Defence Demand Sharpens Focus on Critical Minerals Energy Infrastructure

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As allied governments and defence industries intensify efforts to secure critical minerals supply chains, energy infrastructure is emerging as a decisive factor in project viability, resilience, and long-term competitiveness.

In this interview with Energy and Mines Magazine, David Willick, Vice President and Regional Leader Mining, Metals and Mineral North America, Schneider Electric, explains how defence-driven demand is changing the way mining, processing, and advanced materials projects are designed, financed, and operated — from energy reliability and digital resilience to traceability, processing capacity, and integrated industrial partnerships.

"Energy resilience is increasingly a precondition for defence capital— not an add-on"

As defence demand becomes a key driver for critical minerals, how is this changing the requirements for energy infrastructure across mining, processing and advanced materials in production?

The defence demand is yet another source of demand on an already tight supply. Declining ore grades at existing mining operations and slow progress on opening new mines limits the supply, while decarbonization, electrification, AI and now defence keep increasing the demand. Increases in demand while supply is limited increase prices.

Defence demand is no longer a marginal or "specialty" driver for critical minerals—it is now shaping how energy infrastructure must be planned, financed, and operated across mining, processing, and advanced materials production. Compared to civilian markets, defence requirements place harder constraints on reliability, security, and surge capacity, which is materially changing energy system design across the value chain.

Critical minerals essential to defence (REEs, tungsten, tantalum, antimony, nickel, titanium feedstocks) are increasingly being developed outside legacy low-cost jurisdictions.

"Mines are being designed as energy assets, not just energy consumers"

Defence demand changes the energy equation in three ways:

1. **Reliability > lowest-cost electrons**
   Defence supply chains tolerate less production variability than commercial markets. Mines feeding defence programs must prioritize:
   - Firm power availability
   - Redundancy during grid outages
   - Guaranteed minimum uptime
   - This pushes projects toward:
     - On-site generation (gas, hybrid microgrids and perhaps future SMRs)
     - Dedicated transmission rather than shared rural connections

2. **Higher energy intensity acceptance**

Defence-linked minerals often have lower ore grades and more complex metallurgy, increasing power needs per tonne mined. Governments are increasingly willing to subsidize higher-energy-cost assets to ensure security of supply, reversing decades of cost-minimization logic.

3. **Energy as a permitting bottleneck**

In the U.S. and allied countries, grid access studies and interconnection delays are now among the longest critical-path items in mine development timelines, rivalling environmental permitting. Net effect: Mines are being designed as energy assets, not just energy consumers.

Defence supply chains place a premium on reliability and resilience. How can integrated energy systems and digital technologies help ensure consistent, secure operations across the critical minerals value chain?

Many of the critical minerals in the highest demand are by-products of existing processes. Increasing the demand of these by-products will create an opportunity to expand, decarbonize and

modernize / digitalize existing facilities to ensure the guaranteed supply of any new off-take agreements with defence departments or contractors.

Defence supply chains demand a much higher bar for reliability, resilience, and security than most civilian industrial systems. For critical minerals—where supply chains span remote mines, energy-intensive processing plants, and precision advanced-materials facilities—integrated energy systems and digital technologies are becoming essential enablers of continuity rather than optional efficiency tools.

These capabilities work together across the value chain to ensure consistent, secure operations.

1. Integrated Energy Systems: Designing for Continuity, Not Just Efficiency
    - Hybrid and Islandable Energy Architectures
    - Built-In Redundancy and Load Prioritization
    - Dispatchable Power for Energy-Intensive Processing
2. Digital Technologies: Turning Energy into a Predictable, Managed Asset
    - Digital Twins for Energy and Process Resilience
    - Predictive Maintenance and Fault Detection
    - Real-Time Visibility Across the Value Chain
3. Cybersecurity and Digital Sovereignty
    - Secure Energy Control Systems
    - Trusted Data and Traceability

For critical minerals supplying defence applications, resilience is no longer achieved by overbuilding assets alone; it is engineered through integrated energy architecture and intelligent digital control. Together, these systems:

- Convert energy from a vulnerability into a strategic advantage
- Enable continuous operation under geopolitical, physical, or cyber stress
- Provide defence planners with confidence that material supply will hold when it matters most

Governments are increasingly using procurement, offtake, and financing tools to support defence-critical minerals projects. How can energy and infrastructure planning help projects align with these defence-driven funding and procurement pathways?

Energy and infrastructure must come first, before any resource extraction can take place. The current defence-driven demand, coupled with the availability of new funding pathways, allows the development of the required infrastructure that may not have been developed without the new funding pathways.

Defence agencies do not fund minerals projects simply to increase supply; they fund them to secure assured, resilient, and controllable production capacity under stress. Energy and infrastructure choices are among the most powerful signals that a project can meet that standard.

When well-designed, energy planning:

- Reduces the risk governments must underwrite
- Improves eligibility for offtake and concessional finance
- Differentiates projects in competitive procurement processes

Put simply: Energy resilience is increasingly a precondition for defence capital—not an add-on.

To align with defence-driven procurement, offtake, and financing pathways: Projects must show that energy and infrastructure are designed to protect defence outcomes, not just project economics.

A major gap in allied supply chains is midstream processing capacity. What role do energy availability, cost, and reliability play in enabling processing and refining projects to move forward in Canada and other allied jurisdictions?

Western critical mineral supply security requires a shift away from a model where Canada focuses primarily on resource extraction while much of the downstream value-added processing occurs outside allied jurisdictions. Canada and its allies need to develop greater domestic processing capability for their own resources. To compete economically with well-established global processing ecosystems, we must be extremely efficient in our energy consumption and leverage digital and AI tools to optimize this new processing capacity.

Midstream processing and refining are the principal choke points in allied critical minerals supply chains, and energy availability, cost, and reliability are often the decisive factors determining whether these projects advance beyond feasibility in Canada and other allied jurisdictions (U.S., Australia, EU, Japan). Unlike mining, processing is capital-intensive, energy-intensive, and operationally unforgiving, which makes energy planning central to project viability and long-term competitiveness.

Midstream processing capacity in allied jurisdictions will not scale on policy intent alone. It depends on energy systems that can deliver large volumes of affordable power, continuously, with high reliability, for decades.

In Canada and other allied economies:

- Availability determines whether projects can break ground
- Cost determines whether they can compete with established global processing capacity
- Reliability determines whether governments and defence buyers will underwrite them

This is why energy infrastructure planning is increasingly the decisive enabler—or blocker—of midstream critical minerals projects across the allied world.

Traceability and transparency are becoming essential for defence supply chains. How can digital technologies support the tracking, verification, and qualification of critical minerals from mine to end-use?

Real-time tracking and reporting of raw material sources is becoming more common. The tools and systems are in place and currently used to certify non-conflict area minerals and sustainability roots. These digital tracing and tracking tools can easily be expanded to verification of critical mineral sourcing and through steps in the processing and recycling value chains.

For defence supply chains, traceability is no longer just about ESG disclosure or compliance—it is about trust under conflict conditions. Defence buyers must be confident that materials:

- Originate from approved sources
- Were processed in secure and reliable facilities
- Meet exact performance and contamination standards
- Have not been substituted, diluted, or tampered with

> *"Defence OEMs are no longer just buying materials—they are co-owning supply-chain resilience."*

Digital technologies enable this by turning traceability from a paper audit into a living, verifiable control system across the value chain.

Traceability is no longer a reporting exercise—it is a control system for trust. Digital technologies—when integrated across operations, energy systems, processing, and manufacturing—allow governments and defence primes to:

- Verify provenance and processing integrity
- Continuously qualify materials
- Detect and isolate risk early
- Defend supply chains against both disruption and deception

As defence primes and OEMs become more engaged in upstream supply chains, what new types of partnerships are emerging—and how can energy and infrastructure providers support these collaborations?

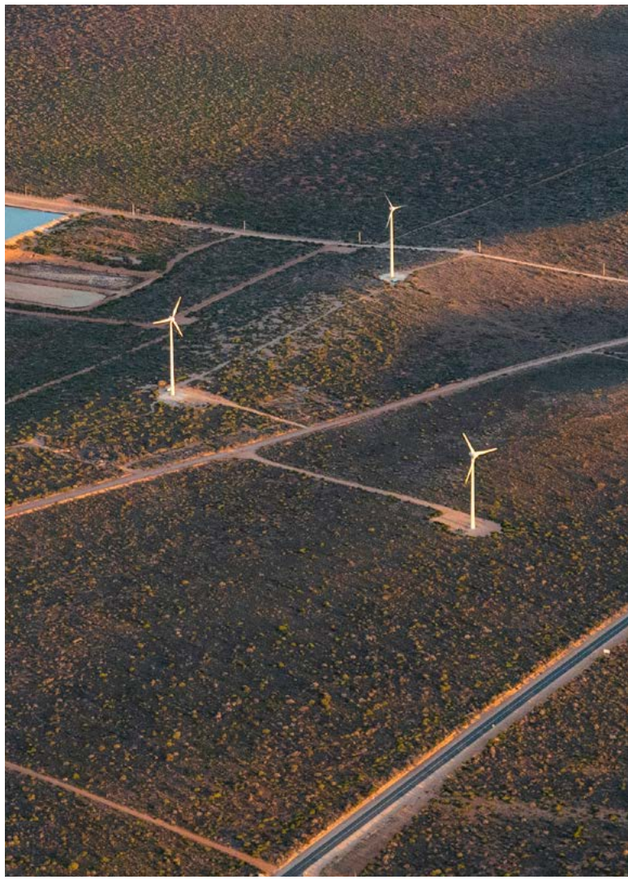
The defence industry is among the latest sectors to recognize the strategic importance of securing critical mineral supply chains. Concentration of processing capacity in a limited number of global markets, and recent supply-side constraints on certain materials—for example, antimony- have exposed vulnerabilities for defence supply chains and governments alike. Antimony is an essential ingredient in ammunition and larger weapons systems, making secure access to this material particularly important.

Schneider Electric is also concerned with our copper supply chain and have recently teamed up with Glencore to create what we call a 360-degree relationship, which includes circularity. Glencore recycles our end-of-life equipment and manufacturing scrap while we buy back the 100% recycled copper to feed our supply chain partners, who transform this copper into the parts needed for our new products. This is one example of supply chain resiliency, which is also occurring in the defence and data centre industries.

Defence OEMs are no longer just buying materials—they are co-owning supply-chain resilience. Energy and infrastructure providers are becoming strategic partners in defence industrial ecosystems, helping convert upstream assets into defence-grade capacity.

1. **Strategic offtake + co-development partnerships**
   Defence primes are entering long-term offtake agreements tied to capacity development, not just output: Energy certainty turns conditional offtake into bankable demand.
2. **OEM-anchored "industrial cluster" partnerships**
   Defence primes are increasingly anchoring regional industrial clusters.
   Clusters reduce supply-chain fragility—but only if infrastructure scales with the ecosystem, not individual projects.
3. **Equity and risk-sharing partnerships upstream**
   Defence OEMs and Tier-1 suppliers are taking shared financial exposure; however, this only works if energy risk is also shared—and managed.
4. **Long-term qualification and "always-on" supply partnerships**
   Rather than qualifying a supplier once, defence OEMs are moving toward continuous qualification, which requires continuous operation, and energy reliability becomes a contractual requirement.
5. **Data- and digital-thread partnerships**
   As traceability requirements rise, defence OEMs are partnering upstream with mining producers. Energy and process data are now part of material qualification, not just operations.
6. **Public–private–defence consortium models**
   Infrastructure is often the largest common dependency across consortium members.
7. **How energy & infrastructure providers should reposition themselves**
   To support these emerging partnerships, energy and infrastructure providers increasingly need to shift from utility mindset to strategic partner mindset

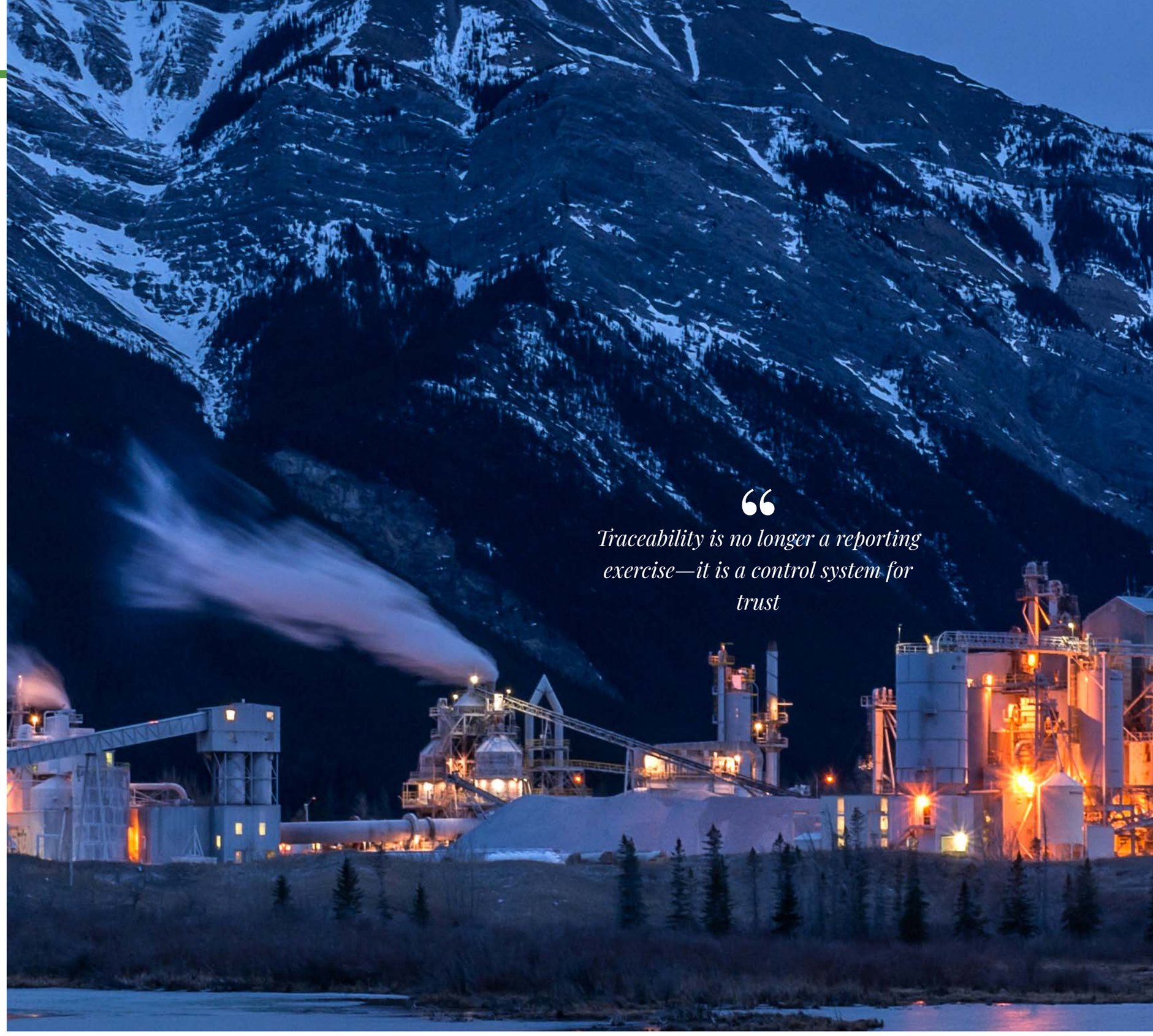
As defence primes and OEMs move upstream, partnerships are evolving from transactional sourcing to co-managed industrial ecosystems. In this environment, energy and infrastructure providers are not peripheral—they are foundational partners in defence readiness. Those that can: Deliver reliable, secure, and scalable systems; Align contract structures with defence commitments; Support clusters, co-investment, and digital integration will increasingly sit inside defence-critical partnerships, not outside them.



Looking ahead, what are the most important steps industry and governments should take to ensure that critical minerals projects are not only developed, but fully integrated into secure, defence-aligned supply chains?

Western world countries must invest in mineral processing technology to “re-shore” the critical processing step, thereby reducing complete dependency on processing capacity located outside allied jurisdictions. The West has become complacent and dependent on externally located processing capacity and is now subject to export restrictions imposed by key processing regions. Some markets have a long history of subsidising critical mineral and BEV material processing to secure large-scale global processing capacity.

These practices drive down prices and make processing in the West “uneconomical” in the short term. The West needs to evaluate programs such as a guaranteed minimum price for minerals to provide a stable, long-term outlook to secure private capital investment. The USA has recently deployed this model successfully for several commodities. The most public example is the U.S. Department of Defense partnering with MP Materials, taking an equity stake and providing a guaranteed 10-year floor price of $110/kg for neodymium-praseodymium (NdPr) oxide, which is well above market price. This arrangement, coupled with offtake agreements for magnets, reduces the risk for investors and encourages private capital to build domestic processing and manufacturing capacity that would otherwise not be viable against lower-cost global supply.



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