

CHALLENGING TIMES: THE BRAVE NEW WORLD OF REPURPOSING MINED-OUT SPACES

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Abstract

While the world's superpowers are battling for supremacy, the African continent is undergoing a transformation as it positions itself to be the emerging supercontinent of the 21st century.

With a landmass of over 30,000,000 km² it is big enough to fit the USA, China, India, Japan, Mexico, and most of the European nations within it. But the world has gone somewhat crazy with Covid, wars, loss of political direction, and a general loss of global leadership.

Somewhere within this mix is a climate emergency which has many countries and organisations scrambling for more sustainable and adaptive infrastructure. There is an emerging recognition that without investment, the peoples of Africa will not enjoy the levels of happiness and wealth to which they have for so long aspired: Africa needs infrastructure now.

At this time the world is flush with money for green investments, and yet at the same time is struggling to adjust itself to the huge increase in demand for resources needed to transform economies from fossil fuel energy sources to more environmentally friendly options.

Although mining projects once enjoyed great favour, there is increasing resistance to approving and funding new mines because of the environmental damages and perceived inequity of the benefits they bring.

Africa contains an abundance of resources the world so desperately needs for its energy transition.

There is an emerging opportunity to reimagine mining as the first phase of underground construction of power stations. Not just thermal power stations, but the most efficient and least carbon-producing large-scale power stations known to humanity at this stage in our history – pump storage using old mines.

For existing mines this means that there is an opportunity to transform their future use from rehabilitation to repurposing as a power station

For new mines, there is the possibility to entirely rebadged them, not as simple mines, but as the first phase of subsidised development of major renewable intergenerational power stations.

Currently the world's superpowers in pump storage hydro are China, Japan, the United States, Germany, and India.

With superpower interest in development and influence in Africa, there are enormous opportunities to harness both the hunger for Africa's resources with its need for renewable energy.

There are numerous examples of pump storage hydro – either built, or in construction using old mines.

Mines offer the most cost-effective pump storage hydropower stations, as the cost of their construction is subsidised by the mining operation itself. From the world's largest head pump storage hydro in Finland using an old metals mine; proposals for pump storage of an old gold mine in Australia; the reuse of coal mines in India; the largest pump storage hydro systems in China; to Anglo American's proposals for repurposing abandoned gold mines in South Africa – pump storage hydro is the future of sustainable, funded mining.

The time is now for intergenerational energy solutions for Africa, combining mining and pump storage hydro solutions.

Such solutions combine the necessary ingredients to attract modern ethical investment, provide intergenerational benefits, and at the same time feed the world's desire for new minerals and energy.



Arnold Dix

Professor Arnold Dix is the President of the International Tunnelling & Underground Space association – representing the interests of more than 100,000 global subject matter experts and 79 Member nations as the peak Underground NGO to the United Nations. An accomplished Lawyer and scientist/engineer – with longstanding appointments to organisations such as NFPA 130 & 502 as an underground fire safety expert – the peak USA standards body, and to KATZ in Europe as part of the European Unions Chemical, Biological and Radiological resilience program. He has a long history of investigating underground disasters such as the Twin Towers Collapse, the London Bombings and other misfortunes. He provides advice to projects on all continents – sometimes as an expert, a lawyer, a judge or investigator. A Professor of Engineering (Tunnels) at Tokyo City University Japan, as well as a former Partner at two of the Worlds leading Law firms – he just advises on all things underground.

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