MINERAL RESOURCES

Myanmar’s rich mineral resources originate in the specific geological history of Southeast Asia, induced by overall processes of plate tectonic. Three different orogenetic phases determine the main geological units; they took place in different regions. Thus, the mineral resources are distributed unevenly within the country. Usually, three main geological units are distinguished: (A) the Indoburman Ranges in the West (subdivided, from north to south, into the Patkoi Ranges, the Naga Ranges, the Chin Ranges and the Rakhine Yoma), (B) the Innerburman Tertiary Basin and (C) the East Myanmar Units; metamorphic rocks are flanking the Innerburman Tertiary Basin (Bannert/Lyen/Htay 2011: 11). Chhibber (1933) additionally mentions the coastal strip of Rakhine. Furthermore, four major geotectonic units of Myanmar can be distinguished, (a) the Rakhine Coastal Zone, (b) the Rakhine Chin Ranges, (c) the Inner Myanmar Tertiary Basin (Central Zone) and (d) the Eastern Highlands (Bender 1983). They are usually subdivided into six major tectonic domains, stretching from north to south (Chhibber 1933 and 1934a, Bender 1983). These are, according to ESCAP (1996: 6-20): (1) the subduction zone of the Rakhine Coastal Area which is predominantly made up of Miocene folded, disturbed and structurally deformed sandstones and siltstones. (2) The Rakhine Chin Ranges are mainly built by Tertiary flysch-like sediments and allochthon Cretaceous and Triassic rocks and are separated by a major fault system from the (3) Western Inner Myanmar Tertiary Basin (as fore arc), which consists of several long and wide sub-basins, containing up to 10,000 m Eocene/Oligocene to Recent folded sediments. (4) The Central Volcanic Belt of intermediate to acid igneous rocks (Late Mesozoic and Tertiary) stretches over 1,200 km. The ‘young post-Paleocene to Recent volcanics … lie largely along parallel N-S linear trends’ (ESCAP 1996: 14); two of them are well-defined, the inner volcanic arc (from Mt. Loi-Mye via Wuntho, Monywa, Mt. Popa, Pyay) and the eastern volcanic line (close to the Shan-Sittaung Boundary Fault, via Katha, Mandalay, Pyinmana, Thaton), both with earthquakes and numerous volcanic occurrences, e.g. a large number of hot springs or mud volcanoes (Chhibber 1934a, Bender 1983). Outside of the Central Lowlands, Tertiary or Recent volcanism can be found at Nat Ma Taung (Mt. Victoria) or near Lashio. (5) In the east, the Eastern Inner Myanmar Tertiary Basin (as back arc) follows; it is separated by the Shan Boundary Fault Zone from the (6) Sino Myanmar Ranges (or Kachin-Shan-Tanintharyi Highlands or Eastern Highlands Belt) with mostly folded, partly metamorphosed Palaeozoic sediments. It is part of the land mass of the Indo-Chinese peninsula. They are subdivided in the West Kachin Unit in the north, the East Kachin/Shan Unit (forming the largest unit) and the Kayin/Tanintharyi Unit in the South. They are divided by the Lashio Fault system with its ENE and EW trending faults; the Mogok deposits are located inbetween.

PRODUCTION

Development and production agreements for mineral oil and natural gas fields, gold mines, precious stones and copper and nickel deposits are driven mainly by foreign capital and ventures. Furthermore, key industrialisation processes are based on Myanmar’s own mineral resources. According to Fong-Sam (2016), the most important mineral fuels mined in 2013 were lignite coal (380,272 metric tons), natural gas (12,894 million cubic metres), crude oil (5,875 thousand 42-gallon barrels) and petroleum refinery products (4,000 thousand
Precious and semiprecious stones were extracted in the following amounts: jade (12.76 million kilograms), rubies (397,711 kilograms), sapphires (1,059,559 kilograms) and spinel (417,441 kilograms). Metals were mined at constant levels since 2006, among them manganese (160,000 metric tons), lead (11,700 metric tons), copper (25,000 metric tons) and zinc (5,000 metric tons) (Fong-Sam 2016, Chhibber 1934b). Among Myanmar’s total trade in 2013, which was at $18.05 billion (exports totalled $8.98 billion), natural gas exports accounted for $3.67 billion (equalling 40.8% of total exports), while the exports of base metals and ores were estimated at $92.0 million (Fong-Sam 2016). Main export partners were Thailand, China, India and Japan.

**FUEL MINERALS**

Fuel minerals, mainly oil and natural gas fields, can be found in the sedimentary basins which cover approximately three quarters of the territory (for the following: ESCAP 1996: 58-73). The Myanmar Tertiary geosyncline with an area of about 140,000 square (km2) is the main oil and natural gas potential region where offshore and onshore drilling has been extended since decades. Since pre-colonial times, oil seepages have been known in the Ramree and Cheduba islands. The largest offshore fields – Shwe, Yadana, Zawtika and Yetagun – are internationally connected for export. Oil from the Yadana field contributes to the increasing amount of gas for local consumption in Yangon, moreover it is connected to two power plants in Bangkok; the main operators are the France-based Total E&P Myanmar (31.24%), the US-based Chevron Corp. (28.3%), the Thailand-based PTTEP (25.5%) and MOGE (15%) (Fong-Sam 2012). In 2013, the 794 km long Kyaukphyu Kunming gas and oil pipeline was completed to transport natural gas to Yunnan Province/China; a parallel pipeline measuring 771 km in length is under construction to transport crude oil from the Middle East (Fong-Sam 2016). The domestic pipeline links the largest onshore oil and natural gas fields of Ayadaw, Chauk, Htaukshabin and Yenangyaung. Numerous major and minor coal deposits ranging from Mesozoic to Tertiary age have been surveyed, the Kalewa and south-western Shan mountain basins currently being the largest exploitation areas. Tertiary coals are usually of the lignite type with low calorific power due to high percentages of moisture and volatile constituents.