MADAGASCAR

By Paul Crankshaw

Madagascar, better known for small-scale gemstone production, has at least two world-class mineral projects waiting in the wings. While mineral prices will be among the more important factors behind the progress of these projects, the country's government is improving the regulatory conditions. It promulgated a new, more investor-friendly mining code in 1999, and added further tax and import duty incentives for big projects (larger than US$150 million) in 2001.

The largest potential lies in Phelps Dodge Corp.'s Ambatovy nickel and cobalt deposit, where feasibility studies indicate mineable reserves of over 80 Mt. The wider area surveyed is thought to host over 250 Mt at an average grade of 1% Ni and 0.1% Co, and could support a mining operation for over 40 years.

The capital required to fund the project amounts to over US$1.0 billion, much of which will be required to install or upgrade infrastructure; the property is about 120 km from the port at Tamatave and 100 km from the capital, Antananarivo. Mining plans envisage an open-pit, free digging operation using shovels and trucks; over 3 Mt/y of material would be processed, yielding 36,000 t of nickel and 3,000 t of cobalt.

The other major initiative that has made progress in recent years is QIT Madagascar Minerals' (QMM) titanium project near Talagnaro, formerly Fort Dauphin, on the country's south-east coast. Owned 80% by Rio Tinto and 20% by the Government of Madagascar, QMM has worked through a detailed environmental permitting phase which received governmental approval at the end of 2001.

Delineated reserves at the Talagnaro deposit are over 600 Mt, with average grades of 4.3% ilmenite and 0.2% zircon. Deposits at the Mandena site contain the world's largest free-flowing, high-grade ilmenite ore amenable to the chlorine processing route. The ilmenite contains 62% TiO_2, a feature that makes the ore suitable for the production of either slag, synthetic rutile, or directly as a pigment feedstock. This flexibility makes Madagascar very competitive in TiO_2 markets.

The Talagnaro project would require some US$350 million in capital investment; this would include a new port (the current port facilities would not cope with the tonnages envisaged in the mining plans) and a new road from Mandena to the port.

Both these large projects would benefit from recent incentives in Madgascar for large-scale mining investment. Import duty on capital goods is reduced from 10% to as low as 1%, and income taxes could be reduced from 35% to

25%. An investment tax credit is to be allowed, based on a formula related to the capital expenditures. Furthermore, if value is added to the nickel or titanium-metal within the country, the income tax rate is further reduced.

Aside from the future possibilities of these projects, the formal mining sector in Madagascar is not significant. Excluding gold and gem production by artisanal miners, mining contributes less than 1% of GDP and employs just 1% of the workforce. If the informal sector is included, however, the contribution to GDP is around 3%.

The country is an important producer of gemstones, particularly of the beryllium-group varieties. The world's largest known emerald cluster was discovered in Madagascar in 1996. Small quantities of semi-precious stones (garnets and amethysts) are mined for export, and sapphire mining started in southern Madagascar in 1998.

Gold production is mainly unofficial, but possibly represents a higher value than the products exported in the formal sector. More than 2.3 Moz are said to have been produced historically from nine known goldfields; present output is an estimated 3-4 t/y, mainly from an artisanal sector numbering some 100,000 individual miners and small syndicates.

Although the government tolerates this form of mining, it is concerned about its ecological effects (which include a high level of mercury being leaked into streams and rivers). In 1999, to combat the environmental destruction, the government set up the Mining Sector Reform Project. It is hoped that this will lead to better control of the sector.

There is some gold potential if new explorers can apply modern exploration technology and techniques to the number of small, closed-down mines worked only for higher-grade ore. These were often only worked down to the level of the water table.

Madagascar is the world's tenth largest chromite producer. The state-owned Societe Kraomita Malagasy (Kraoma) - Madagascar's main chromite producer - extracts around 40,000 t of concentrates and 80,000 t of lumpy ore annually from the Andriamana complex, and a further 20,000 t/y from the Behandrinana mine.

The country also produces graphite, 66% of which comes from the Gallois mine near Toamasina. It exports up to 15,000 t/y, mostly to the UK, the US and Germany. Graphite is widespread throughout the country with important and still unexplored resources in a number of localities. Mica in the form of phlogopite (or brown mica) occurs in very large sheets, with production averaging 300 - 500 t/y.

Madagascar has identified deposits of bauxite, uranium, iron ore, quartz, copper, lead, platinum, labradorite, rock-crystal, rhodolite and marble. There are also known deposits containing 400 Mt of iron ore.

There are resources of coal at Sakoa in the southeast of the island where the total deposit is probably in excess of 500 Mt. Bituminous shales are located at Bemolanga and the mineable resource is reported to be 3.0 Mt, part of it accessible by open pit. The largest bauxite resource is at Manatenina in the southeast. This has been estimated by French and Russian experts to be at least 100 Mt, although the quality is not exceptional. The biggest kaolin deposit is at Ampanihy. The estimated size of the resource, which is believed to be of good quality, is in excess of 2.0 Mt.