



Critical Raw Materials extraction in environmentally protected areas

Towards Efficient Policy Making

Deliverable D6.2

? The Critical Raw Materials Act (CRMA) was only just on the radar when the CIRAN project was first adopted into the Horizon program mid-2022. But the need to fundamentally rethink EU and wider European minerals policymaking to address the two cardinal weaknesses in critical raw materials (CRM) policy pinpointed in 2017 by the UN Economic and Social Council, under-investment in both building CRM physical supply chains and in developing CRM-related social capital – the capabilities required to understand and use CRMs – was already clear. In February 2022 the Russian invasion of Ukraine left no doubt as to the speed of the response and degree of commitment and investment required for achieving it.

The impact was the start of a ground-up, fast-track rethink of how to combine the Circular Economy and Green Energy transition with European defence policy, capabilities, resources and financing. A common sense of urgency led to the CRMA being ready for adoption by the end of the year. This ground-up rethink has since been further accelerated in Europe since January 2025 under the impact of the United States Trump administration to significantly advance defence spending.

Recommendation: Apply graded layers of protection (LOPs) in protected areas to optimise use efficiency and minimise adverse social or environmental impact.

These LOPs are:

- Integrated management, recovery, and reuse of secondary and primary resources, with secondary resource options as the default, minimising energy loads and carbon emissions where possible,
- Optimise resource use efficiency at all points across supply and value chains,
- Encourage continuous adjustment of individual and collective behaviours for personal and collective sufficiency – not dogmatic “degrowth” but pragmatic “self-discipline and community solidarity”,
- Use national or regional anchor policies to determine investments and capital allocations in the CRM sector, policies that take protected area requirements into responsible consideration, and manage complex issues applying pre-agreed exceptions and exemptions,
- Apply a range of “social resource contracts” for CRM projects, based on common core principles to establish legally enforceable value chains and governance tools, not just social licences to operate,
- Steer the CRM investment process by a win/win negotiated equilibrium model where a) all members of the value chain engage through and benefit from “smart contracts” (based on the Nash-Stackelberg equilibrium model) and all CRMs are managed b) through trackability and traceability tools aligned to the UN Transparency Protocol (UNTP), e.g. resource passports and certificates of origin confirm protected area permitting procedures are enforced.

Findings

To enhance social acceptance of the mining and processing effort that delivering CRM policy objectives, determinations, project investments, management and resource distribution and use would require it was recognised that the CRMA delivery plans must be grounded in democratic values and principles, including recognition of CRMs as Public Good, whether the source areas for providing those CRMs are protected or not. As established by the CIRAN project more than 85% of Europe’s available CRMs are estimated to be found either beneath, or within 5km of protected areas. That suggests the obvious normalising approach to permitting mining and processing of all CRMs will be to use the same level of socio-environmental and techno-scientific rigour expected in permitting in protected areas in all areas, complemented by intense engagement with local communities and primary stakeholders in all cases.

Democratic values and a holistic equilibrium of social, the public good, equitable economic return and environmental protection – the “Triple Bottom Line” – must define the core of the “social resource contract” to be applied to address the crisis of trust and confidence in extractive industries, which could destabilise or even defeat delivery of the CRM Act if left unaddressed.

On the assumption of CRMs as in principle Public Good, funding for securing supply chains and out of the forging resilient value chains, must be government policy-anchored and underwritten with public-private partnerships as a strategic complement.

The New Normal

Developing EU strategies for defining indispensable resilient value chains for competitiveness and sustainable value chains built on the talents and resources available in the EU and like-minded countries.

Value-chain design and project implementation approaches under “new normal” operational conditions should consider streamlined implementation processes (ideally a 90-day push), with artificial intelligence techniques and machine learning technologies at the core:

1. Map existing capabilities and identify and rectify strategic gaps in CRM value chains,
2. Develop industrial clusters (actual and virtual) around CRM processing and manufacturing, prioritised for both economic energy transition and defence requirements,
3. Assure policy-anchored, government-underwritten investment is assured for any critical project which under previous conditions would be uninvestable (see actual EBRD Anchor Policy Investment strategy and practice for key secondary raw materials for food security),
4. Implement targeted incentives for partners and other companies investing in full value-chain development for high criticality resources enables government led PPPs,
5. Support cross-border value chain collaboration by encouraging Member States to specialise in different segments of strategic value chains based on their comparative advantages while ensuring EU-wide and aligned European state integration.

This new normal foundation is key to the development of industrial clusters around mineral operations, with a focus on regional development goals and opportunities as well as EU- and European level priorities of economic security, environmental performance and transition imperatives. The strategic economic goal is to define a new, Nash-model sustainable point of CRM equilibrium, focused on consultation, autonomy and collective self-sufficiency.

But essential to a workable permitting process both in- and outside protected areas, in the context of national interest and public protection, no absolute prohibition can be entertained of permitting mining and processing CRMs from protected areas.

In practical terms three capabilities are likewise keys to success:

1. Preparedness and flexibility
2. Deployment of powerful technologies and optimum use of AI, machine learning and block chain to rectify vulnerabilities and weaknesses in the current body of human CRM knowledge and expertise
3. Application of a predetermined graded approach to assessing and managing resource criticality states.

So is installed a finely structured “layer of protection” (LOP) operational model, with appropriate escalation, de-escalation and two-way decision gates for managing project activities from the least to the most contentious states. That way, terms and conditions of mining and processing in protected areas would be pre-agreed, well-rehearsed and tested long before being activated.



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