Minerals and metals for a low Carbon Future: the need for ‘Climate Smart Mining’

Kirsten Hund
World Bank
Energy and Extractives
Presentation outline

01
1. Why a low-carbon future will be more mineral intensive

02
2. What does this mean for resource-rich countries and producer companies

03
3. The need for ‘climate smart’ mining

04
4. Way forward
Without metals there would simply be no low carbon future possible…

One 3-MW turbine contains

- 335 tons of steel.
- 4.7 tons of copper.
- 1,200 tons of concrete (cement and aggregates)
- 3 tons of aluminum.
- 2 tons of rare earth elements.
- zinc
- molybdenum

Source: (NW Mining Association)
Electric hybrid cars use twice as much copper as non-hybrid cars.
The Growing Role of Minerals for a Low carbon future

Examines the implications of changing material requirements for the mining/metals industry as a result of low carbon energy future.

How can resource rich developing countries best position themselves to take advantage of the evolving commodities market?
IEA’s ETP 2016 Scenarios

IEA’s Energy Technology Perspective Scenarios For Electricity Installed Capacity

6 degree scenario

4 degree scenario

2 degree scenario

Source: IEA ETP 2016
## Technology Studied

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<tr>
<th>Wind</th>
<th>Onshore</th>
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<td>Offshore</td>
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<tr>
<td>Solar</td>
<td>Photovoltaics – crystalline silicon</td>
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<td>Photovoltaics – CdTe</td>
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<td>Photovoltaics – CIGS</td>
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<td>PV – amorphous silicon</td>
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<td>CSP</td>
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<th>Energy Storage (split between lithium-ion, lead-acid, other)</th>
<th>Automotive</th>
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<td>Grid-scale</td>
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<td>Decentralise</td>
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Example: Change in metal demand from Solar PV
(as percentage change from 6 degree scenario)

Source: WB Analysis

Note: Values are derived from mean value of 'metal per MW' demand
Example: Change in metal demand from Energy Battery Storage
(as percentage change from 6 degree scenario)
2. Where will these resources come from?
Developing Countries % of Bauxite Production represents 52%, without China, 30%.
Developing Countries % of Bauxite Reserves represents 65%, without China 63%.
Developing countries % of lithium production 52%, without China 45%
Developing countries % of lithium reserves 91%, without China 68%
3. Addressing the carbon footprint of the industry
Low-emission technologies: Innovation and efficiency

- New modes of extraction practices
- Energy and water efficiency
- Methane emission reduction opportunities
- Use of smart data
- Carbon Capture and Storage

- *Mostly Industry-led: role for governments?*
Integrated Landscape Management and planning - including infrastructure

- 20% of all GHG emissions come from Deforestation
- Grades diminish, deforestation increases
- Footprint of associated Infrastructure
- Spatial Planning/ resource Corridors

Challenge: Requires a leading role from government and intergovernmental coordination
4. Conclusions: Towards a ‘Climate Smart’ Mineral and Metals Industry?

• Meeting the Paris climate target will require a radical restructuring of energy supply and transmission systems globally;
• The clean energy shift will be significantly MORE material intensive
• This will probably open up new mining frontiers with new opportunities and risks
• Technology choices matter: Need for a flexible approach
• Footprint implications of the materiality of clean energy need to be factored into climate change and mineral development strategies of countries and companies

Need for a multi stakeholder approach: Governments, industry, Mining and Metals Community, Climate Change/ Sustainable Development Community
Thank you!

Khund@worldbank.org

full report: