

JOINT VENTURE ARTICLE

Mining Insights

How Dundee Sustainable Technologies eases adoption of green processes



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Dundee Sustainable Technologies (CSE: DST) offers eco-friendly alternatives to traditional mining practices with its Chlorination Leach in a Vat Reactor (CLEVR) process and the GlassLock process which safely stabilizes arsenic from mining waste.

While these innovative technologies represent a significant step forward, the larger challenge remains their adoption by a traditionally risk-averse industry. In this Q&A, president and CEO Jean-Philippe Mai explains what mining companies are asking for, the hurdles in testing alternative processes and why involving technology providers early in project planning can de-risk projects and lead to more sustainable operations.

Mai, who holds a B.Sc. in Geology from the University of Quebec in Montreal and has worked on projects spanning Canada, Australia and South America, has seen the industry realize that change benefiting the environment helps everyone and could even boost miners' balance sheet bottom lines.

In February, Mai sat down with MINING.com's Devan Murugan to discuss how tailored metallurgical test work and early-stage evaluations are key to unlocking greener flowsheets.

Devan Murugan: Now that you've introduced the CLEVR and GlassLock processes, what exactly are mining companies asking for? How do they typically proceed?

Jean-Philippe Mai: Over the past few years, the response from the industry has been very positive. We've been developing novel metallurgical processes for more than 10 years, and as companies become increasingly curious about cleaner alternatives, the main question isn't simply "What is this technology?" It quickly shifts to "How do we test this on our specific ore bodies?"

In many cases, the initial interest prompts project developers to ask for tailored metallurgical test work. This means running dedicated, small-scale tests to generate hard data that shows how our processes can be applied to their material. By doing so, companies can quantify the potential improvements in recovery rates while minimizing environmental impacts.

They want assurance that our CLEVR process, which offers cyanide-free gold extraction, can be seamlessly integrated into their existing flowsheets and deliver tangible benefits before committing to any significant changes. Essentially, it's about reducing uncertainty by putting numbers behind the technology.

DM: Considering the current structure of the mining industry, do you think it's well positioned to adopt these innovative technologies, or is there a need for a fundamental rethink?

JPM: I wouldn't argue that the industry needs a complete overhaul. We're not suggesting a fundamental rethink of mining practices, but rather the incorporation of new approaches within existing frameworks. The challenge lies in the standard testing methods — traditional laboratories typically rely on processes like the bottle roll test, which aren't designed to evaluate alternative methods.

This means that if companies stick solely to conventional testing, they might miss the benefits our innovative processes offer. With increasing regulatory pressures and investor demands for greener operations, there's a strong incentive for companies to look beyond standard methods. That said, the industry's conservative nature means that change often comes slowly. It's not a question of capability but rather of adapting established practices to better evaluate and integrate new technologies. We're working with various consulting and engineering firms to broaden the range of testing options available, which we hope will eventually ease this transition.

DM: Engineering firms usually lead project design, yet they might not always be aware of alternative processes like yours. How does that impact the shift toward cleaner technologies?

JPM: Engineering firms hold a wealth of collective knowledge and have a major influence on project design. However, not every consultant is up to date on the latest innovations, including what we're doing at Dundee



Gold smelting at Dundee Sustainable Technologies' plant. DUNDEE SUSTAINABLE TECHNOLOGIES

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Sustainable Technologies. This gap in awareness can slow the shift toward greener technologies because if the key decision-makers aren't aware of the alternatives, they won't recommend them.

To address this, we actively engage in initiatives like lunch-and-learns, seminars and targeted discussions with consulting groups. Our goal is to ensure that these professionals fully understand our processes, how they differ from traditional methods and the specific benefits they offer. Once they gain this understanding, they become more comfortable in recommending our approach to their clients. In turn, this drives broader adoption across the industry, as a well-informed consultant network can significantly influence a company's willingness to consider innovative alternatives during the early stages of project design.

DM: Is it crucial for companies to involve technology providers like Dundee earlier in the project planning phase?

JPM: Absolutely — when problems arise, the industry is then forced to explore alternatives in a reactive manner, which is far less efficient and more costly.

By involving us early in the planning phase, project developers can run a series of trade-off studies that compare various processing options from the beginning. This proactive approach not only helps them understand the pros and cons of each technology but also de-risks the project by ensuring that all potential issues are considered before large capital investments are made.

Early engagement means that alternative processes like ours can be evaluated on an even footing using traditional methods, which in turn supports more informed

and strategic decision-making. It's all about optimizing the metallurgy right from the start, rather than trying to retrofit a solution later.

DM: Speaking of optimization, what role do flowsheets play in determining whether a mine operates sustainably, and how can miners adapt them to include greener options?

JPM: Every mining project is unique; there isn't a one-size-fits-all approach when it comes to metallurgical flowsheets. The objective is always to maximize recovery while minimizing both the plant footprint and resource consumption, including energy, water and reagents.

Our processes, for example, leverage fast kinetics to achieve gold solubilization in a matter of hours instead of days. This not only improves throughput but also means that less energy is used over time, thereby reducing the overall environmental impact. Integrating new technologies into flowsheets can also lead to significant reductions in reagent usage and waste generation. The key is flexibility—flowsheets must be designed to adapt to different ore characteristics and to incorporate innovative, efficient processes as they become available.

DM: Often, companies wait to consider alternatives until traditional methods become unworkable. Is that a risk you see and what would you suggest instead?

JPM: That's a scenario we frequently encounter. Many companies tend to wait until their established processes start to fail or become inefficient before they consider any alternatives. When the traditional method becomes unworkable, it forces a rushed adoption of new technologies,

which may not be as well-integrated into the project's overall design.

In contrast, there's a growing openness in the industry today, with more companies recognizing that early exploration of alternative processes can be a strategic advantage. Even if our solution represents a significant departure from conventional methods—a step change rather than incremental improvement—it can serve as a crucial differentiator for project developers. By carrying out thorough trade-off studies during the planning phase, companies can avoid the pitfalls of reactive decision-making.

In short, waiting until traditional methods fail is a risk that can be mitigated by early testing and a willingness to explore all available options.

DM: With all these changes and challenges, what do you see as the future for alternative processing methods in the mining industry?

JPM: I believe we're at a turning point. The industry is slowly but surely shifting towards more sustainable practices, driven by both regulatory pressures and an increasing demand from investors for greener projects. While traditional processes have served the industry well for decades, the need for safer, more efficient alternatives is becoming ever more apparent. Our role at Dundee Sustainable Technologies is to provide the tools and data needed to make that transition as smooth as possible.

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