

Theory to practice: The scope, purpose and practice of prefeasibility studies for critical resources in the era of sustainable development

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While the fundamental goal of a PreFeasibilityStudy, (PFS) to justify the technical, financial, social and environmental case for a given mining and/or processing project, remains unchanged, the way this goal is met in the era of sustainable development must change to meet a wide range of new appraisal criteria against which “feasibility” can be determined. This paper addresses what a newlook PFS might need to contain.

The change drivers for sustainability include:

Whole Basin Resource Management - new upstream approaches to estimating and managing resources across whole basins, such as sedimentary basins containing oil, gas, coal, phosphate, uranium on Rare Earth Elements

Comprehensive Extraction - new comprehensive extraction technologies based on integrated flow-sheets designed to extract all resources of interest from a single ore body in the best economic, social and environmental manner, as for example, extraction of P, U, Th, REE, etc from a P ore body

Life-cycle Resource Management (Primary, Secondary, Circular) –based on models of criticality and substitutability, life-cycle resource management requires the approach to all resource management to be similar to that required for non-substitutable resources such as phosphates –even when substitutes are available

Waste Hierarchy –progressive / step-wise transformation of waste to resource, with a hierarchy of waste itself premised as i. prevention (or transformation to resource), ii. minimisation, iii. reuse; iv, recycling, v. disposal.

Stakeholder Engagement and Social Licensing –a project can no longer be regarded as either safe or sustainable if it does not earn and retain a social licence to operate, based on stakeholder communications and engagement. Key determinants of success will be the aggregate beneficial or detrimental impact on Food, Energy and Water (FEW) security.

The operational fulcrum of these changes, and hence the core of the new look PFS, is that the driver of sustainability is the resource set itself, such that once ground is broken or holes are drilled, the return from that activity is optimised across all resources, not just a single target. In short, the process is resource driven, and hence the key determinant in the PFS is to work out the best strategic solution to managing such resources rather than taking the project-based tactical solution of selecting single targets. This change of approach in one key way facilitates the PFS task, because the other key resources required to succeed, human and financial, become alternate facets of the same project, and feasibility is demonstrated when they come into congruence. Hence in a People, Process, Purpose approach, Human Resources must be suitably capitalised, as must Process Solutions (whether for mining or processing) to meet Triple Bottom Line Purposes –economic, social and environmental.

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