRA Managing Director and the State's relevant agencies and departments.
- (c) The project developer shall provide timely and accurate mineral and geological data or information, inclusive of research activities to the MRA.

(11) Financial Assurance

Consistent with Clause 6 (4) of this Part, sustainable socio-economic development and the mine rehabilitation and closure requirements, a financial assurance shall be required as a condition of any EL relating to a geothermal resource that involves drilling a well and/or any ML for a development involving the extraction/production of geothermal water and/or steam to the level prescribed.

PART TWO: METHODOLOGY

PART

1. IMPLEMENTATION AND PROCEDURE

1. 6

1. 6-25

The implementation of this Policy is subjected to the following considerations as spelt out in the *Mining Act* 1992:

(1) Institutional Structure

The State through the MRA and the PPL recognises the need for Institutional Resource Sector Planning (IRSP) in developing the geothermal resource by;

- (a) Using the mineral tenement licensing process from the application through to the administration and regulation of the development of the geothermal resource; and
- (b) Promoting and encouraging the use of the appropriate modern technology and the best practice available internationally in the production of geothermal energy in the extraction, development and production for the supply of electricity and heat; and
- (c) Complying with the requirements of the *Electricity Industry Act* 2002 (Chapter 78) and *Electricity Supply (Government Power Stations) Act* 1970.

(2) Mineral Rights in Geothermal Resource

The Independent State of Papua New Guinea has ownership over all natural reserves of geothermal resources within its jurisdiction as provided for in the *Mining Act* 1992.

All mineral rights of every geothermal resource in PNG are vested in the State. The State has the exclusive right to permit any person, particularly investors to explore, produce, use and manage the geothermal resource.

(3) Exploration Rights

Exploration rights over geothermal resources are granted in the form of tenements under the *Mining Act* 1992 to persons or companies over a fixed term and over a fixed area subject to the following requirements;

(a) Reporting

The National Government requires transparent reporting on all information regarding any mineral or geological data found within PNG. Reporting shall be in accordance with the *Mining Act* 1992 to the MRA.

(b) Consultation

The National Government encourages consultations and awareness to be carried out as part of the preparation of any application for a mineral tenement relating to geothermal resources.

(4) Application for a Mineral Tenement relating to Geothermal Resources

The type of tenements and the application process for geothermal resource exploration and development are as prescribed in the *Mining Act* 1992 and is administered by the MRA.

(5) Geothermal Resource Agreements

- (a) The State may enter into the agreements as prescribed in the *Mining Act* 1992 with the developer and the landholders of the impacted project area. The State shall ensure appropriate production and benefit sharing arrangements are made between all relevant stakeholders inclusive of the sale of and the distribution of carbon credits (where applicable).
- (b) All laws of PNG shall apply to the project and any dispute that may arise as a result of the project participants executing the agreement.
- (c) The agreement shall be interpreted in accordance with the *Mining Act* 1992 and all applicable laws of the Independent State of Papua New Guinea.

(6) Fiscal Regime

The applicable mining fiscal provisions in the *interim* are as encapsulated in the Mineral Policy Handbook 2004, *Mining Act* 1992 and the *Income Tax Act* 1959 until a determination is made on the applicable rates applicable for geothermal resource. The Mineral Policy Handbook 2004 specifies the fiscal provisions for all minerals and would be used as a guide taking into account the special nature of the geothermal resources.

(7) Royalties

Royalty generated is applicable from the production of geothermal energy and/or water. The project developer of the geothermal resource shall pay to the Independent State of Papua New Guinea a royalty at a rate to be determined by the State, which shall be determined prior to any geothermal development.

(8) State's Participation

Pursuant to the *Mining Act* 1992 and in consideration of the project economics and all other relevant considerations, the State through the Mining SNT acting on advice may consider the State's participation in the following matters;

- (a) State Equity Option; and
- (b) Landholder Equity; and
- (c) Non Customary Landholders; and
- (d) Carbon Credit sales.

(9) Clean Development Mechanism

In exploiting geothermal resources, the State through MRA, Kumul Minerals Holdings Limited, PPL or the CCDA shall be responsible for promoting sustainable socio-economic development for Papua New Guinea through the CDM arrangement consistent with the United Nations Framework Convention on Climate Change.

(10) Carbon Credits

Subject to Clause 1 (8) of this Part, the State through its nominee and in consultation with the MRA, Department of Treasury, CEPA and the CCDA shall participate in the sale of carbon credits associated with the production of a geothermal resource power plant.

2. GEOTHERMAL RESOURCE DATABASE AND INFORMATION MANAGEMENT

Consistent with the reporting requirements of the *Mining Act* 1992, the State through the MRA is mandated to retain full and accurate information on geothermal resource in Papua New Guinea kept by the holder of the geothermal resource tenement relating to;

- (a) Boreholes drilled with detailed logs of strata penetrated; and
- (b) Results of any geochemical and geophysical analysis; and
- (c) Geological interpretation of the records on boreholes drilled and the results of the geochemical and geophysical analysis, maps, profiles and diagram charts.

And not limited to this, any such other information or data relating to the availability of the geothermal resources, its exploration, extraction, development and production. The State has the absolute right over all such information, data and records as the owner of the geothermal resource.

3. DISPUTE RESOLUTION

All disputes shall be settled in Papua New Guinea in accordance with the *Mining Act 1992*.

Any disputes relating to the exploitation of geothermal resource shall be dealt with in accordance with the *Mining Act 1992* and the nature of the disputes as follows but not limited to:

NOs:	NATURE OF DISPUTES	RESPONSIBLE AGENCIES
1.	<i>Tenement</i>	▪ MRA ▪ DMPGM
2.	<i>Electricity/Water</i>	▪ ICCC ▪ PPL ▪ MRA ▪ DPE ▪ Water PNG ▪ Prime Minister's Department and NEC
3.	<i>Landholders</i>	▪ MRA ▪ DMPGM ▪ DPE ▪ Water PNG ▪ PPL ▪ Host Provincial Government ▪ DPLLGA ▪ Prime Minister's Department and NEC ▪ DJAG

Nos:	NATURE OF DISPUTES	RESPONSIBLE AGENCIES
4.	<i>Economic</i>	▪ DMPGM (SNT Member) ▪ Department of Treasury (SNT Member) ▪ State Solicitor (SNT Member) ▪ MRA ▪ ICCC ▪ PPL ▪ DPE ▪ Water PNG ▪ IRC ▪ CCDA ▪ Prime Minister's Department and NEC
5.	<i>Environment/Safety</i>	▪ MRA ▪ CEPA ▪ DPE ▪ Water PNG ▪ DMPGM ▪ Prime Minister's Department and NEC

- (1) All issues are to be resolved amicably by mutual consent of the parties with guidance from the Office of the State Solicitor of Papua New Guinea.
- (2) Where an issue is unresolved then pursuant to the *Mining Act* 1992 the dispute shall be dealt with through an arbitrator duly nominated by the parties with the relevant expertise in geothermal resource or the subject of the issue in dispute.

PART THREE: LEGISLATIVE AND REGULATORY FRAMEWORK

This Part provides the legislative and regulatory framework by which the exploration, development, production, use and management of geothermal resources in Papua New Guinea are regulated.

1. LEGISLATIVE FRAMEWORK

(1) INTERNATIONAL LEGAL FRAMEWORK

Papua New Guinea is a member to many international treaties insofar Section 117 of the *Constitution of the Independent State of Papua New Guinea* applies. The principal convention on the development of geothermal resources to which this Policy seeks to be consistent with is the United Nations Framework Convention on Climate Change.

(2) NATIONAL LEGAL FRAMEWORK

Mining Act 1992

For the purposes of this Policy, geothermal resources are classified as a mineral pursuant to the *Mining Act 1992* and are to be regulated under the mining regulatory framework. Geothermal resources are not considered petroleum nor a petroleum product under the *Oil and Gas Act 1998*.

While it involves different physical processes compared with other forms of mining (e.g. an open cast mine), the use of the heat and energy within a geothermal system as a result of geothermal water being extracted from the ground is a form of mining. A key difference is that geothermal energy is a renewable resource if the geothermal system from which it is taken is managed appropriately in a sustainable manner.

2. COMPLIANCE WITH LEGAL REQUIREMENTS

The following national legislation and policies apply in the administration of this Policy:

(1) Legislations

- (a) *Constitution of the Independent State of Papua New Guinea*; and
- (b) *Electricity Industry Act 2002* (Chapter 78); and
- (c) *Electricity Supply (Government Power Stations) Act 1970*; and
- (d) *Environment Act 2000*; and
- (e) *Income Tax Act 1959*; and
- (f) *Land Act 1996*; and
- (g) *Land Disputes Settlement Act 1975*; and
- (h) *Mining Act 1992*; and
- (i) *Mineral Resources Authority Act 2018*; and
- (j) *Mining (Safety) Act 1977*; and

any other relevant and/or applicable legislations.

(2) Policies

- (a) Development Strategic Plan 2010 - 2030; and
- (b) Medium Term Development Plan 2011 - 2015; and
- (c) Mineral Policy Handbook 2004; and
- (d) National Goals and Directive Principles; and
- (e) Papua New Guinea Vision 2050; and

such other relevant national development plans or policy directives issued by the National Government from time to time.

3. INSTITUTIONAL GOVERNANCE

The relevant institutions with the responsibility for overseeing the development, planning, implementation and monitoring of this Policy are:

- (a) Department of Mineral Policy & Geohazards Management; and
- (b) Mineral Resources Authority; and
- (c) Conservation and Environment Protection Authority; and
- (d) Office of the Climate Change and Development; and
- (e) Independent Consumer and Competition Commission; and
- (f) PNG Power Limited; and
- (g) Water PNG; and
- (h) Department of Petroleum and Energy; and
- (i) Department of Justice and Attorney-General.

The specific functions of these institutions are defined as follows-

(1) Department of Mineral Policy & Geohazards Management

The DMPGM is the custodian of this Geothermal Resource Policy and is responsible for developing and reviewing the Policy from time to time.

(2) Mineral Resources Authority

The MRA pursuant to the *Mineral Resource Authority Act* 2018 shall:

- (a) Be the overall implementing and regulating agency for the development of geothermal resources in Papua New Guinea; and

- (b) Facilitate stakeholder agreements and development agreements; and
- (c) Collect and maintain the principal database on geothermal resource for Papua New Guinea; and
- (d) Sell geo data on the geothermal energy to potential and prospecting investors and developers where such information is not the subject of a confidentiality agreement; and
- (e) Promote training and the development of its technical capacity in the field of geothermal resources exploration and production.

(3) Conservation and Environment Protection Authority

The CEPA is responsible for ensuring compliance with the *Environment Act 2000* and the *Environmental (Prescribed Activities) Regulation* for permitting and compliance purposes.

(4) Climate Change and Development Authority

The State through the CCDA shall be responsible for any dealings relating to the geothermal resource CDM and carbon trade.

(5) Independent Consumer and Competition Commission

For the specific purposes of the production and use of geothermal resources for generating electricity, the ICCC shall be responsible for regulating prices, service standards and adjudicating disputes related to access codes and access arrangements.

(6) PNG Power Limited

The State through the MRA, the developer and the PPL in close collaboration with DPE and Water PNG shall be responsible for formulating the power supply plan for the geothermal resources to ensure there is ample and affordable supply of heat and electricity for domestic usage, commercial consumption and industrial development.

(7) Water PNG

The State through the Water PNG shall ensure the supply of piped hot water extracted from the geothermal resource for domestic usage, commercial consumption and industrial development.

(8) Department of Petroleum and Energy

The State through the DPE in close collaboration with the PPL and Water PNG shall be responsible for the supply of energy derived from the geothermal resources to ensure there is ample and affordable supply of energy for domestic usage, commercial consumption and industrial development.

(9) Department of Justice and Attorney-General

The DJAG in collaboration with the Department of Mineral Policy & Geohazards Management and the Mineral Resources Authority shall have the legislative oversight as well as in the resolution of disputes arising in relation to the exploitation of geothermal resources in PNG.

APPENDICES

FIGURE 1: PROJECT SEQUENCING

The project sequencing is as follows-

- 1 Lodging of the Application for an Exploration Licence and Alluvial Mining Lease
- 2 Granting of the Exploration Licence and Alluvial Mining Lease (*non-mechanized*)
- 3 Lodging of the Application for Retention Licence (*where applicable*)
- 4 Granting of Retention Licence (*where applicable*)
- 5 Submitting the Environmental and Social Impact Assessment (ESIA) Report
- 6 Requisite Regulatory Authorization, Approval and Permit (*Environment Act 2000, Land Act 1996, etc.*)
- 7 Lodging of the Application for Mining Lease and Alluvial Mining Lease (*mechanized*)
- 8 Signing of the Mining Development Contract (MDC) for Mining Lease (*where applicable*)
- 9 Conducting of the Development Forum
- 10 Signing of the Community Development Agreement (CDA) and Compensation Agreement (CA)
- 11 Granting of the Mining Lease and Alluvial Mining Lease (*mechanized*)

FIGURE 2: MINING PROJECT CYCLE

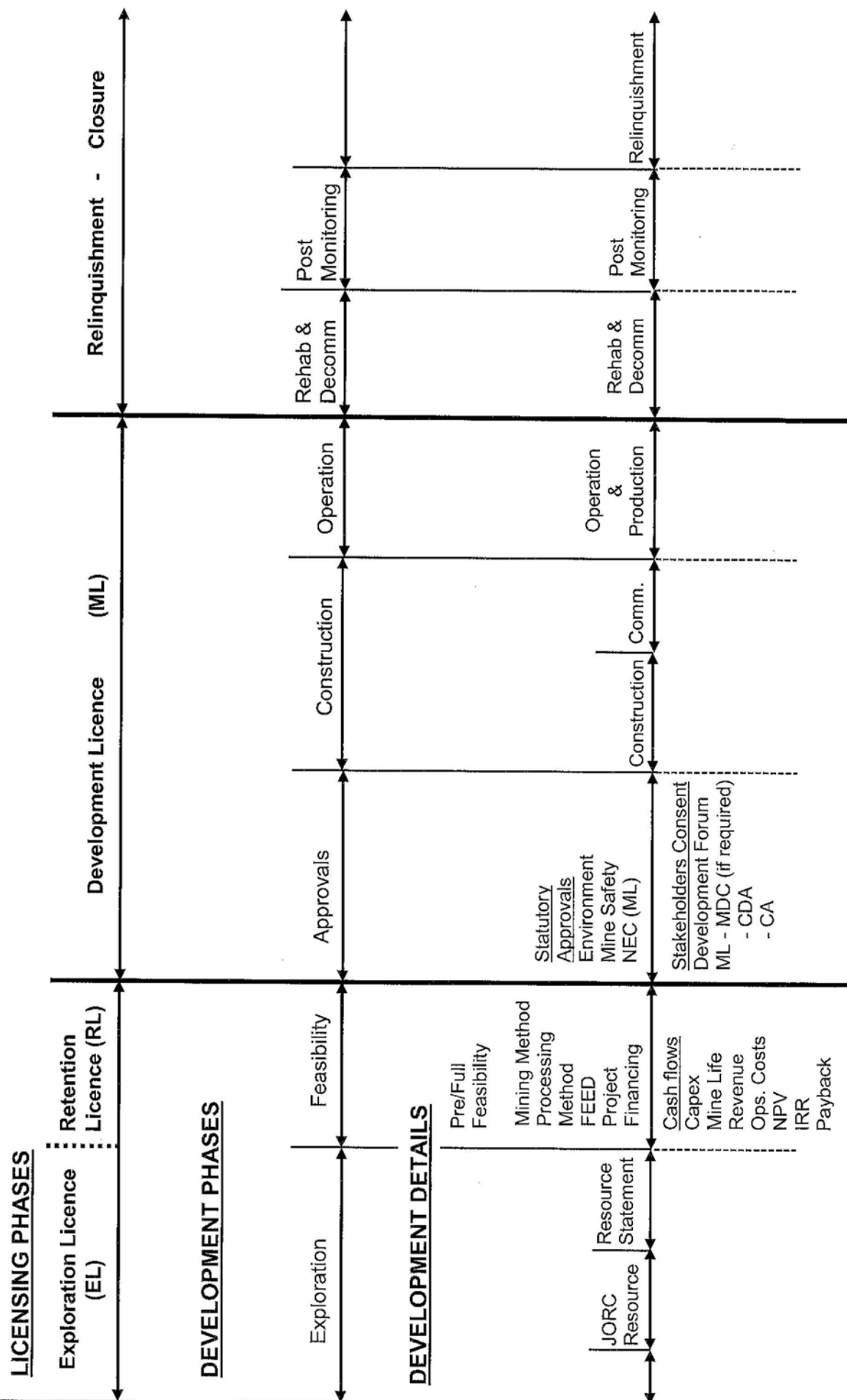
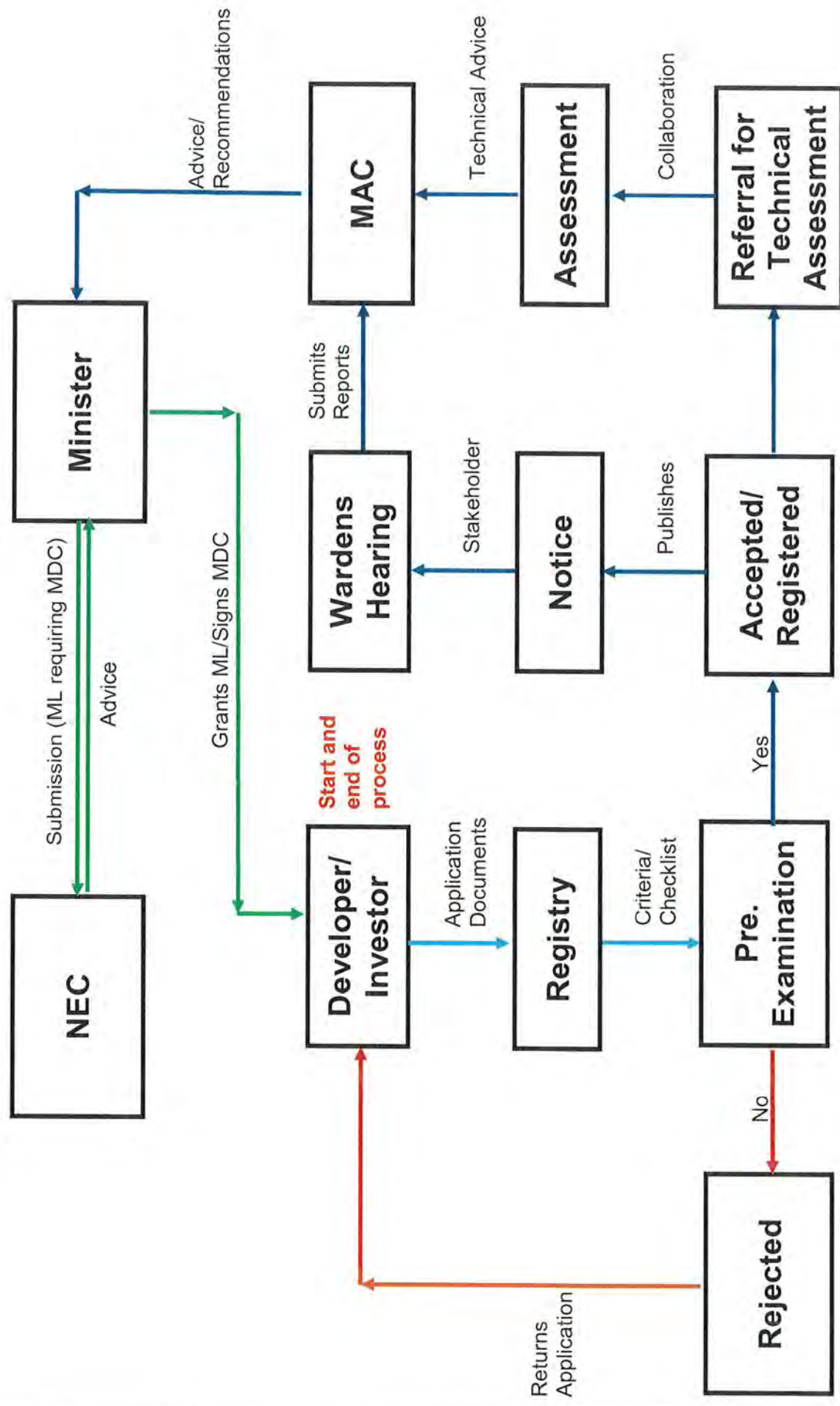


FIGURE 3: TENEMENT APPLICATION & LICENSING PROCESS



For further information contact the Department of Mineral Policy & Geohazards Management and the Mineral Resources Authority.

POLICY AND LEGISLATION:

The Secretary
Department of Mineral Policy & Geohazards Management
Private Mail Bag
PORT MORESBY
National Capital District
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Telephone: (+675) 321 4138/ 322 7678/ 322 7600
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REGULATION:

The Managing Director
Mineral Resources Authority
P.O. Box 1906
PORT MORESBY
National Capital District
Papua New Guinea



Telephone: (+675) 321 3511
Facsimile: (+675) 321 5781
Email: infor@mra.gov.pg
Website: www.mra.gov.pg