

Quellaveco Mine

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PERU'S QUELLAVECO MINE

Digital Mining Sustainably

RESEARCH BY [MAX DOTTA](#)



In the pulsating heart of the global energy transition, copper has ascended to an unparalleled prominence, wielding its influence over technologies that propel us into a sustainable future. In this electric symphony, the Quellaveco Copper Mine in Peru emerges as a dynamic maestro, not merely mitigating the echoes of a looming global copper shortage but orchestrating a transformative saga of innovation, sustainability, and community harmony. Across a tapestry woven with 10,000 years of copper's indispensable role, Quellaveco strides onto the stage, a monumental creation nestled in the rugged landscapes of Moquegua, southern Peru. This collaboration between Anglo American (60%) and Mitsubishi Corporation (40%) isn't just a mining venture; it's a bold proclamation - the largest mining investment in Peru, an audacious foray into digital frontiers.

Imagine a mine not bound by tradition but surging forward as Peru's pioneer 100% digital marvel. Quellaveco dances on the precipice of innovation, entwining autonomous processes and a cutting-edge Integrated Operations Center, where real-time data fuels operational prowess and resource efficiency. This is a \$5.3 billion odyssey, an open-pit mining venture unearthing one of the planet's most formidable porphyry copper deposits, a juggernaut with a reserve base eclipsing 1.3 billion tonnes. But Quellaveco isn't just numbers; it's a promise—a promise of sustainable mining practices, a promise etched into the very fabric of its existence. As we delve into the pulse of this copper colossus, join us on this editorial journey where Quellaveco not only addresses the exigencies of global copper supply but redefines the very essence of mining in a world clamoring for sustainability. In

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the captivating rhythm of Moquegua's landscapes, Quellaveco reverberates not just as a mine but as a beacon of possibility, an emblematic force steering the trajectory of Peru's mining landscape. Buckle up as we embark on a riveting exploration of Quellaveco's unfolding narrative—an editorial feature that delves into its technological marvels, socio-economic impact, and the possibilities that spring forth from the confluence of mining prowess and sustainability. In this editorial feature, our team at BE Mining takes an in-depth look into the developments at the Quellaveco project and all its possibilities.

Background

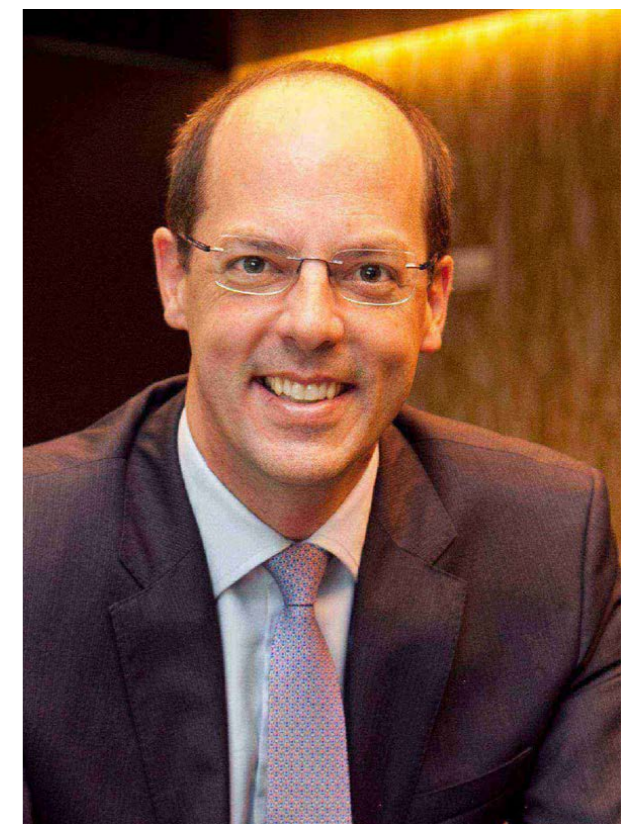
The project has been in the making for over 30 years since Anglo American obtained the concession for the Quellaveco copper deposit via public tender, which belonged to the assets of the state-owned Minero Perú. In 1995, the Tumilaca, Pocata, Coscore and Tala communities approved the sale of land to develop the mine following an open and transparent process.

With Quellaveco located on the course of the Asana River, the early site infrastructure



development in 2014 included the diversion of the river. This involved the construction of four tunnels totaling 13km in length and three dams of 40m to 85m in height.

The construction, led by Anglo American's world-class technical team, saw four construction camps housing 8,400 workers on site, a tailing storage facility, a water



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At 3,500m above sea level is the open pit mine from which the copper will be extracted. This includes the primary crusher, truck and other equipment maintenance workshops, the first of three giant electric shovels, and a conveyor belt to take the rock mineral through a tunnel to the processing plant. A protective barrier and tunnel have been built to protect the course of the Asana River.

The Papujune Plant will have the capacity to process more than 127,500 tons of ore per day. It is made up of mills and flotation cells to separate the copper. The Integrated Operations Center (IOC), the "brain" of the mine to control all processes, and the coarse particle plant with efficient use of water and energy are based here.

In the Cortadera area is the tailings conduction system that will go from the Papujune plant to a tailings dam. The system, designed with a zero discharge concept, will allow water received at the dam to be reused and returned to the mineral processing plant. The project's final point is a concentrate warehouse and a loader built at the Ilo port facilities to carry minerals directly to the ships.

Quellaveco is a pioneer in the use of renewable energy in large-scale mining, since the demand of 187 MW for its



storage, pipeline system, and associated port infrastructure. The project created over 29,000 jobs in the construction phase, with 2,500 jobs expected to be completed during operation.

In an area known as Alta Montaña, at 4,500 meters above sea level, Quellaveco's most challenging works have been built. An engineering system captures water the project needs from an intake in the Titere River, whose waters are unsuitable for human consumption due to high boron and arsenic contaminants.

An 88 km carbon steel pipeline carries water from the river to a processing plant and the 60 million m³ Vizcachas dam. This will capture surplus rainfall and provide a small fraction to the mine, and the rest to the Moquegua community.



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operations comes from renewable sources from the Punta Lomitas Wind Power Plant, contributing to significantly reducing greenhouse gas emissions. . In addition, he highlighted the female presence at Anglo American in Peru, reaching 38.2% in leadership positions and 24.5% of the total workforce.

In a pivotal moment for the Quellaveco project, July 2022 witnessed the inauguration of copper concentrate production and the initiation of comprehensive testing for the mineral

processing plant. Authorization from Peru's Ministry of Energy and Mines was secured, paving the way for the operation of mining facilities and the commercialization of copper production. Adolfo Heeren, CEO of Anglo American Peru, expressed, "First copper production at Quellaveco is a key milestone in our delivery of this world-class asset, on time and on budget." This achievement, achieved in under four years post-project approval, even amidst significant pandemic disruptions, underscores the steadfast commitment to the workforce,

local communities, the Moquegua region, and Peruvian government stakeholders.

The commencement of copper concentrate marks the testing phase for the processing plant and signifies the escalation of mining activities, showcasing the project's readiness for full-scale operations. Once fully operational, Quellaveco is poised to yield 300,000 tonnes of copper annually over its initial decade, embodying a

Quellaveco will be the first 100% digital mine in Peru and the first Anglo American mine to begin in this way

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Sattel Chile, is a Chilean company with more than 10 years in the market. It's a company of innovation and technological solutions that is oriented to the design and development of its products among which are the Auxiliary Device Protector (PDA); Solar Carts, Cachimba Wireless Control System (SCIC), Access Control System (SICAM). They are currently present in the Peruvian market with SICAM and PDA. They are also present in Brazil, and Australia, one of the most important countries in terms of technology in mining, where an alliance was generated with a prestigious local company to begin exporting the development of its successful PDA technology and its Backup Units, a solution cataloged as a success story in the Chilean mining industry, with more than a thousand units installed in the most important mining companies in Chile.

Due to its recognition in the Peruvian market, Anglo-American contacted them for an automatic system of gate and traffic lights for Quellaveco Mine. This project included interaction with existing technologies such as Web Control and MineStar. The implementation phase was carried out efficiently, achieving the installation of access portals for light and heavy vehicles, as well as the successful integration with existing platforms.

The SICAM project at the Quellaveco Mine is a reflection of Sattel Chile's commitment to innovation and operational efficiency. This project not only improves security and access control but also demonstrates the ability to adapt to emerging technologies in the mining sector.

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Its Concentrating the Mine concept addresses the need for greater mining precision and lower energy consumption, water and capital consumption. On the path to carbon-neutral mining production, Anglo American is utilizing methods to produce a reduced environmental footprint using precision mining technologies and data analysis.

One of these elements is Digital Twins, cutting-edge technology that allows the creation of a virtual replica that simulates everything that happens at Quellaveco. Technology allows Anglo American to test different solutions several times until the best alignment and result from the virtual part is achieved and moved to reality. Predictive tests have been carried out to reduce risks, optimize resource use, and improve production performance.

Another strand of the Future SmartMining strategy is the Integrated Operations Center (CIO), the "brain" that will control Quellaveco's production processes. The

The Quellaveco Fund, a \$10 million trust, has financed 48 local community projects since 2011, focusing on education, health, nutrition, and agriculture, positively impacting over 26,500 lives

CIO's function is to control production data, safety reports, autonomous processes and environmental measures in real-time. In addition, it will process data that will arrive from sensors installed throughout the production chain, and with this, predictive intelligence will be applied to anticipate events. The CIO will be overseen by 80 people on a 24/7 basis.



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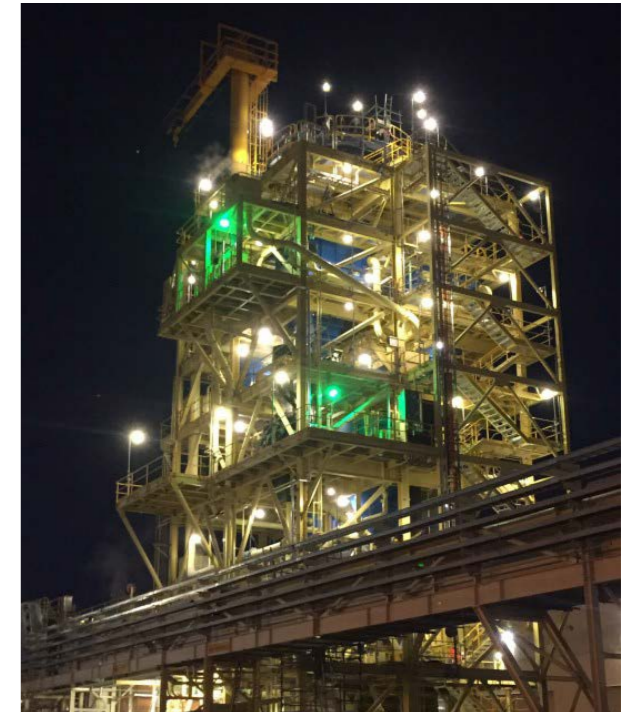


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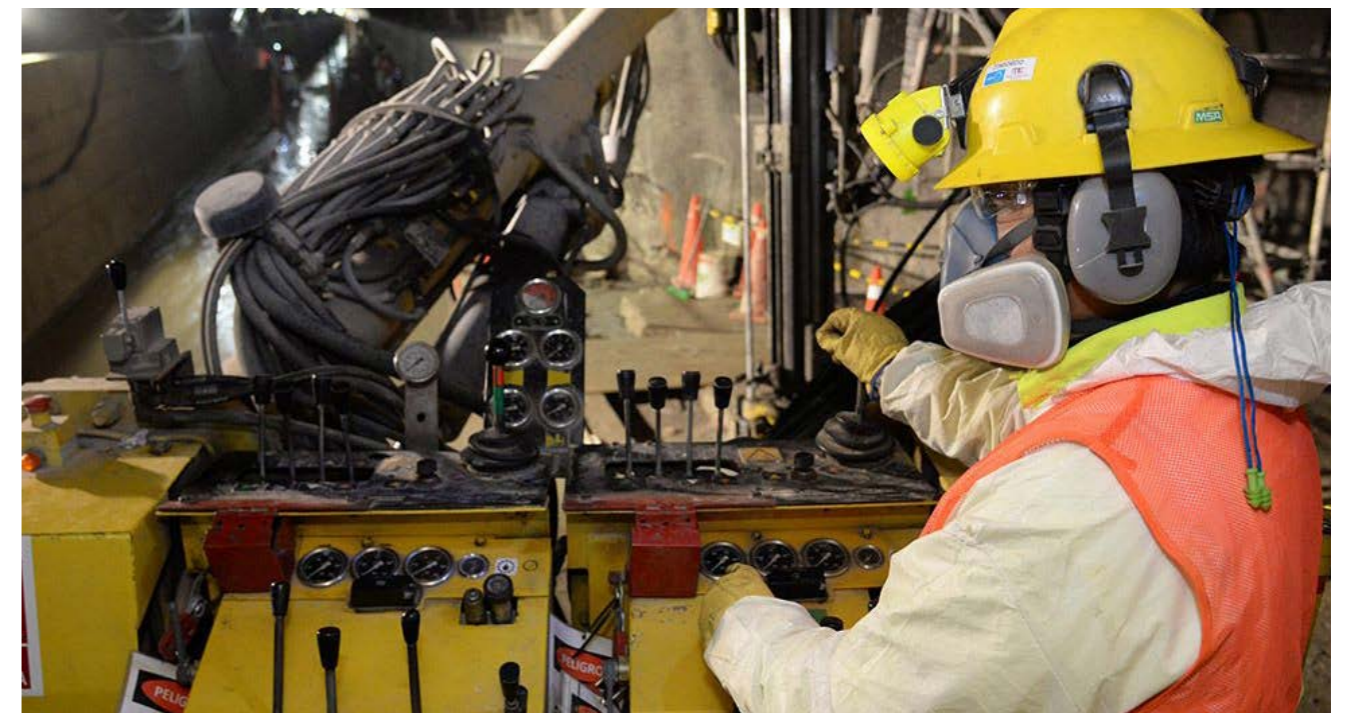
Socio-economic Impact

Quellaveco's commitment to sustainable mining extends far beyond the extraction of copper; it's a dedication to fostering positive socio-economic change in the Moquegua region of Peru. Anchored in a collaborative ethos, Anglo American initiated a comprehensive consultation in 2011, engaging with 31 local authorities and institutions alongside community representatives to shape the project's contribution to Moquegua's sustainable development. The outcome was a set of 26 commitments covering water management, environmental care, and social investment.

This commitment materializes through numerous social programs and initiatives. The Moquegua Emerge enterprise program, a partnership with the Inter-American Development Bank, has empowered over 1156 local entrepreneurs. Quellaveco has conducted 20+ capacity-building programs, benefiting over 9000



participants, enhancing employability in the mining sector and other economic spheres. Notably, the project champions diversity and skill development, exemplified by training Moqueguana women to operate massive mining trucks.



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Investing in education, Quellaveco plans to transform the José Carlos Mariátegui technical-educational institute into a Center of Excellence, emphasizing the project's long-term commitment to knowledge development. The Quellaveco Fund, a \$10 million trust, has financed 48 local community projects since 2011, focusing on education, health, nutrition, and agriculture, positively impacting over 26,500 lives.

Moreover, the 'Moquegua Crece' Collaborative Regional Development program, launched in 2021, underscores Quellaveco's dedication to sustainable and inclusive development. In partnership with key entities, this initiative works to strengthen public investments, improve services, and enhance infrastructure.



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Quellaveco's impact isn't confined to the mine's immediate vicinity; it resonates across entrepreneurial networks, agricultural ventures, and collaborative efforts aimed at region-wide growth. Adolfo Heeren, CEO of Anglo American in Peru, highlights the profound socio-economic impact, anticipating a 10% boost in Peru's copper production. Quellaveco actively engages with local suppliers, stimulates regional growth ecosystems, and channels investments through initiatives like the Moquegua Development Fund, Agro Quellaveco, and Moquegua Crece. Beyond copper extraction, Quellaveco is scripting a narrative of sustainable growth, community empowerment, and inclusive development, showcasing the transformative potential of responsible mining practices.

Contracting and Supply Partners

The Quellaveco copper project in Peru has strategically engaged a consortium of world-class contractors and suppliers, reflecting a commitment to local engagement, innovation, sustainability, and cutting-edge engineering solutions. Fluor, a key player since 2014, not only managed the early site infrastructure development but also secured the engineering, procurement, and construction contract for the ore processing facility, subcontracting earth-moving operations to Graña y Montero. Turner and Townsend joined the project in 2010, providing crucial cost and commercial management services.

Local engagement and personalized monitoring are exemplified by GAM

Alquiler Perú S.A.C, a machinery rental provider, and NAZCA ENERGY, a transformer manufacturer. Siemens' gearless drive technology powers an overland conveyor, showcasing innovation and efficiency gains of up to 4 percent.

EPIROC contributes to safety and efficiency with six autonomous Pit Viper drill rigs, programmed for cautious operation. Molycop, with state-of-the-art plants in Lima and Arequipa, offers comprehensive solutions, including grinding media, instrumentation, and process optimization.

Metaproject S.A. brings global technologies and digital transformation to mining project design, while MAPTEK provides innovative software, hardware, and services. Fundición Ferrosa proposes improvements for critical chutes, and ALQUIMODUL SAC assembles prefabricated modules for temporary installations. Sayr undertakes the construction of the main stone crusher, conveyor belt line, and truck workshop.

Sgs Peru and Arcadis Peru ensure high-quality engineering services with a focus on

water reuse and reduced consumption. Ferreyros S.A. supplies Caterpillar mining equipment, and GroundProbe implements a comprehensive geotechnical monitoring strategy, emphasizing safety.

In a groundbreaking move toward sustainability, Anglo American and ENGIE's Peru-based subsidiary have committed to converting the energy supply for the Quellaveco copper project to 100% renewable sources. This initiative, coupled with an eight-year agreement for "green energy" inputs starting in 2029, positions Quellaveco as a pioneer in promoting non-conventional renewable energy plants within the mining sector.

Looking Forward

Quellaveco mine transcends conventional mining narratives, ushering in a new era of innovation, sustainability, and community engagement. This is best put as in the eloquent words of Adolfo Heeren, CEO of Anglo American in Peru, the success of Quellaveco lies not only in its productivity



but in its shared vision of development, anchored in sustainability, innovation, and technology. This isn't just a mining venture; it's a glimpse into the future of mining processes.

At the heart of Quellaveco's narrative is the audacious Sustainable Mining Plan spearheaded by Anglo American. This plan doesn't merely seek coexistence with nature; it boldly aims to achieve a net positive impact on Moquegua's biodiversity. Quellaveco aspires not only to extract copper but to regenerate the local flora and fauna, presenting a novel paradigm in the industry. It's not just a mining project; it's a transformative force, striving to harmonize industrial vigor with ecological resilience.

Beyond its mining endeavors, Quellaveco emerges as a symbol of responsible and avant-garde mining practices. Anglo American's Sustainable Mining Plan, with its three pillars—environmental harmony, community prosperity, and corporate

leadership—transcends the ordinary. Quellaveco isn't merely a copper project; it's a manifesto for responsible mining, a symphony of innovation, and a carnival of positive transformation. As we gaze into the future, Quellaveco stands as a beacon, heralding a mining renaissance—a paradigm shift where prosperity, sustainability, and community vibrancy converge into a resounding crescendo that echoes far beyond the mine's boundaries. Get ready to witness the Quellaveco way—a legacy of progress, innovation, and community empowerment.

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