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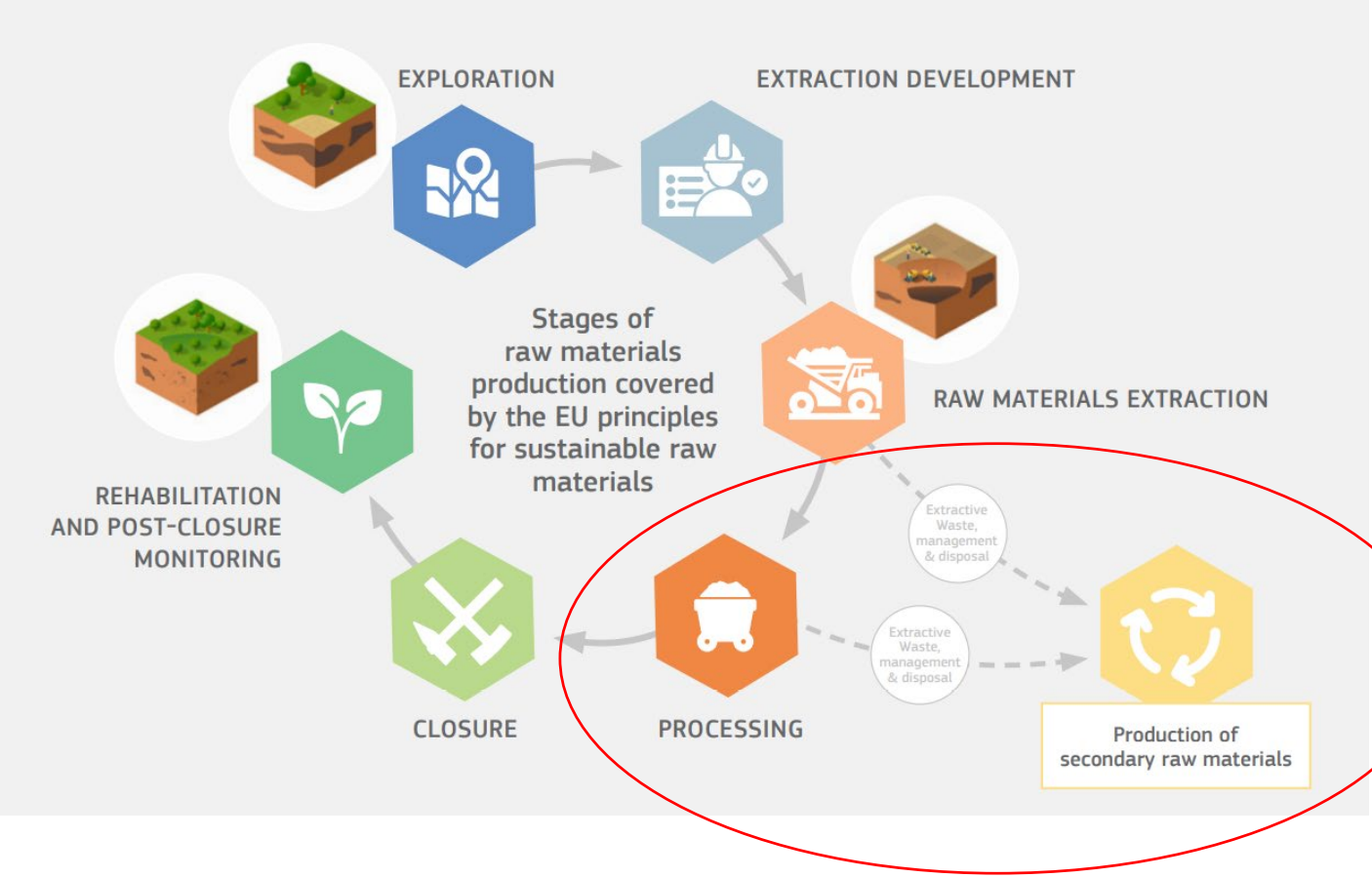
UNFC applied to Downstream Projects
General Considerations

Objectives

- Nature of downstream projects
- General downstream considerations
- Downstream E, F and G axis considerations

Raw material project life-cycle



UNFC Mineral Specifications

- The minerals cycle starts with the exploration and subsequent primary mineral production, such as excavation, beneficiation, processing and value-addition in a mineral project(s), as wells as site decommissioning and remediation.
- Mineral products reflect the primary entrance of raw materials into the stock available for economic value chains.

Downstream projects

- Examples
  - Battery materials
  - Steel
  - Hi-tech materials
  - Fertilizers
  - Petrochemicals
  - Component manufacture
  - Consumer goods
  - Recycling

- Opportunity
  - Value-added premium products
- Challenges
  - Supply risks
  - Critical raw material management
  - Governance – Transparency, conflicts, human rights (child, forced labor)
  - Technical issues
  - Social and environmental
  - Occupational safety

Why UNFC for downstream projects?

Simplification

Classification

Order

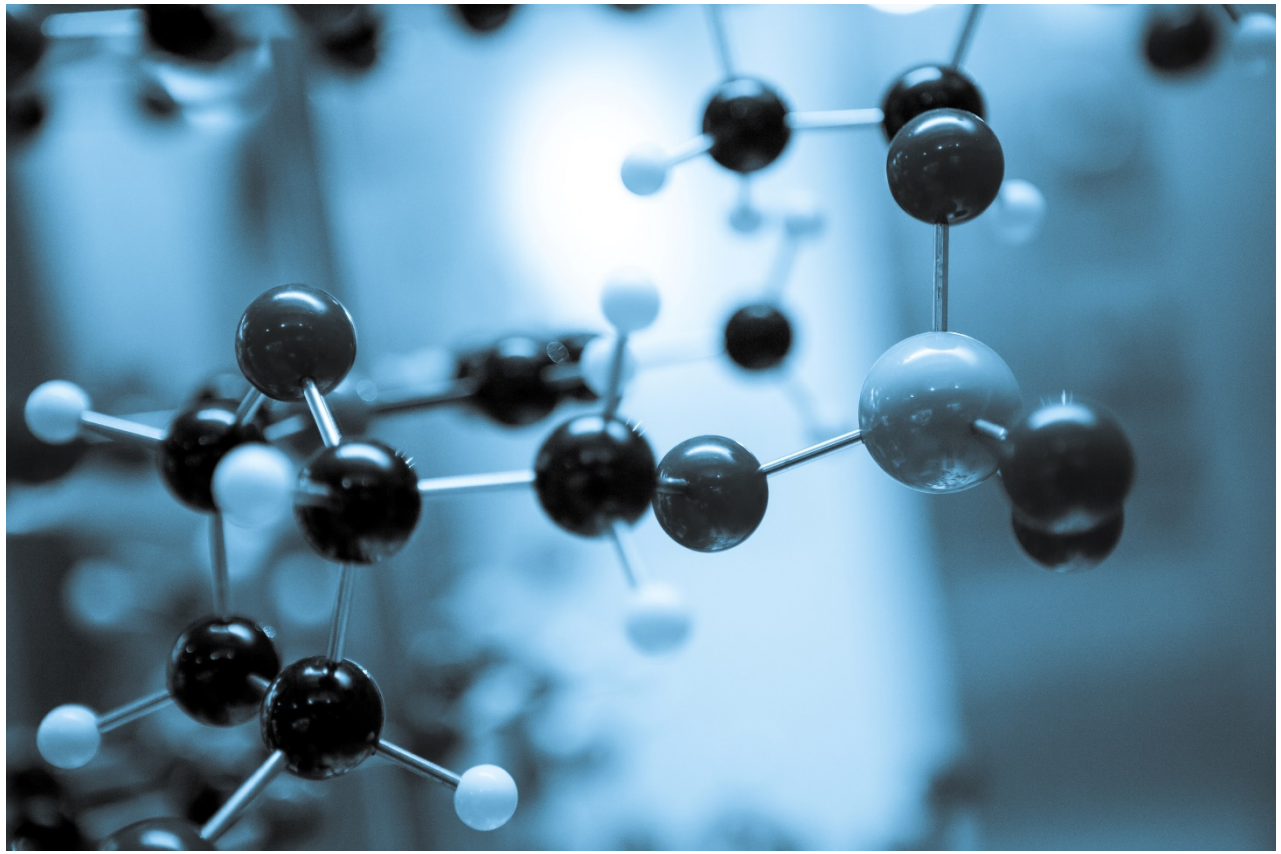
Simpler information processing

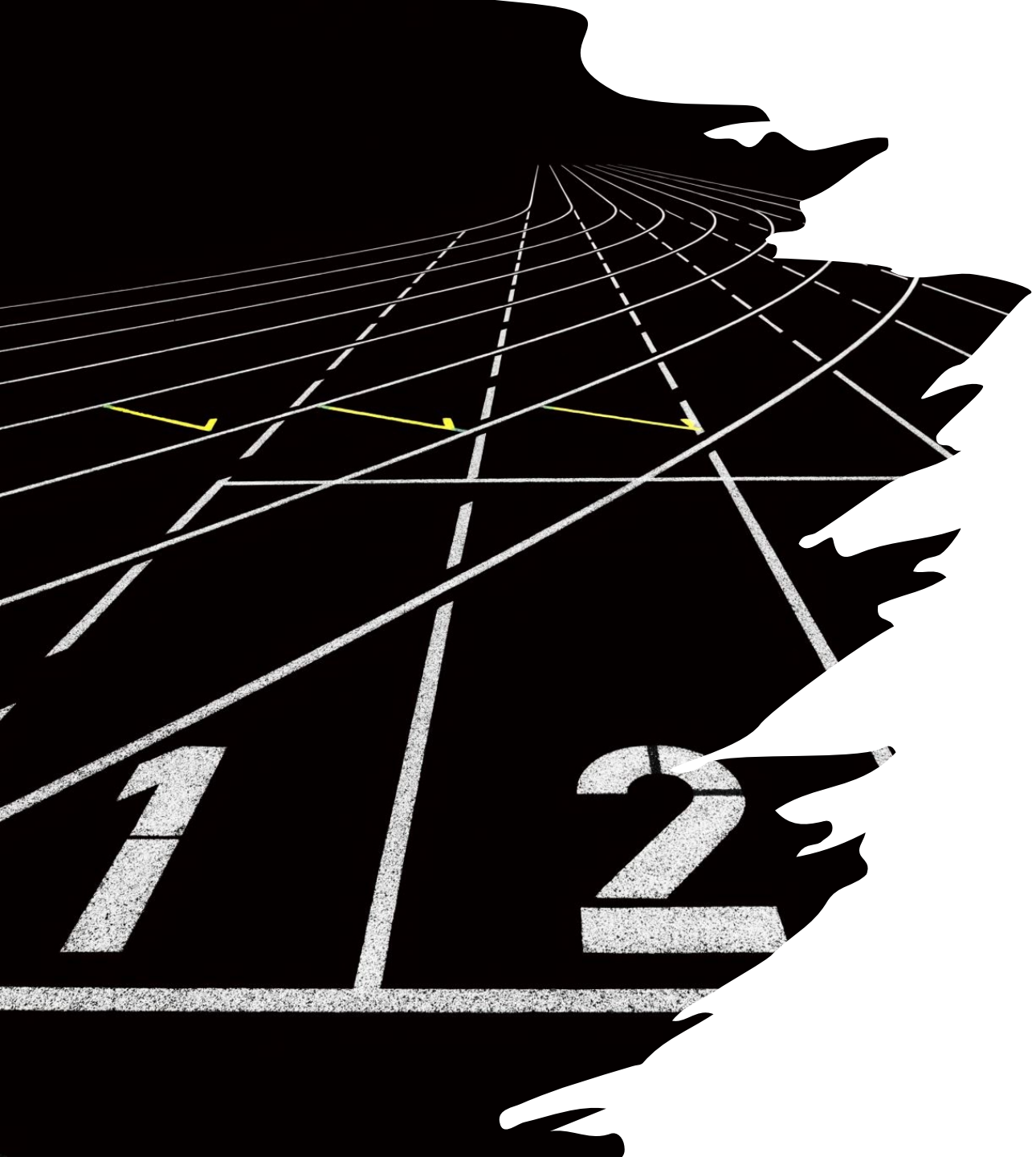
Speeds up decision making

- UNFC
  - Environmental-social-economic
  - Technical feasibility
  - Degree of confidence about sources
- E,F and G are important and interlinked

Processing methods

- Hydrometallurgy
- Pyrometallurgy
- Reprocessing
- New technologies





General considerations 1/3

- Requirements
  - E axis
    - Regulatory – Social and environmental
    - Legal (contracts etc.)
    - Safety
    - Residues and wastes
    - Infrastructure
  - F axis
    - Preliminary and detailed feasibility studies Demonstration (if required)
  - G-axis
    - Sources and quantities
    - Full characterization of source materials
    - Accounting of processing losses
    - Inventories

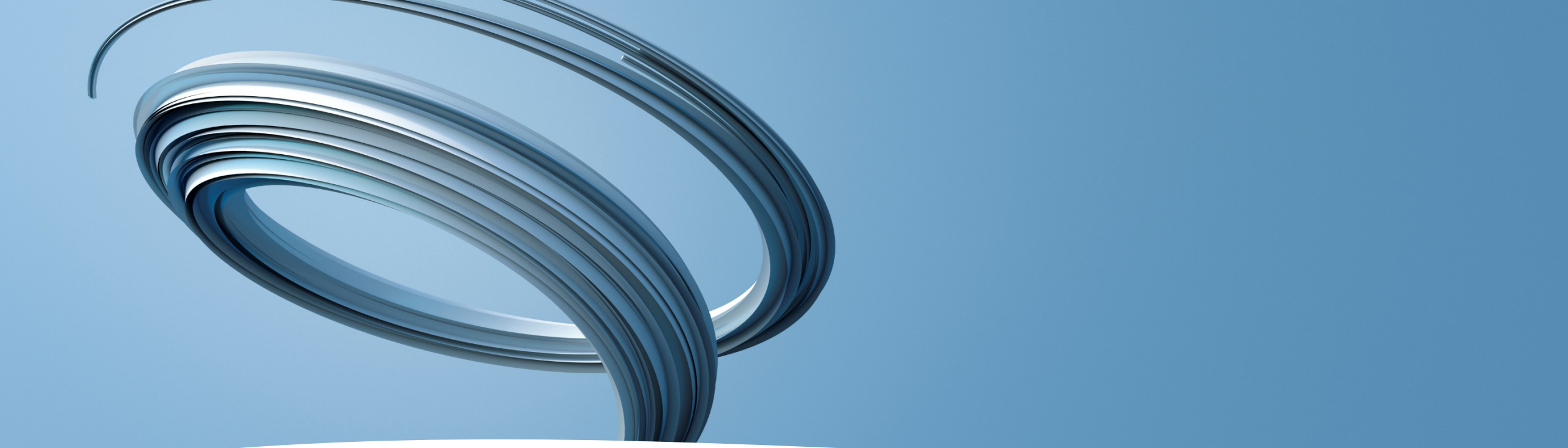
General considerations 2/3

- Mandatory provisions
  1. Numerical codes
  2. Effective date
  3. Transparent aggregation of sourced quantities and products
  4. Reporting basis - What is reported?
  5. Reference point
  6. Foreseeable future, reasonable expectations, reasonable prospects, reasonable time frame
  7. Unprocessed quantities, losses and wastes
  8. Basis of economic assumptions
  9. Uniform use of SI units
  10. Sufficient documentation

- Preferred
  1. Account all information prior to effective date
  2. Separate estimates for each product type
  3. Assumptions of market conditions based either on company view, qualified person view, independently published views

General considerations 3/3

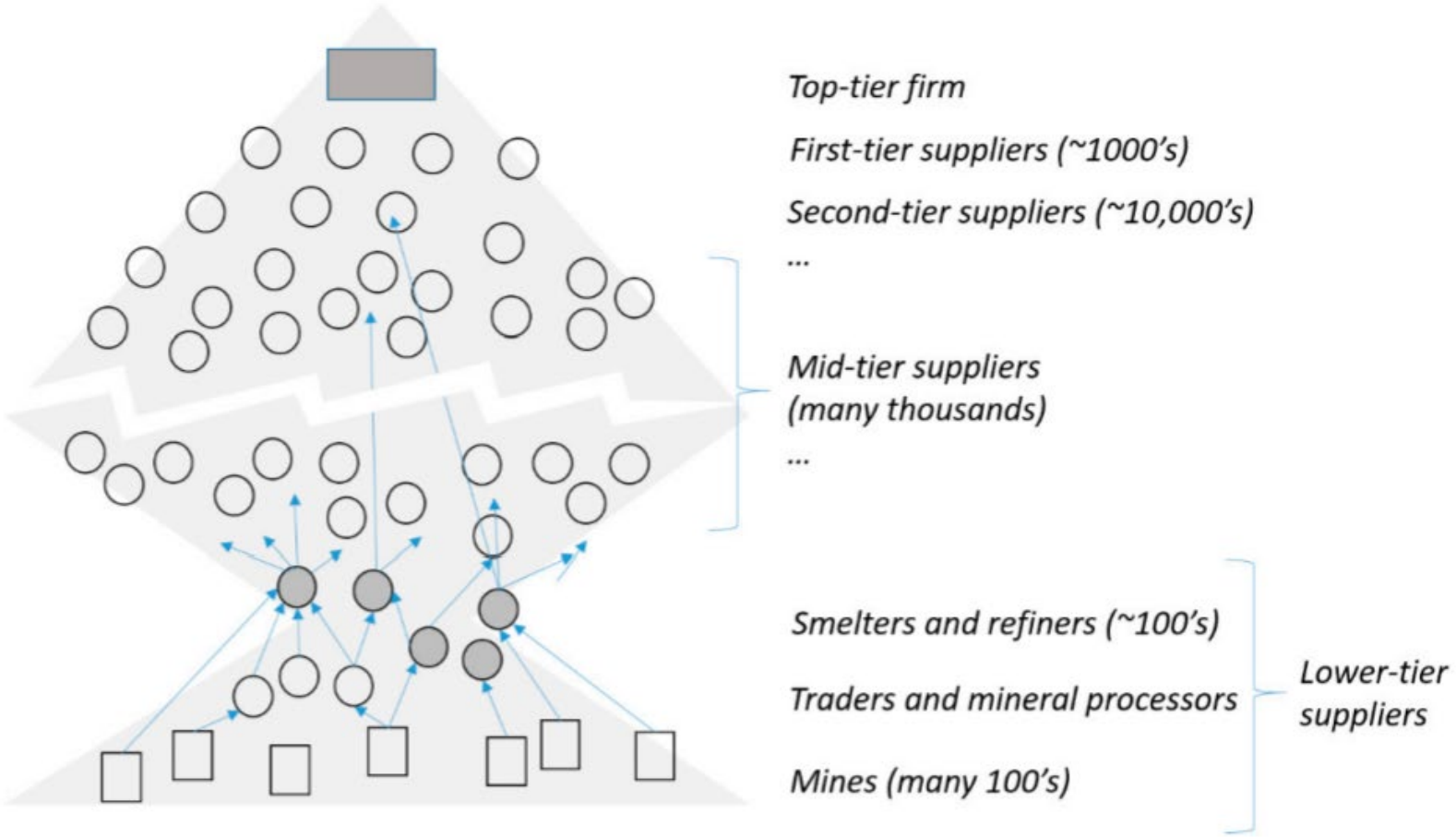
- Alternatives acceptable
  - Use of sub-classes (will allow faster decision making)
  - Quantities attributable to whole project or share of reporting entities economic interest
  - Reference point may be sale point, or an intermediate point
  - If processing technology is not confirmed, quantities with reasonable prospects may be reported
  - Early development project may be classified on the basis of maturity
  - Additional quantities (unprocessed, losses, wastes, etc.) may be reported.



G axis - Quantities

- Measurement techniques
- Types of raw material sources
- Confidence levels – low, medium or high
- Consideration for G4
- Reference point
- Co-product and By-product accounting

G axis - Supply chain risks



Responsible sourcing

- Responsible sourcing, based on due diligence guidance and standards
- EU Conflict Minerals Regulation
- EU Mineral Supply Due Diligence Regulation
- OECD Due Diligence Guidance
- European Partnership for Responsible Minerals

F axis - Project feasibility

- Processing methodology
- Recovery factors
- Technological development
- Level of maturity
- Studies
  - Pre-evaluation/Preliminary economic assessment (less than 5% of the CAPEX) - by comparison with similar existing operations, more advanced projects, or using general cost curves.
  - Pre-feasibility studies (5-15% of the CAPEX) - based on more specific data
  - Feasibility studies (15-20% of the CAPEX) - Final detailed study

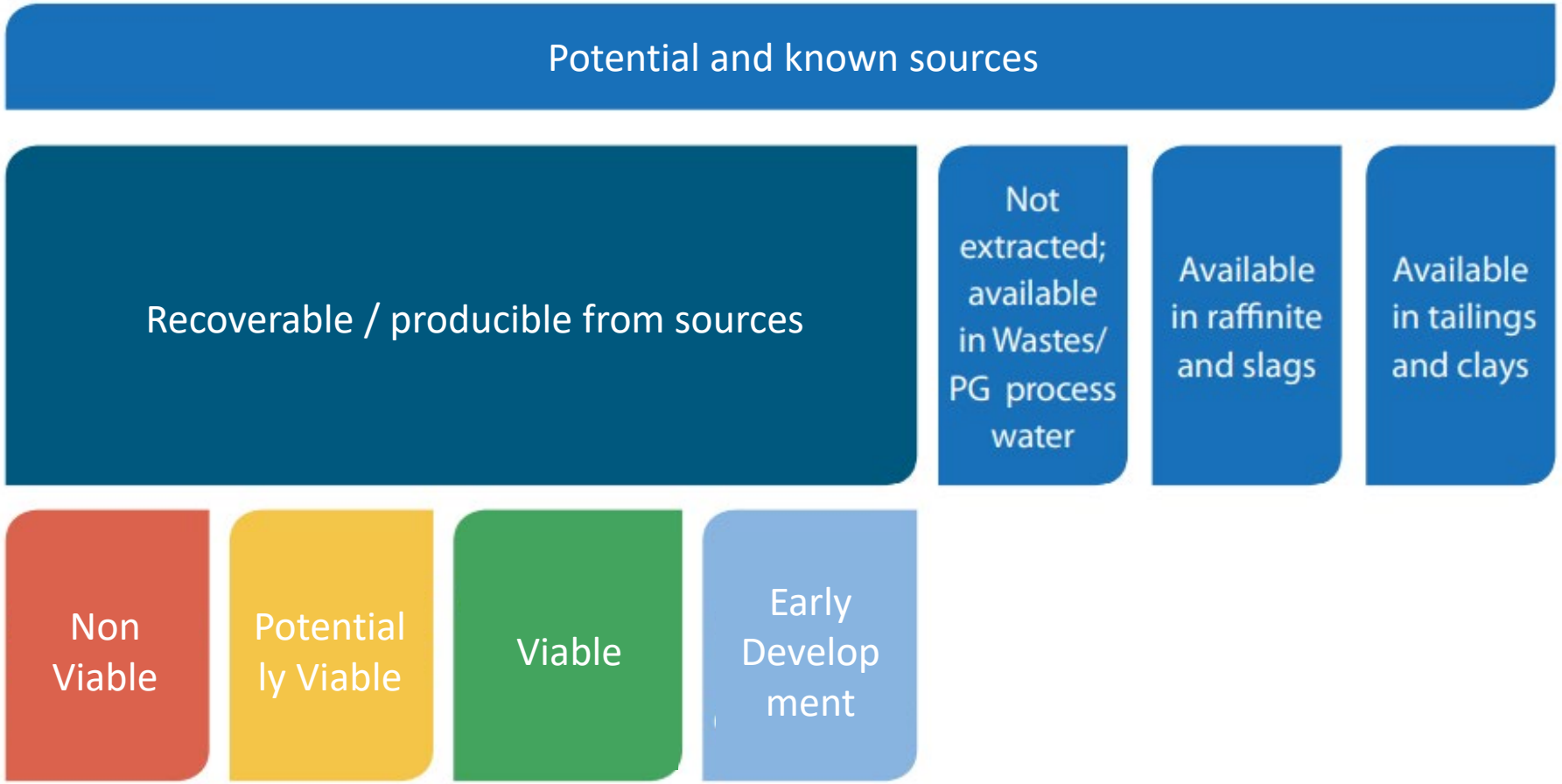
- Detailed studies
  - Demonstrate the feasibility
  - Accurately and completely describe the proposed project
  - Supported by adequate test work and studies
  - Design of a processing method
  - Process equipment, infrastructure details
  - Recovery factors at all steps
  - Mitigation of undesirable environmental impacts

E axis - Project licensing and operations

Political stability
Appropriate regulations
A coherent and transparent licensing strategy
Stakeholder engagement
Tax regime
Land use planning and legislation
Complementary industrial laws
Fair resolution of any consequences

- Legislation framework for sustainability and environmental protection
- Water requirements
- Disposal paths of hazardous chemicals
- Disposal of slags, wastes
- Radioactive materials handling
- Human resources
- Transparency
- International regulations
- Milestones and decision gates
- Social contract
- Occupational safety
- Closure and decommissioning plans

UNFC Downstream Classification



To Summarize

- Downstream projects could be varied and complex.
- Mandatory, preferred and non-mandatory rules of UNFC classification
- Pay attention to sourcing.

Thank you!

Hari Tulsidas
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UNECE

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