



Critical Raw Materials Management: Challenges and Opportunities in India

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Workshop on Critical Raw Materials Management: UNFC and UNRMS as the Sustainable Transition Pathway

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Impacting sustainable development at scale with data, integrated analysis, and strategic outreach

TRANSFORMATIONS

Low-carbon Economy

Energy Transitions

Power Markets

Industrial Sustainability

Sustainable Livelihoods

QUALITY OF LIFE

Clean Air

Sustainable Water

Sustainable Food Systems

Sustainable Cooling

Sustainable Mobility

ENABLERS

Sustainable Finance

Technology Futures

Circular Economy

Climate Resilience

International Cooperation

200+

Multidisciplinary team

320+

Peer-reviewed publications

160+

Instances of increased data transparency

460+

Roundtables & conferences

22

Indian states engaged

110+

Bilateral & multilateral initiatives promoted

SPECIAL INITIATIVES

CEEW Centre for Energy Finance

Powering Livelihoods

Emerging Economies

UP State Office

India's leapfrog to sustainable development..

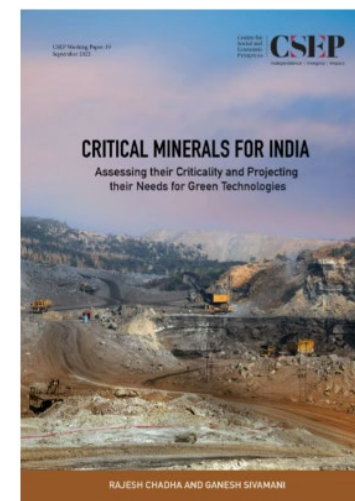
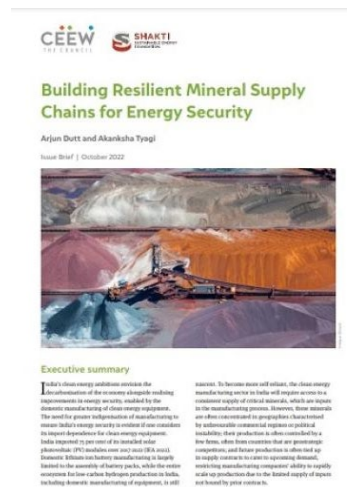
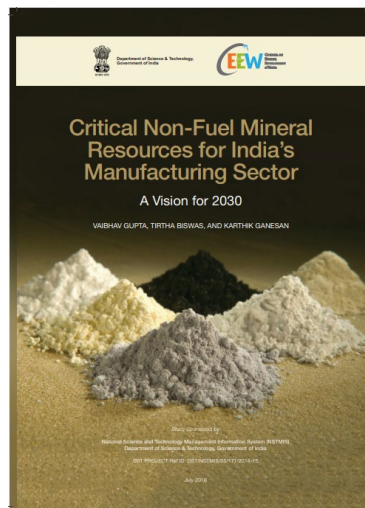
- Increasing energy access
- Decarbonisation of productive use sectors of economy
 - growing share of renewables in electricity mix
 - electrification of transport
 - green hydrogen for steel production
- Smart cities
- Make in India
- Atmanirbhar Bharat

..will increase mineral demand

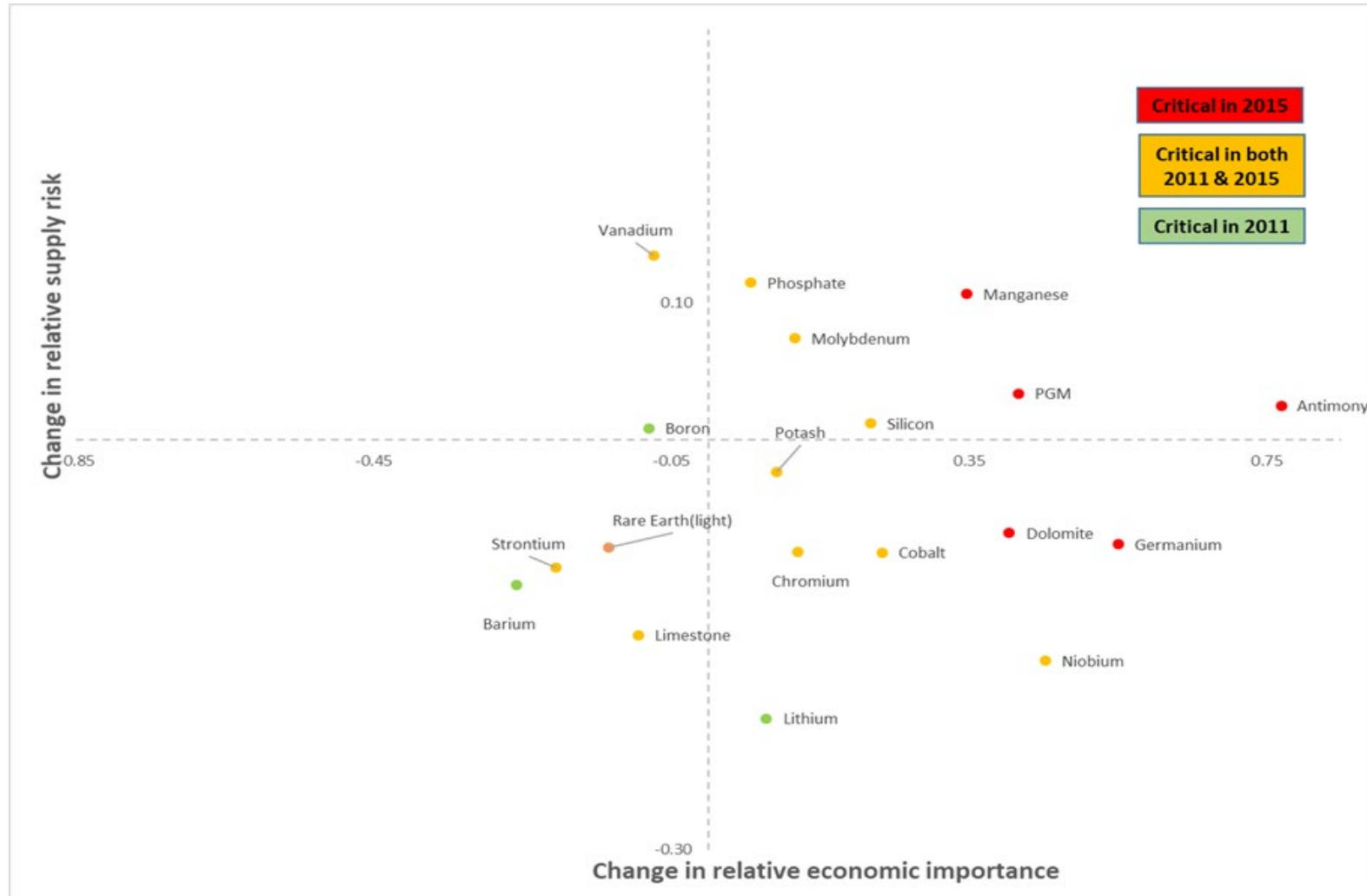
- Clean energy technologies: production and deployment
- Demand is much higher globally
 - Increase in annual mineral production in 2050 compared to 2021 production¹
 - Lithium: 13X
 - Cobalt: 2X
 - Nickel: 5X
 - Copper: 2X
- Manufacturing and trade import of clean energy technologies is highly concentrated for middle income countries²

Supply chain risks could impede the growth

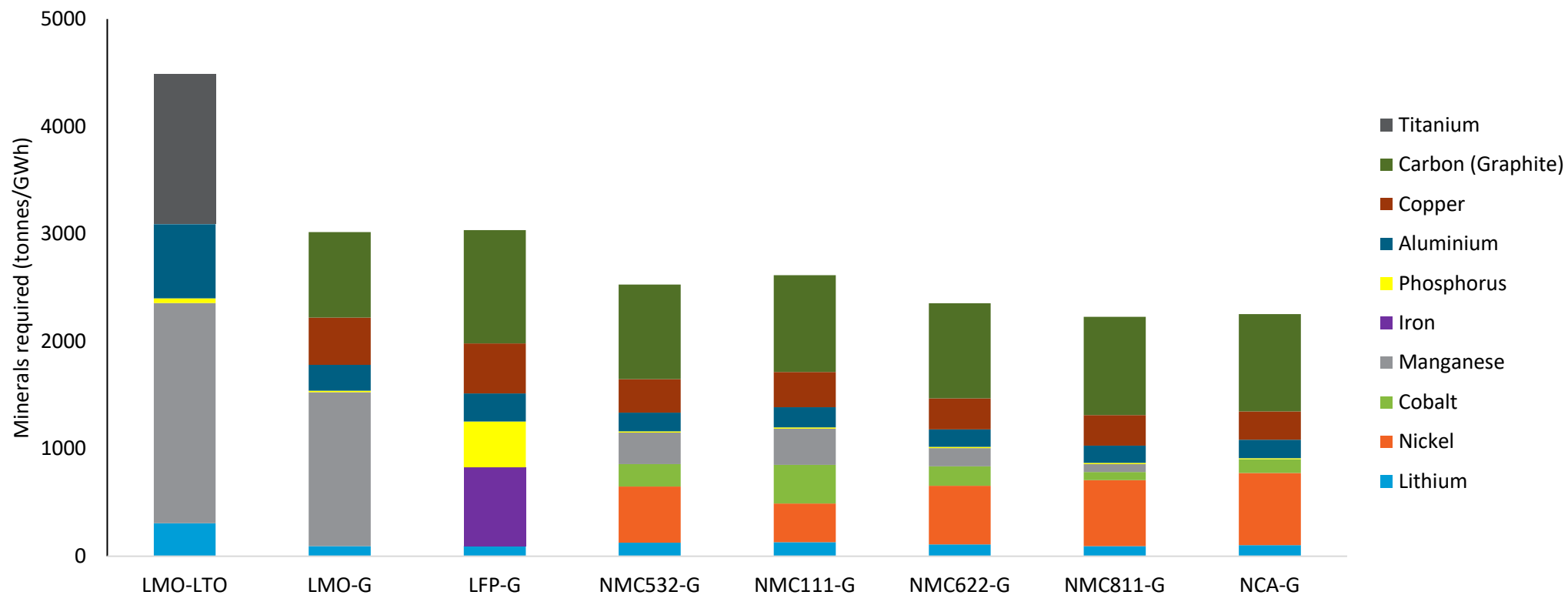
- India is not naturally endowed with several clean energy minerals
- Mineral processing capabilities are also limited
- Emerging manufacturing industries
- No periodic estimation of mineral demand and criticality assessment
 - India has defined strategic minerals but an evolved understanding of criticality lacking
- Independent studies to assess India's mineral requirement and associated criticality



Periodic mineral demand and criticality assessments are important

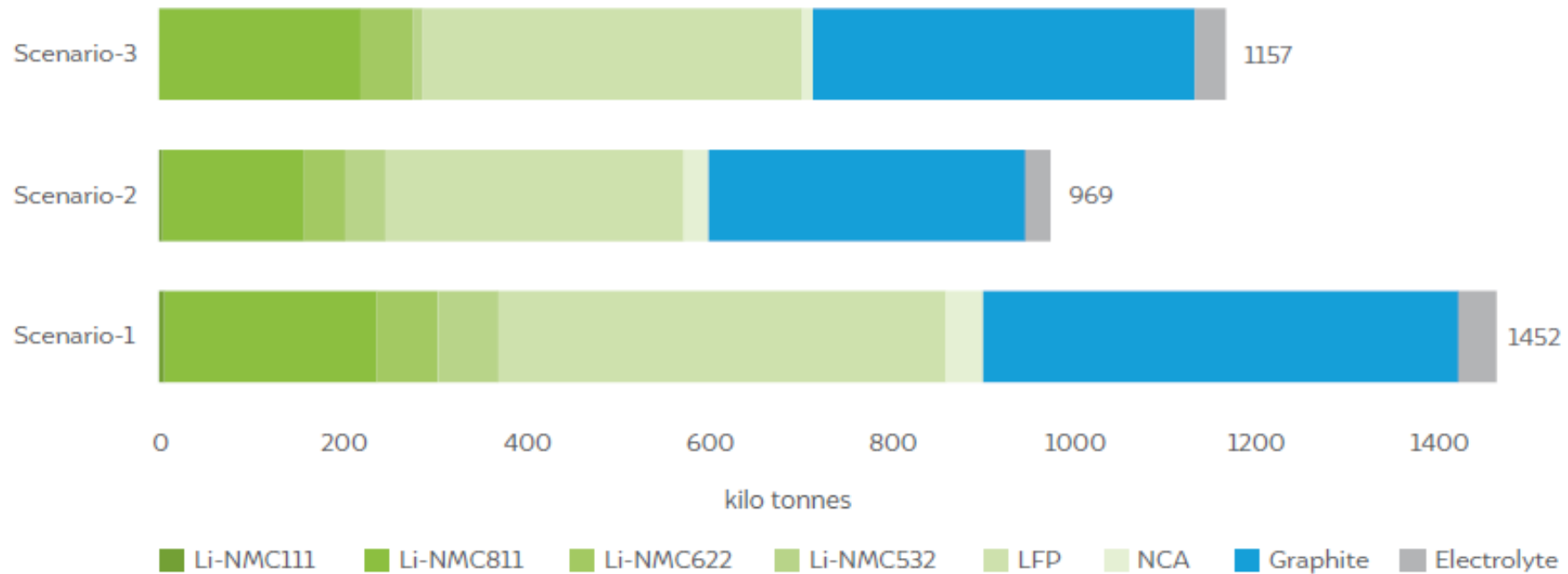


Long term plans necessitate access to key minerals



Mineral requirement for some lithium-ion batteries

Capabilities for intermediate active components also important



Note: Li-NMC – Lithium nickel manganese cobalt; LFP– lithium ferro phosphate; NCA–nickel cobalt aluminium

Opportunities for critical mineral management

- Capabilities for mineral exploration
 - global cooperation in technology sharing and transfer
 - development of responsible technologies
- Mineral processing technologies
 - improving efficiency
 - using clean electricity
- Circular economy
 - uniform indicators for circularity
 - reduce the mineral intensity of products and use minerals that are substitutable and recyclable.
 - design the products for disassembly or recyclability.
 - promote refurbishing and recycling technologies.

India is slowly progressing on all aspects

- Production-linked incentive schemes for advanced chemistry cell and high efficiency solar cells and modules
 - near-term focus is to build midstream capabilities
- KABIL to explore overseas partnerships for mineral deposits
 - recent effort in Australia and
- Circular economy
 - Draft national resource efficiency policy
 - Circular economy strategies for 11 key sectors including batteries, solar modules, and electronics.
 - Battery waste management rules and E-waste management rules

Thank you

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