Myanmar’s Mineral Potentials and Opportunities.

By
Zaw Win
Director (Retired)
Department of Mines
Member of M E S
Outlines

• Myanmar’s Geology in brief
• Mineral Provinces of Myanmar
• Status of Mineral Exploration Activities
• Mineral Occurrences
• Location of Mineral Deposits, Gold, Copper, Lead/Zinc, Nickel, Antimony, Tin/Tungsten, Limestone, Coal
Outlines (Contd.)

- Type of Mining Activities
- Essentials in the Proposals
- Business License
- Logistics/ Communication/ HR
- Environmental Issues
- Conclusion
Myanmar can be divided into four geographic belts, each of which, by its own right is geotectonic belt, possessing a separate stratigraphic succession and a deformational history. They are from east to west: -

• The Eastern Highlands.
• The Central Lowlands.
• The Western Ranges.
• The Rakhine Coastal Belt.
The Eastern Highlands

• Mountainous tract of Kachin State on the North, Shan Plateau in the middle and Tanintharyi Ranges in South- composed principally of Pre-Cambrian, Paleozoic-
-Mesozoic rocks, Granite intrusions of Mesozoic- early Tertiary
The Central Lowland

- Composed of Ayeyarwady, the Chindwin, the Myittha- Kabaw, the Sittaung Valley and intervening ridges. The Belt is underlain dominantly by Cenozoic strata and some volcanic rocks. The central volcanic arc of Myanmar passes through along the middle
The Western Ranges

• Consisting of Naga Hills in the North, the Chin Hills in the Middle and the Rakhine Yoma in the south and underlain by flisch type deposits (mid Triassic- Eocene rocks) Ultra basic rocks occurs along eastern margin.
The Coastal Belt

- The Belt consists the Rakhine Coastal lowland between the Western Ranges and Bay of Bengal and underlain by flysch type deposits (Up. Cretaceous) and Tertiary rocks
Mineral provinces of Myanmar
Geotechtonic Belts and Mineral Provinces
Present Status of Mineral Prospecting, Exploration and Production.

a) **Gold** - Extensively going on with good results.
b) **Platinum Group Minerals** - Very rarely found as by-product from washed gold in Kachin State and Sagaing Region.
c) **Uranium and Radioactive Minerals** - Scout prospecting of tantalite, columbite, monazite, zircon, xenotime and fossil wood was made throughout Myanmar. No follow up yet.
d) **Rare Earth Elements** - No considerable activities to date.
Future Programme

a) JOGMEC and DGSE (Ministry of Mines, Myanmar) has agreed to commence joint exploration activities for Sn, W, Sb, Mineral Sands, REE and PGM in regions influenced by igneous activities.
Mineral occurrence map of Myanmar

4. MINERAL OCCURRENCES MAP OF MYANMAR

62 commodities of mineral about 2000 mineral occurrences are recorded.

MAJOR MINERALS

PRECIOUS STONES
- Jade, Ruby, Sapphire and other Gems stones

PRECIOUS METAL
- Gold, Silver, PGM

METALLIC MINERAL
- Copper, Lead, Zinc, Titanium, Telluride
- Tin, Tungsten, Bismuth, Molybdenum, Cobalt,
- Nickel, Chromite, Iron, Manganese,

NONMETALLIC MINERAL
- Barite, Fluorite, Quartz, Feldspar, Beryllium
- Heavy mineral , Bauxite, Phosphate,
- Glass sand , Zircon sand, Graphite, Asbestos

INDUSTRIAL MINERAL
- Limestone, Feldspar, Clay, Bentonite

ENERGY MINERAL
- Coal, Oil Shale
1. Gold
2. Gems & Jade
3. Copper
4. Coal
5. Nickel
6. Antimony
7. Lead, Silver, Zinc
8. Tin, Wolfram
9. Pearl
10. Iron & Steel
11. Limestone
Occurrence of Mineral deposits are observed all over Myanmar except along eastern most and Ayeyarwady delta areas.

Detailed field exploration activities are envisaged.

Infrastructure development in mineral deposit locations will encourage economic exploitation.
Gold Platinum Deposits

Gold occurrences = 341
Potential = 66 million ore tons
Copper Deposits of Myanmar

DISTRIBUTION OF COPPER DEPOSITS

- Shangalon
  Cu - 0.23%
  9 million (Possible)

- KyesinTaung
  Cu - 0.77%
  66.5 million (Possible)

- SabeTaung & SB south
  Cu - 0.7 to 1.01%
  27.86 million (Possible)

- Letpadaung
  Cu - 0.4%
  1478 million (Possible)

- SabeTaung
  Cu - 1.51%
  0.88 million (Possible)

- Laymyetna
  Cu - 0.8 to 2%
  0.28 million (Possible)

- Sinbo-Nankesan
  Cu - 3 to 4%
  0.21 million (Possible)

- Bawdwin
  Cu - 0.87%
  2.5 million (Possible)

- Panmakut Manna
  Cu - 4%
  0.001 million (Possible)

- Panpwe KyaiktAung
  Cu - 0.4%
  0.003 million (Possible)

- Kweeight
  Cu - 4%
  0.001 million (Possible)

Copper Occurrences = 115
Potential = 1990 million ton

Potential area
**Lead-zinc Deposits**

**DISTRIBUTION OF LEAD-ZINC-SILVER DEPOSIT**

- **Panwa (Kachin)**
  - Pb, Zn: -1.06%
  - 12.5 million (Possible)

- **Bawdwin (Shan North)**
  - Pb, Zn: -5%
  - 12.8 million (Probable)

- **Yadanatheingi (Shan North)**
  - Pb, Zn: -4%
  - 0.1 million (Probable)

- **Bawsaing (Shan North)**
  - Pb, Zn: -6%
  - 0.0075 million (Probable)

- **Paungdaw (Mandalay)**
  - Pb: -4.7%
  - 0.09 million (Probable)

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**Lead Zinc Occurrences = 291**

**Potential = 44 million ton**
Nickel deposits of Myanmar

**DISTRIBUTION OF NICKEL DEPOSITS**

- **MWETAUNG**
  - Ni: 1.19%
  - 110 mt (Probable)

- **MAUNGDW-NANMADAW**
  - Ni: 0.41%
  - 0.49 mt (Possible)

- **MINDINKYIN**
  - Ni: 0.45%
  - 0.02 mt (Possible)

- **UKINTAUNG,HKAKYINTAUNG**
  - Ni: 0.4%
  - 0.046 mt (Possible)

- **INDAWGYI**
  - Ni: 0.41%
  - 5.0 mt (Possible)

- **TAUNGGADON**
  - Ni: 0.67%
  - 0.028 mt (Possible)

- **TAGAUNTAUNG**
  - Ni: 2.06%
  - 40 mt (Possible)

**Nickel Occurrences = 14**

**Potential = 162 million tons**
Tin-Tungsten Deposits

Tin-Tungsten deposits = 480
Potential = 40 million tons

Padatchaung (Primary)
Sn – 0.11%,WO₃ -0.81%
0.46 million (Probable)

Heinze (Placer)
Sn – 0.2- 0.3 lb/cu.yd.
0.012 million (Possible)

Kanbauk (Primary/ Placer)
Sn – 0.59%, 0.56 lb/cu.yd.
0.00865 million (Possible)

Atwin Bokpyin (Placer)
Sn – 0.56 lb/cu.yd.
0.0036 million (Probable)

Mawchi (Primary)
Sn – 0.32%
31 million (Probable)

Hermyingyi (Primary)
Sn – 0.37%
0.698 million (Probable)

Heinda (Placer)
Sn – 0.68 lb/cu.yd.
0.013 million (Probable)

KyaukmeTaung,
Pagaye(Placer)
Sn – 0.5 lb/cu.yd.
0.001 million (Probable)

Theindaw(Placer)
Sn – 0.36 lb/cu.yd.
0.0016 million (Probable)

Manawlon(Placer)
Sn – 0.6 lb/cu.yd.
0.0021 million (Probable)
Distribution of Limestone Deposits

Lime stone deposits = 452
Potential = 58800 million tons
Coal policy

- Follow up ASEAN Forum on Coal resolutions
- Myanmar Coal Mining Group
- Local Consumption - promotion of Clean coal technology
  - cement plant
  - coal fired power plants
  - ferronickel plant
- Export from border areas
Distribution of Coal Deposits

Coal occurrences = 495
Potential = 490 million tons
Doing Business

• Activities allowed
• Application
Type of Business Activities in mining industry

- **Exploration**
  - Green Field Exploration
  - Reconnaissance for Development

- **Production**
  - Production Sharing Agreement

- **Other Businesses as permitted under FIL2013**
Mining Activities allowed for Foreign Investment

- Exploration, Exploitation, Production and Marketing of non-metallic industrial minerals, such as coal, limestone, gypsum, etc.
- Marble quarrying and production and marketing of marble blocks and slabs
- Carrying out other quarrying industries and marketing of products thereof
- Metallic minerals in cooperation with respective government enterprise on PSC basis
Essentials for Exploration Proposal

- Area Location,
- Type of Minerals
- General description of Area
- Exploration Techniques
- Proposed Exploration Expenses
- Transfer of Technical knowhow
- Signature Bonus
- Minimum Expenditure Commitment
- Employment
- Technical Knowhow Transfer
- I E E , E S I A , E M P and C S R
Essentials for Mineral Production Proposal

- Area Clearance
- Type of Mineral(s)
- Investment Capital
- Signature Bonus
- Scale of Production
- Mine Life
- Production Sharing Split Ratio
- Employment
- Technology Transfer
- I E E, E S I A and E M P and C S R
- Rehabilitation of Abandoned Mine Land
Business License

- Myanmar Foreign Investment Law
- Myanmar Mines Law
- Myanmar Registered Company
- Exploration Agreement
- Production Sharing Agreement
Focal Agencies

- Department of Geological Survey and Mineral Exploration
- Mining Enterprises
- Regional and State Administrative Authorities
- Ministries concerning with use of Land
Fundamentals of implementation
Requirements for Operation

- Transport and Logistics
- Communication
- Human Resource
Port facility in Myanmar at present

Number of Ports in the Myanmar coastline - 9

- Yangon [Yangon Region];
- Sittwe, Kyaukphyu, Thandwe [Rakhine State]
- Pathein [Ayeyawady Region]
- Mawlamyine [Mon State]
- Dawei, Myeik, Kawthoung [Tanintharyi Region]

Vessel Size in Yangon port - 167 LOA/9M draft/15,000DWT

Vessel Size in Thilawa port - 200 LOA/9M draft/20,000DWT

Cargo handle for export and import in 2006 = 12 million tons
Projects under different stages of development

- DAWEI  Deep Water sea port
- KYAUKPHYU  Deep water sea port
Road Distances in Myanmar (at present)

- Yangon - Mandalay: 688 km
- Yangon - Sittwe: 895 km
- Yangon - Pathein: 181 km
- Mandalay - Muse (China border): 461 km
- Mandalay - Tamu (India border): 535 km
- Mandalay – Tachileik (Thai border): 939 km
- Yangon - Myawady (Thai border): 446 km
- Yangon - Kawthoung (Thai border): 1192 km
International road links
### ICT Infrastructure

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<th>National backbone</th>
<th>Fiber link between major cities</th>
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<td>Industrial Network</td>
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Availability of skilled labor

- Organizational arrangement
- Technological level of mine extraction operation
- On the job training facilities
- Stability of labor force
Environmental Matters
Environmental Protection

- Myanmar Environmental Protection Law
- Organizational arrangements
- Action plans EMP
- Monitoring mechanism enforcement,
- Management of Abandoned Mine Lands
Corporate Social Responsibility

- **Social Impact Assessment**
  Impact of the Project on rural community, customs and traditions

- **Community Interrelation**
  Labor recruiting, know-how sharing

- **Implied Responsibility**
  Complementariness to the rural community, Education, Health
Management of Abandoned Mine Lands

- **Nature of Mine Operation**
  Mining method, ore winning process, use of chemicals, final product

- **Impact Assessment**
  Waste rock disposal. Tailings discharge, waste water drainage, Effects on the environment, Location of natural drainage such as rivers, Preservation of Catchment Areas

- **Mitigation Measures**
  Management of waste rock dumps, Land fillings, neutralization of polluted tailings discharge, reforestation

- **Allocation of Funds**
  Funds to be allocated in the operating cost and disbursement procedures to ensure the rehabilitation measures
Conclusion
Conclusion

- Myanmar’s Mineral Potential is promising
- Green field exploration is encouraging
- Brown field exploration opportunities
- Logistics and infrastructure
- Environmental costs
Zaw Win (Mr.)
Director (Retd), [Department of Mines]
Member of M E S
Tel: 95 1 565363   Mob: 95 036447
Email: zinyawgyi@gmail.com
Thank You
for your
Kind Attention