

WHITE PAPER

Extracting a better future

How leading mining companies are bridging sustainability commitments and delivering results





A decisive action plan is needed to extract a better future for mining and to deliver results to investors, shareholders, communities and regulators.

The mining industry has an opportunity to trigger a once-in-a-generation reset of regulatory policy and community expectations.

This reset is predicated on the adoption of Responsible Mining practices - using transparency and openness to demonstrate responsible stewardship of natural resources. In doing so, miners can rebuild trust with regulators, communities and other key stakeholders.

Over the next
10 to 15 years
global shortages of critical mineral and rare earths

9 / 10
institutional investors say they factor ESG and sustainability into decisions

67%
institutional investors feel they have "a responsibility to invest sustainably"

In this white paper:

- 1.** We explore the rise of the Responsible Mining movement and the extent to which it's been embraced by the industry
- 2.** We examine outstanding challenges at play, including the implementation gap between commitment and action
- 3.** We explore the industry leadership of Vale and Newmont, and how their approach can set others up to succeed with similar journeys
- 4.** We provide a 5-step guide on how to begin, or continue, the journey towards Responsible Mining





So, why now for this once-in-a-generation reset?

At a high level, a confluence of factors - macroeconomic, environmental, social, and monetary - have arisen that, combined, act as a unique set of pre-conditions that create the driver for change.

At a macroeconomic and environmental level, mass electrification of world infrastructure is driving demand for critical minerals and rare earths. Global shortages of these minerals are anticipated over the next 10-to-15 years. This is forcing governments worldwide back to the drawing board to secure sufficient supplies to underpin electric vehicle production, wind turbines and other related infrastructure.

For deposit-rich countries, the main inhibitor to bringing on new mining capacity to meet this increased demand is red tape. Permitting processes vary in their duration, from several years in Australia to a decade or more in North America.

The red tape blocking site expansions and new projects has built up over many decades, and exists principally due to a lack of trust that miners will operate responsibly without granular oversight, if given the chance. As a result, miners for years have faced strict compliance processes, bureaucracy, cumbersome approvals and at-times glacial movement at every stage of the project lifecycle, from exploration to feasibility and right up to the final investment decision. These delays often endanger the business case for new projects.

Mining companies need faster approvals and permitting of new operations to increase capacity and supply. Policymakers that want a guaranteed supply of critical minerals are amenable to moving faster, but need to maintain existing levels of assurance.

It is in the best interests of all parties to resolve this impasse. Unwinding the red tape guarantees the future domestic supply of critical minerals, and - where excess supply makes it possible - lucrative export opportunities. But the possibility of a reduction in red tape requires a quid pro quo from the industry. Miners will invariably have to take the first step: to prove they are trustworthy, in order to be given more trust.

The streamlining of the operating environment should be a sufficient motivation in and of itself - but mining companies also have their own additional reasons to change. These include that access to debt facilities and investment on favorable terms is increasingly reserved for companies that operate responsibly and have a demonstrated commitment to environmental, social and corporate governance (ESG).

Investors and shareholders have grown impatient and are increasingly moving against operators that are seen not to be hitting ESG targets or taking responsibilities for environmental stewardship seriously.

The weight of investor expectation now goes above and beyond regulations and licensing. Nine-in-ten institutional investors say they factor ESG and sustainability into decisions, and 67% feel they have “a responsibility to invest sustainably”.

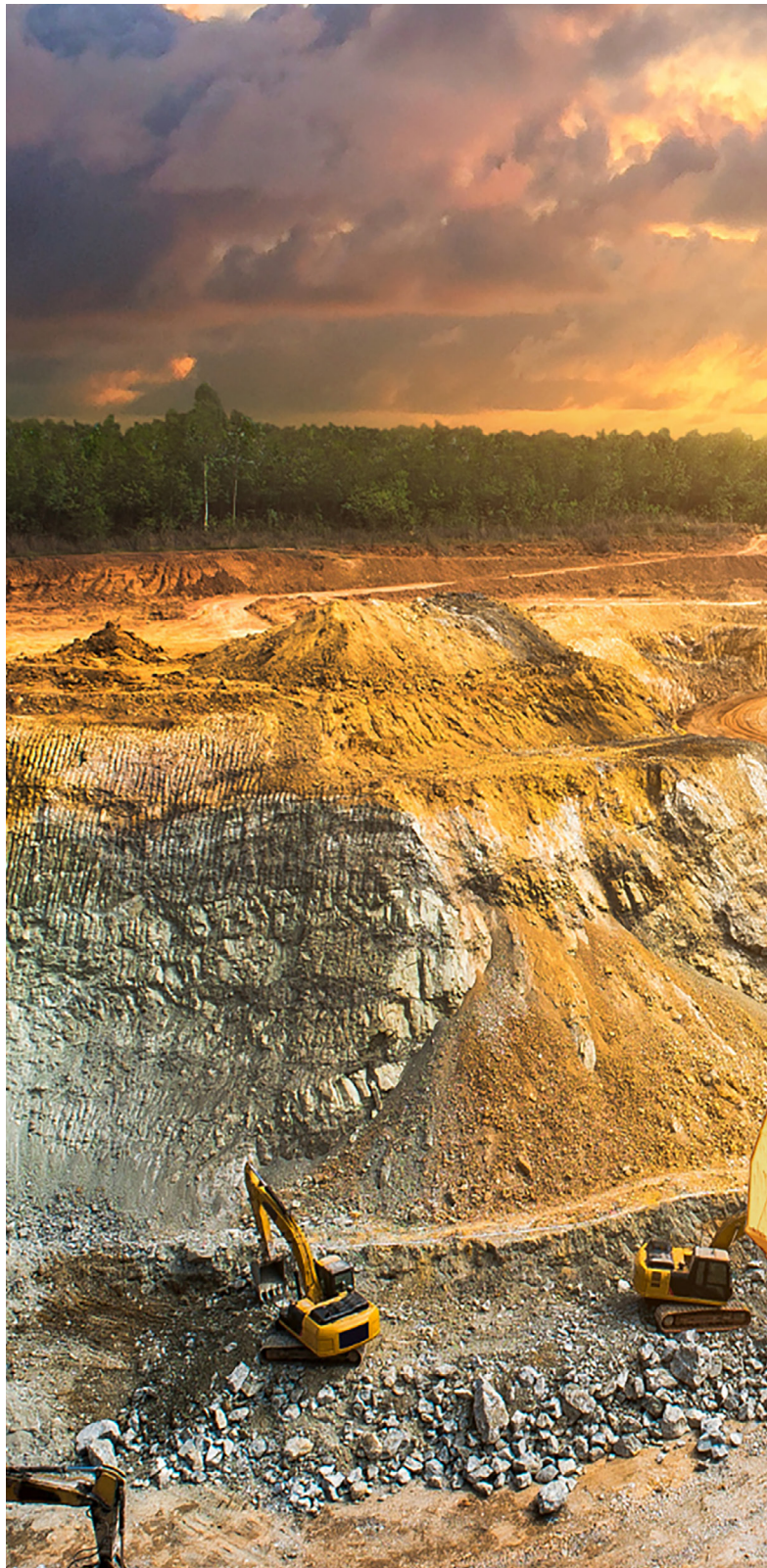
Savvy executives and mining companies, particularly mid-tiers, are courting this attention. They understand the need for commitment and effective action, and more broadly that effective environmental work can attract and bring in new money.

While some miners may not be accustomed to operating with this level of openness - equivalent in many cases to offering a near real-time, public-facing view into their operations - it's the future of mining, and there is an urgency to embrace it. As Deloitte notes, operators that “let the industry’s purpose and dedication to being a responsible steward of nature shine through” in their work “may have a significant advantage in accessing funding, insurance, talent, and securing permits and a social licence to operate.”

Responsible Mining isn't just the right thing to do: it's a business model actively pursued by leaders today for high growth tomorrow.

The onus is on every mining company to seize this opportunity now and to play its part. As a provider of environmental intelligence to mining operations across the globe, Envirosuite stands ready to assist as a key enabler of sustainability, ESG and Responsible Mining.





What is Responsible Mining?

Responsible Mining as a concept first emerged in 1979, though over time it has been elevated in its status and importance by the emergence and adoption of ESG frameworks such as the United Nations' Sustainable Development Goals (SDGs).

Broadly speaking, Responsible Mining is about balancing productivity with environmental stewardship.

There is, of course, more nuance to it than that. It requires a commitment to the highest standards of ethics and respect in engagements with all its stakeholders; the determination to undertake operations responsibly regarding the environment and neighbouring communities; and an environmental strategy aligned with biodiversity and landscape, water, air waste and materials, and energy and climate action.

Through Responsible Mining, the industry has a chance to prove it can move fast sustainably and with implicit trust. But it requires a big change in the mindset and approach of mining companies: one that prioritises transparency, openness, commitment and demonstrable action.

This is where challenges start to arise.

While there is top-down commitment to environmental stewardship and the SDGs from the corporate side of mining - the Board, the Executive Leadership Team, head office - there is currently a lack of detail around how these commitments translate into real and measurable action.

Top-down execution can be fraught: Corporate is often accused of setting policies and standards that operations must implement and execute without guidance or governance. KPIs between corporate and operations are also often in conflict: operations are geared to maximising production by extracting and processing as much of the ore body as possible, whereas the environmental team is KPI'ed on minimising natural impact.

What's required is more than a commitment. It's about taking action - proactively, predictively and to a level that meets or exceeds community and regulatory expectations; and then measuring the effectiveness of that action. Both corporate and operations need to find a common ground here: a place where strategy meets execution.

They also need to remain on the same page, presenting as a unified force on Responsible Mining, and support one another in achieving it.

Weighing in the sector's favor to follow through on this is a strong desire to continuously improve, optimise and generally strive to 'be better'. That's apparent in the high standards and investment set for health and safety. It will increasingly become apparent in environmental stewardship efforts as well.

But the critical unanswered question is: 'When?'

So far, not every organisation is moving at all, or at a consistent pace. Action is happening, but in pockets. In addition, the rate of progress by operators that collectively account for 25-30% of global mining production has recently slowed. This does not assist the broader mining industry's cause, nor does it meet the macroeconomic needs of countries.

For miners, not fully backing environmental stewardship and Responsible Mining today will prove expensive tomorrow. Laggards face a more abrupt change that is more costly and disruptive to business.

Leading operators understand that by onboarding now and taking steps progressively, the costs of implementation are lower and revenue benefits more easily accessible.

25-30%

of global mining production has recently slowed.





Building bridges

Change is complex, and won't happen without appropriate support structures and tooling. Leading mining companies recognize this and have adjusted their approaches.

Between Chief Sustainability Officers and Heads of Responsible Mining, more executives with specialist environmental stewardship skills are being sought to drive stewardship initiatives forward. However, there's an acknowledged shortage of people with deep domain expertise in resources to act as this 'safe pair of hands'.

While it may be possible to source executives from adjacent industry sectors to fill vacant roles, an alternate strategy is to lean on software that has a proven track record of empowering environmental intelligence and stewardship use cases.

Miners will also need other types of support to safely implement environmental stewardship and Responsible Mining initiatives, and this is a role increasingly fulfilled with environmental intelligence platforms.

Once a strategy leaves head office, its execution cannot be a 'black box'. How operations implement the commitment matters, and it can't be left to them alone to work through the finer details. For corporate, the message is clear: you can set targets and be as committed as you like, but without effective and measurable action, you're just making promises. How operations behave day-to-day is, as the Responsible Mining Index notes, 90% of the challenge. Most leaders would be uncomfortable at outsourcing 90% of a task without proper direction and oversight.

Corporate teams setting strategy and direction have a responsibility to put in place tools that define an action plan for operations, measure the effectiveness of actions, and roll that measurement data back up into corporate sustainability and SDG and ESG reporting.

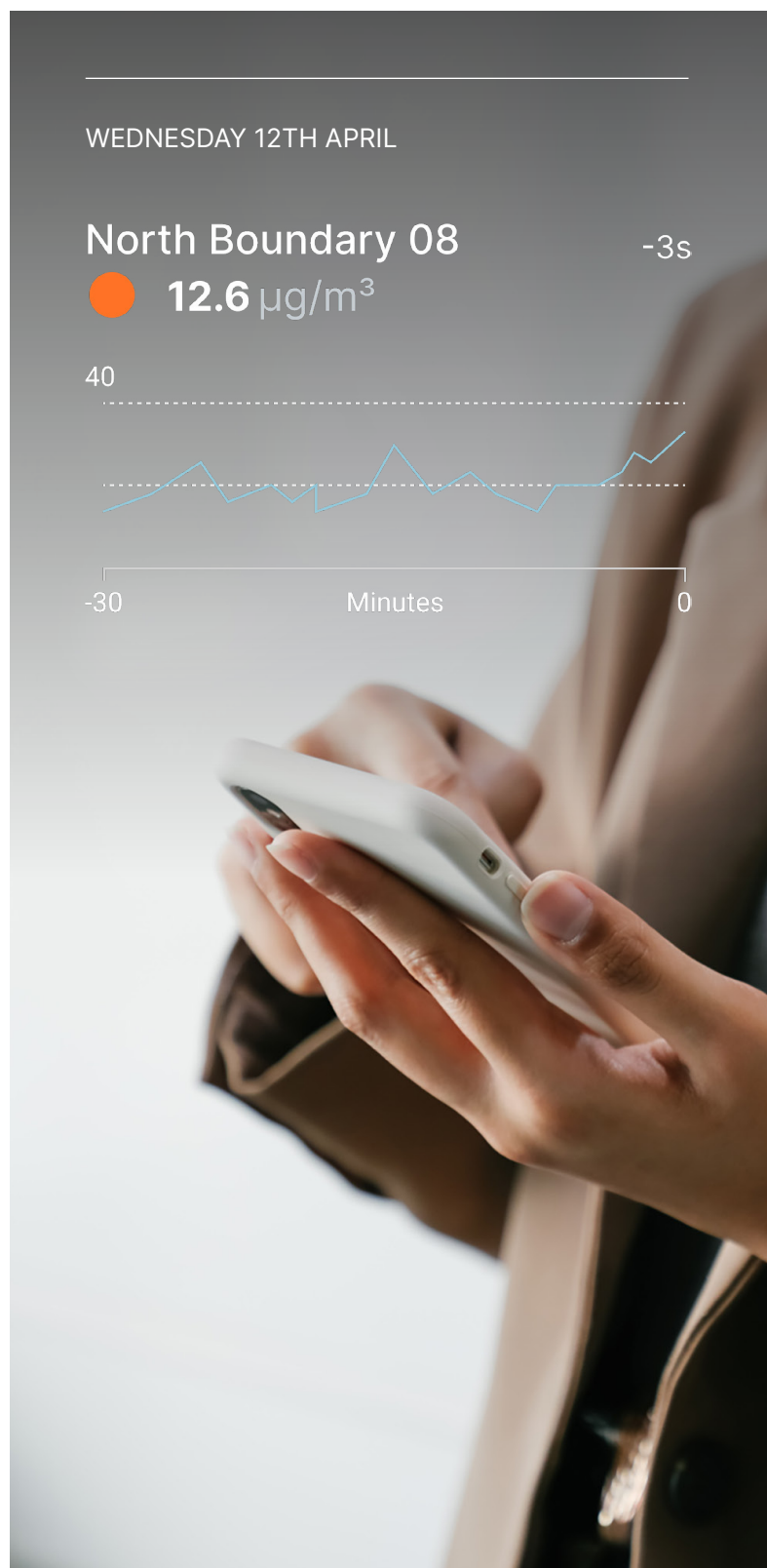
Under this model, actions are explainable, and two-way visibility between head office and operations allows for data-informed decision-making and continuous adjustments. This ensures that not only is there a corporate commitment but also an effective action plan in place to support it.

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The Leap of Faith

Leading operators understand Responsible Mining and environmental stewardship requires a strong leap of faith. It means getting on the front foot with communities and the public: collecting and publishing data transparently and regularly.

One of the outputs of this is greater situational awareness, which means real-time tracking of a broad range of parameters including air quality pollutants, odour, noise, vibration and water quality. Depending on how this data is surfaced and presented, this combination of parameters can offer a 'birds-eye view' and instant understanding of how local weather conditions are affecting emissions at a site.

Responsible Mining leaders are making this information public, in addition to using it to drive actions at the operations level.

Vale has been recognised by the Responsible Mining Index for its leadership on noise monitoring, with the company able "to correlate noise results with its operations and conduct fact-based conversations with neighbouring communities registering complaints."

Newmont similarly publishes online, in real-time, air, noise and weather monitoring for its Hollinger and Borden mines.

A certain level of corporate bravery is required to share data like this directly with your community, but this is what Responsible Mining in 2023 looks like. If you're serious about the commitment you've made, own it, control it, and respond to the data you collect in real-time. Vale and Newmont made that leap of faith: join them.

In saying that, be under no illusion: the path to Responsible Mining is a challenging, multi-year journey that relies on considerable groundwork being laid at mine companies, executive and board commitment and sponsorship, and business buy-in.

What's important is to keep the end goal top-of-mind, and know that no matter where you are on the journey, there's something you can do: another step you can take.

It's also likely that others in the space have encountered some of the same challenges before and helped forward-thinking peers take steps to resolve them. Aligning with an experienced supplier can be a powerful force multiplier for progress.

Taking first - or next - steps

To move forward, mining companies need to be able to demonstrate their adoption of leading practice in key environmental responsibilities. This requires not only a commitment to ESG and SDG targets, but an action plan to implement them: one that ensures corporate policy is directly integrated into operations.

To do this, companies need a way to influence operational outcomes, effective planning, and production goals in real-time. EVS Omnis is helping leading companies to implement this action plan. It offers situational awareness of mining operations like never before. Deep insights from operational data enables immediate action, allowing for an efficient, measurable operation, and leading to better environmental outcomes.

While active environmental management using real-time data is the benchmark today, predictive analysis is a future state to aspire to. Pattern detection using historical and real-time data can be used to predict potential environmental issues ahead of time, allowing preventative action to be taken. This is, in many ways, the ideal end-state for environmental stewardship. Taking situational awareness to a predictive state means potential problems don't have time to develop into actual problems. At that point, trust becomes far more implicit. This is an ideal outcome for everyone involved.

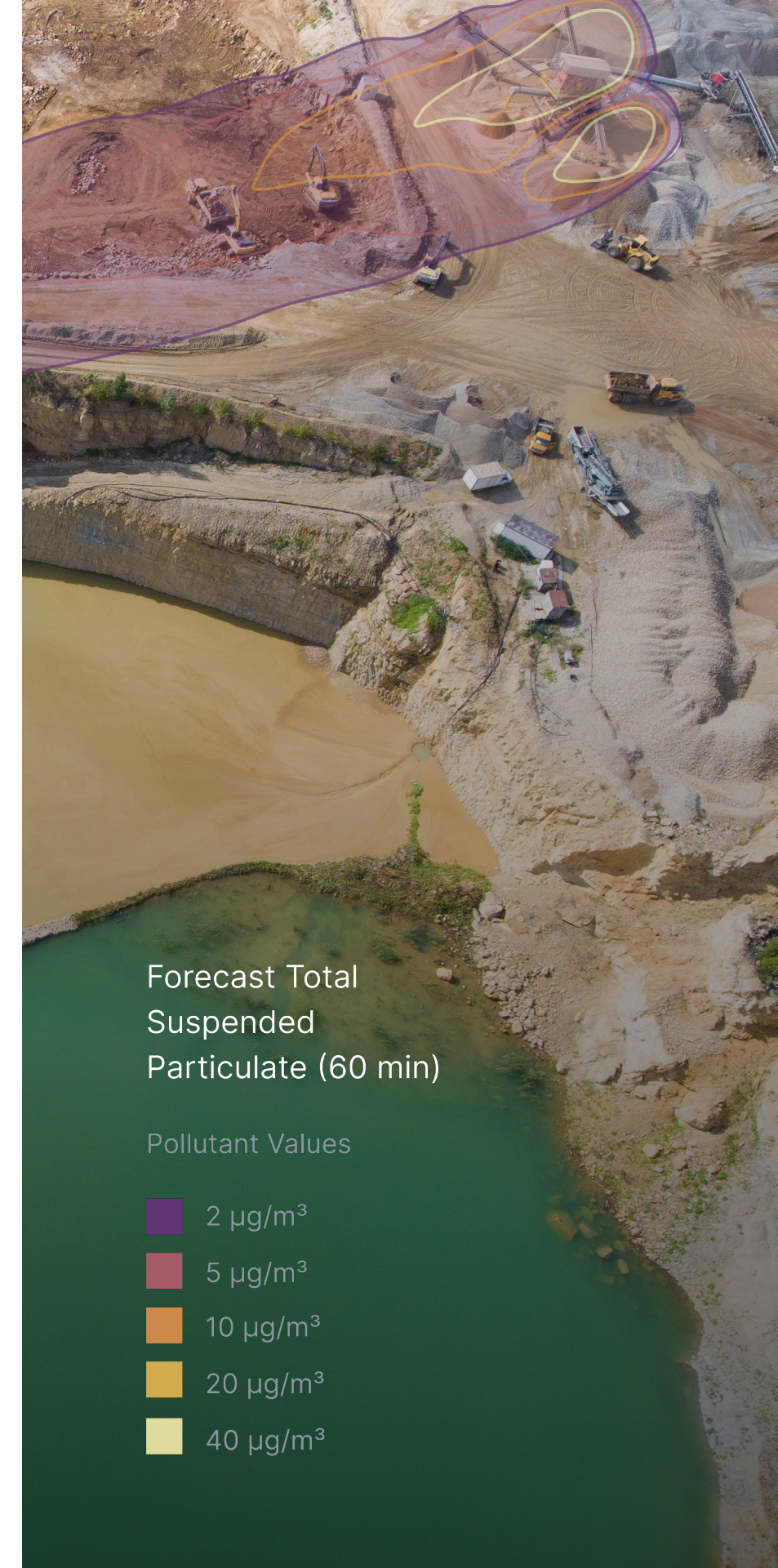
For Responsible Mining companies, the future is bright: a chance to repair and rebuild trust with policymakers and communities, in return for a renewed social licence to operate and more simplified permitting of new mine sites and expansions of existing ones. This will provide the opportunity to actively participate in an extended period of demand for critical minerals and rare earths.

It's still early days, but Responsible Mining is already reshaping the future of the mining industry. Mining now has a roadmap and a path forward to create a sustainable place in the global economy. And with the momentum for change building as countries seek to reduce their reliance on mineral imports and re-take control of their clean energy futures, there's never been a better time to start onboarding your own operations to Responsible Mining principles.

Envirosuite has the on-the-ground experience powering early success stories that you can take advantage of to shape and launch your own successful Responsible Mining initiative. We have included a 5 phased approach below that highlights how to take your first - or your next - steps on that journey.

Forecast Total
Suspended
Particulate (60 min)

Pollutant Values





5 steps to begin your journey to Responsible Mining

1.

Find your purpose: Ask 'Why?'

Responsible Mining can only begin with the outcome in mind. This typically includes one or more of the following:

- Social licence to operate
- Safety
- Operational efficiencies
- Productivity
- ESG
- Compliance

2.

Identify key parameters: The right solution design will underpin your success

After you have identified the purpose of your journey, it's imperative to identify key parameters that will underpin your priorities. The following should be explored and reviewed with cross-functional teams at your organisation.

- Do you have site-specific data that will form the basis of your solution?
- What parameters are required?
- How do they combine with other data sources to inform decisions?

3.

Lay the first building blocks: Confirm what data is available

Once key parameters are identified it's time to confirm data sources, data quality and methods for capture. At this step you may review:

- Gap analysis
- Existing data sources
- Instrumentation
- External data services
- Data quality
- Resolution (temporal, spatial)

4.

Put the systems in place to make the step change

To achieve actual benefits for your effort it's time to connect, automate, process and understand what is happening now. The following aspects are important at this stage:

- Leverage the power of IoT
- Intelligent data processing
- Systematic, broad communication mechanisms
- Integrate with other systems and daily workflows
- Working smarter, not harder

5.

Influence your organisation's future with continuous improvement

With a solution tailored to your organisation's requirements, success is now achievable. You can now:

- Uncover new approaches
- Identify better leading indicators
- Smarter ways to operate
- Improve quality of life for your workforce and communities
- Improve your performance
- Unlock hidden value



Contributors



Jason Cooper

Envirosuite CEO

Jason is a highly regarded and well-respected industry leader with more than 20 years' experience in the technology sector in executive roles in both multi-national and start-up environments. He's a passionate believer in the role technology plays in enabling responsible mining.



Andres Quijano

Envirosuite Sales Manager - Americas

Andres Quijano has over 15 years of experience providing hardware and software solutions to environmental professionals. He's been on a mission to enable sustainable mining operations at some of the world's most complex sites for the past decade.



Matt Scholl

Senior Manager, Environmental Technology Solutions

Matt is a well-regarded senior manager and thought leader with more than 20 years of experience in environmental science and technology. He has guided the implementation of effective solutions at some of the most environmentally constrained mining operations in Australia, North and South America and Northern Europe.



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Our customers are realising their full potential with environmental intelligence



4000+

connected devices
providing situational
awareness to operations



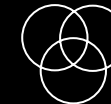
45+

countries with more
engaged communities &
sustainable industries



250+

technologists, scientists &
engineers at your fingertips



30+

years experience

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UK

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to take your operation to
the next step.

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