



Importance of R&D and Innovation for Mineral Extraction

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World in 2025



- **Population**

- 8 billion worldwide
- 61% in Asia, EU just 6,5%
- 35% of the European population over 60

- **Economic power**

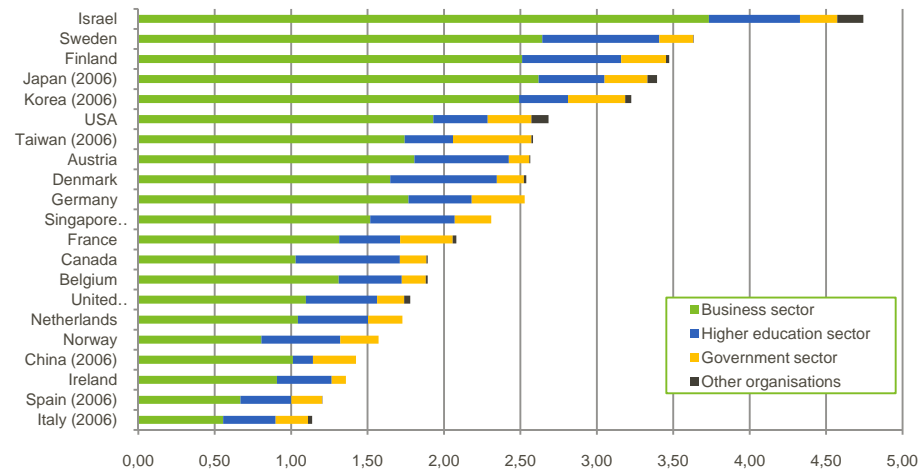
- A doubling of world production by 2025
- 30% of world GDP produced by Asia, EU: 20%
- Asia first world exporter (EU 32%, Asia 35%)

- **R&D capacity**

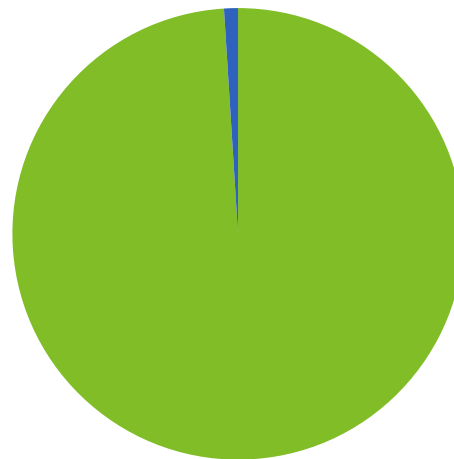
- Asia on par with the US and Europe in R&D

Status of Swedish R&D

- **We are in the lead with respect to % of GDP**



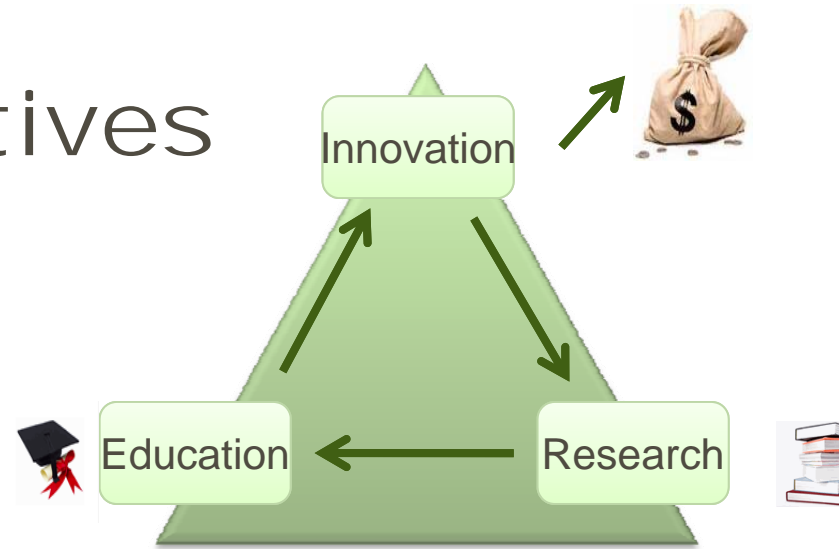
- **.. but 99% of world's R&D is done outside of Sweden**



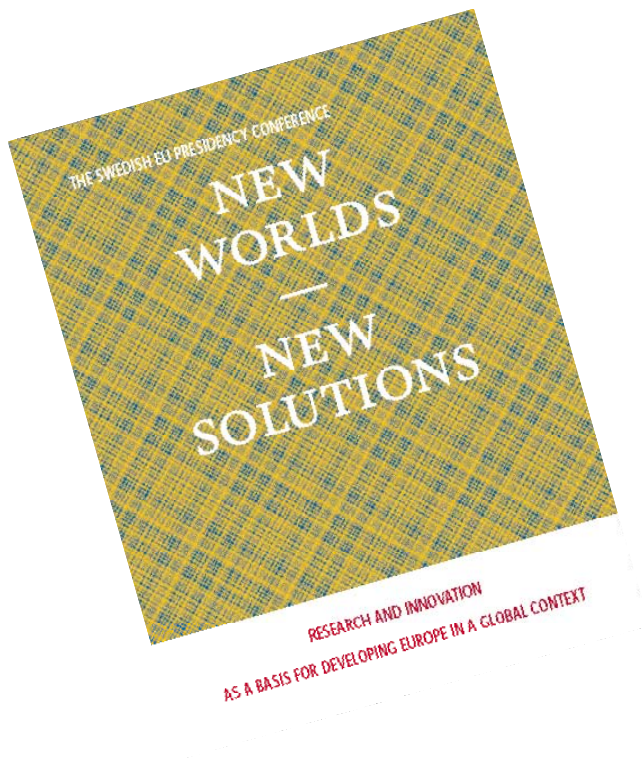


Knowledge Triangle

Ongoing Initiatives



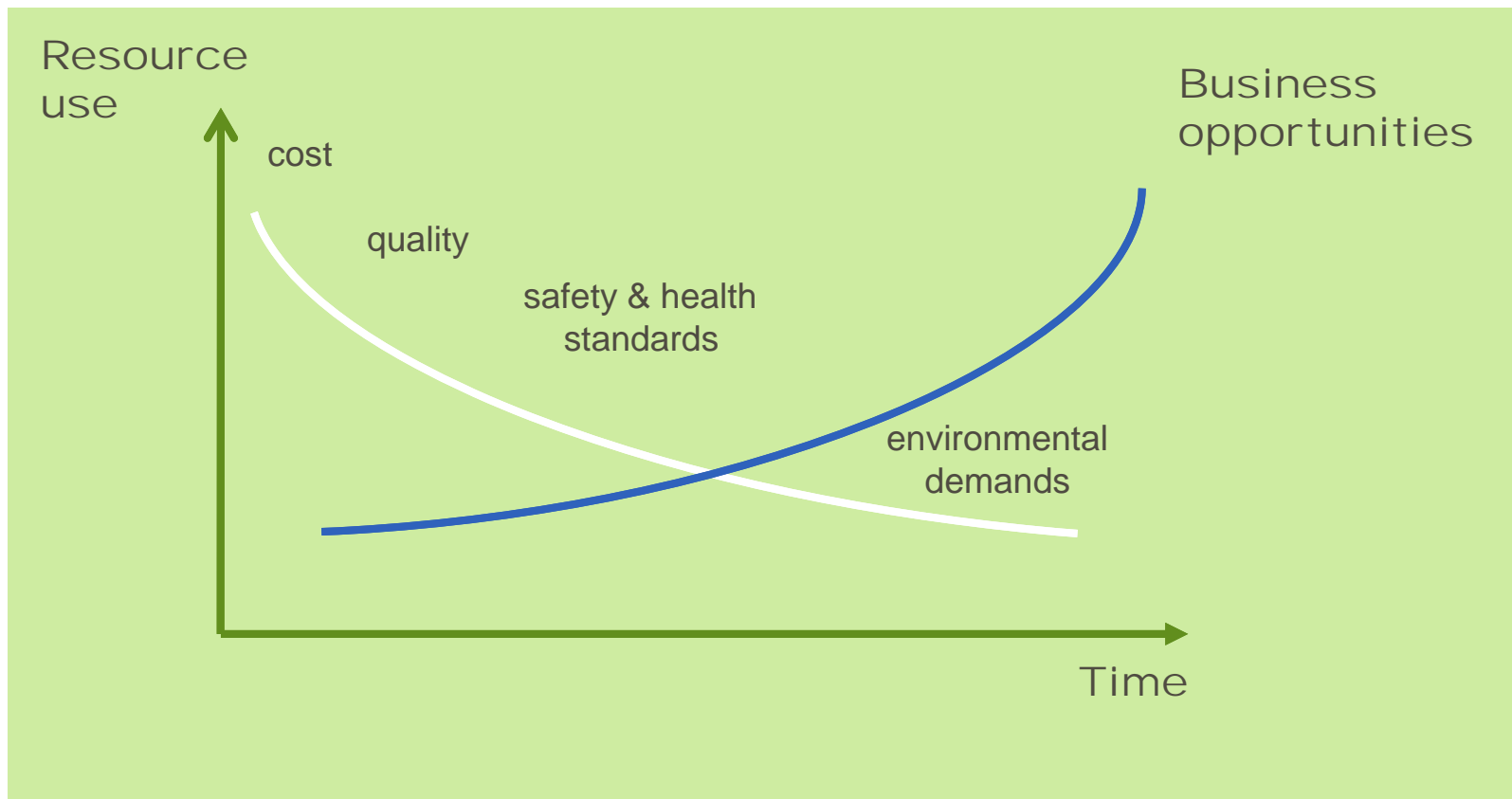
Grand Challenges



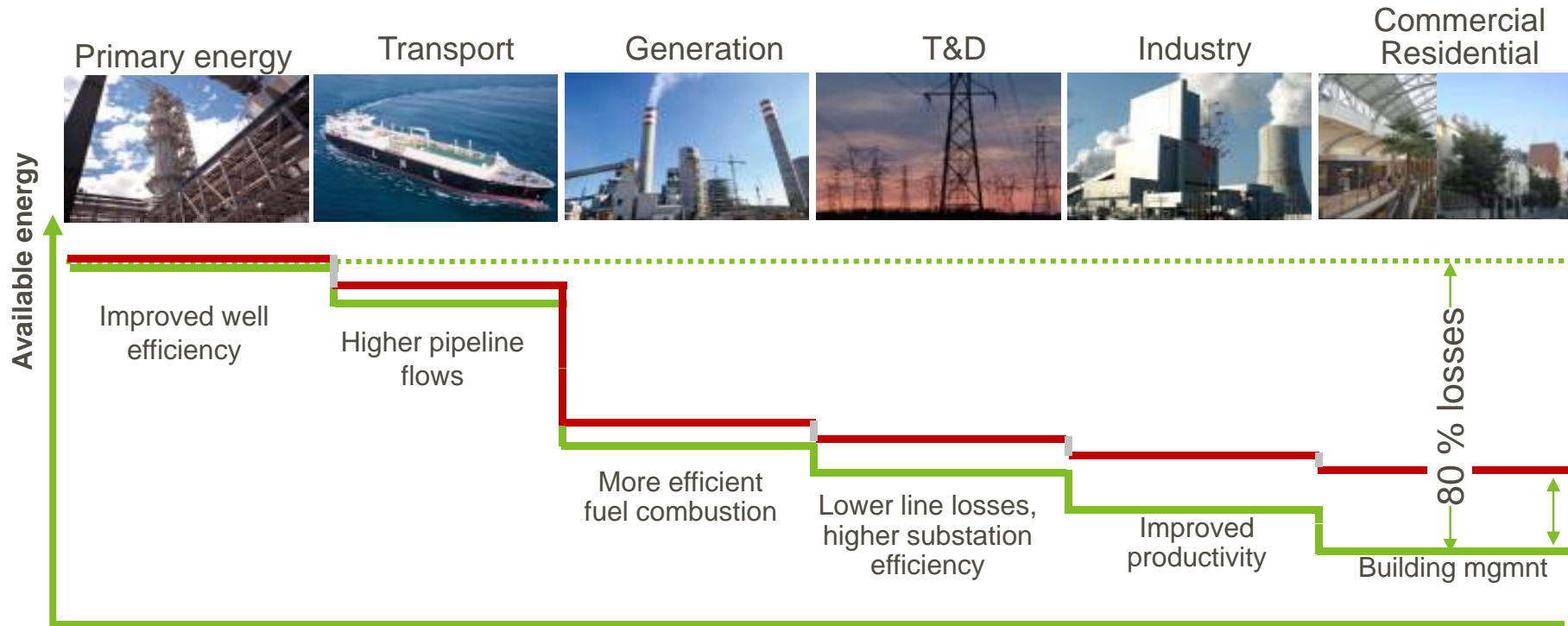
Eco-Efficient Economy



Eco Efficient Economy



Electricity value chain

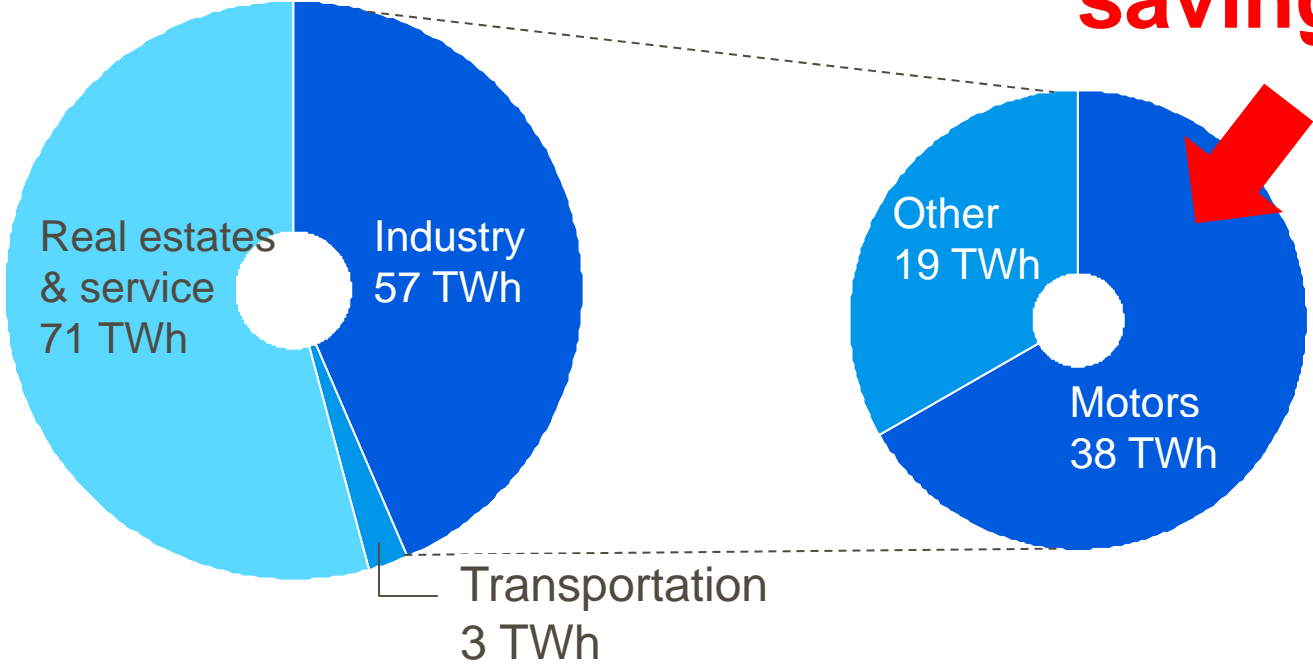


Energy efficiency along the value chain can reduce losses by 30 percent



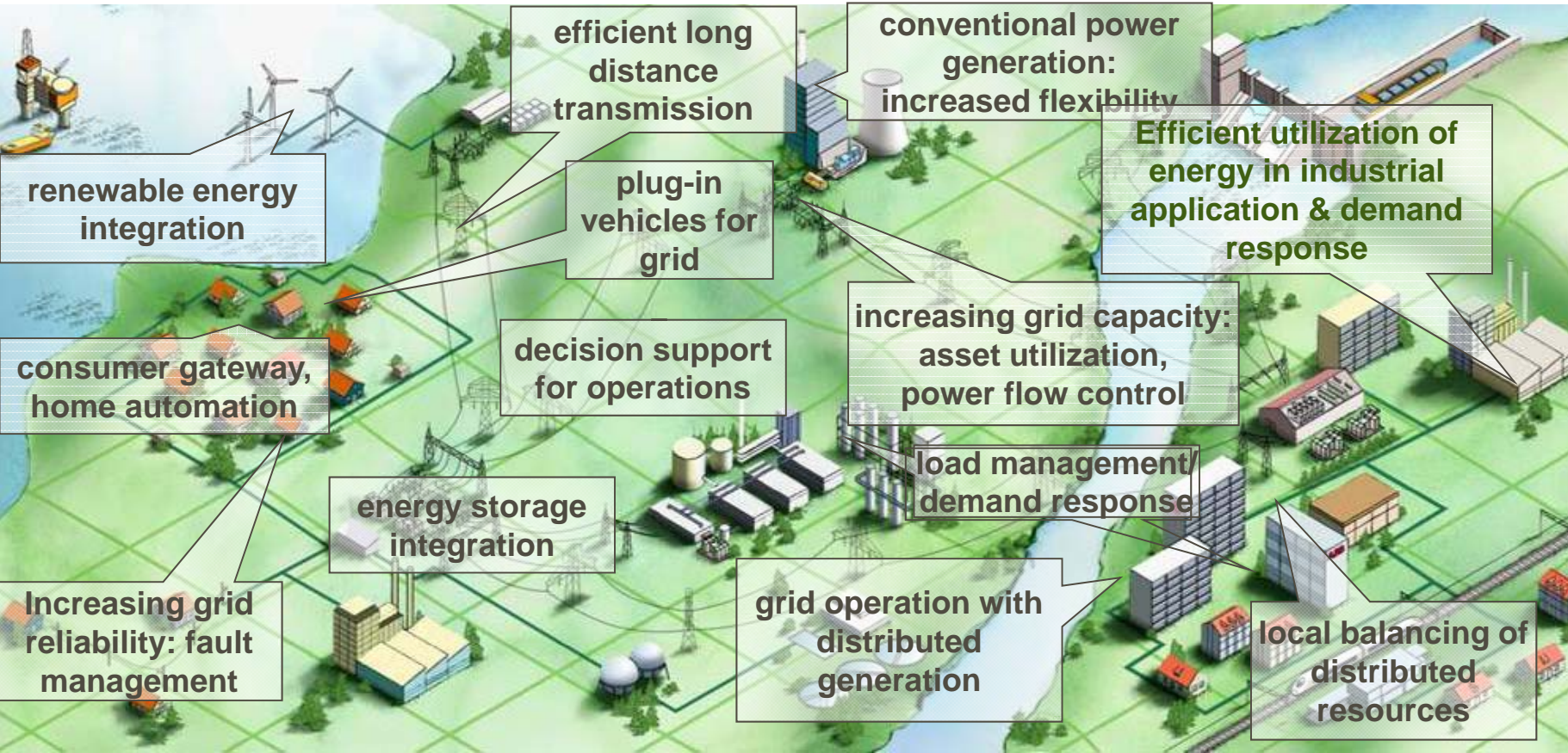
Motors - untapped potential for energy efficiency

Sweden 131 TWh



Potential for 20% savings

Smart Grid



Ultra-Low Carbon Dioxide Steelmaking



Ultra-Low Carbon dioxide(CO₂) Steelmaking, ULCOS



VINNOVA

Vision

We make Sweden more prosperous.

Mission

**VINNOVA invests in research and
strengthens Sweden's innovation
capacity for sustainable growth**

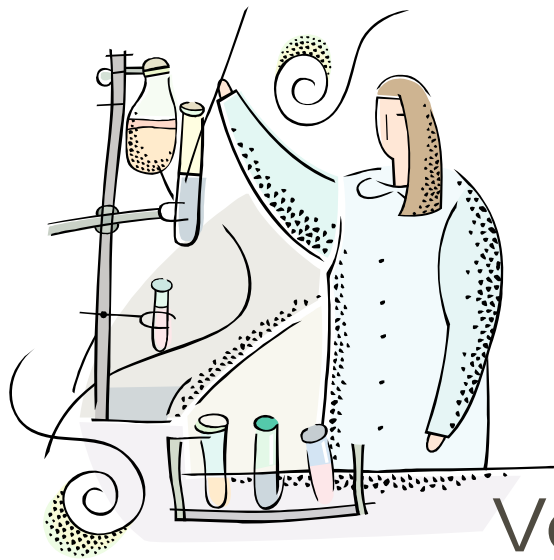


Research

Business



What do we need to do more?



Demonstrators



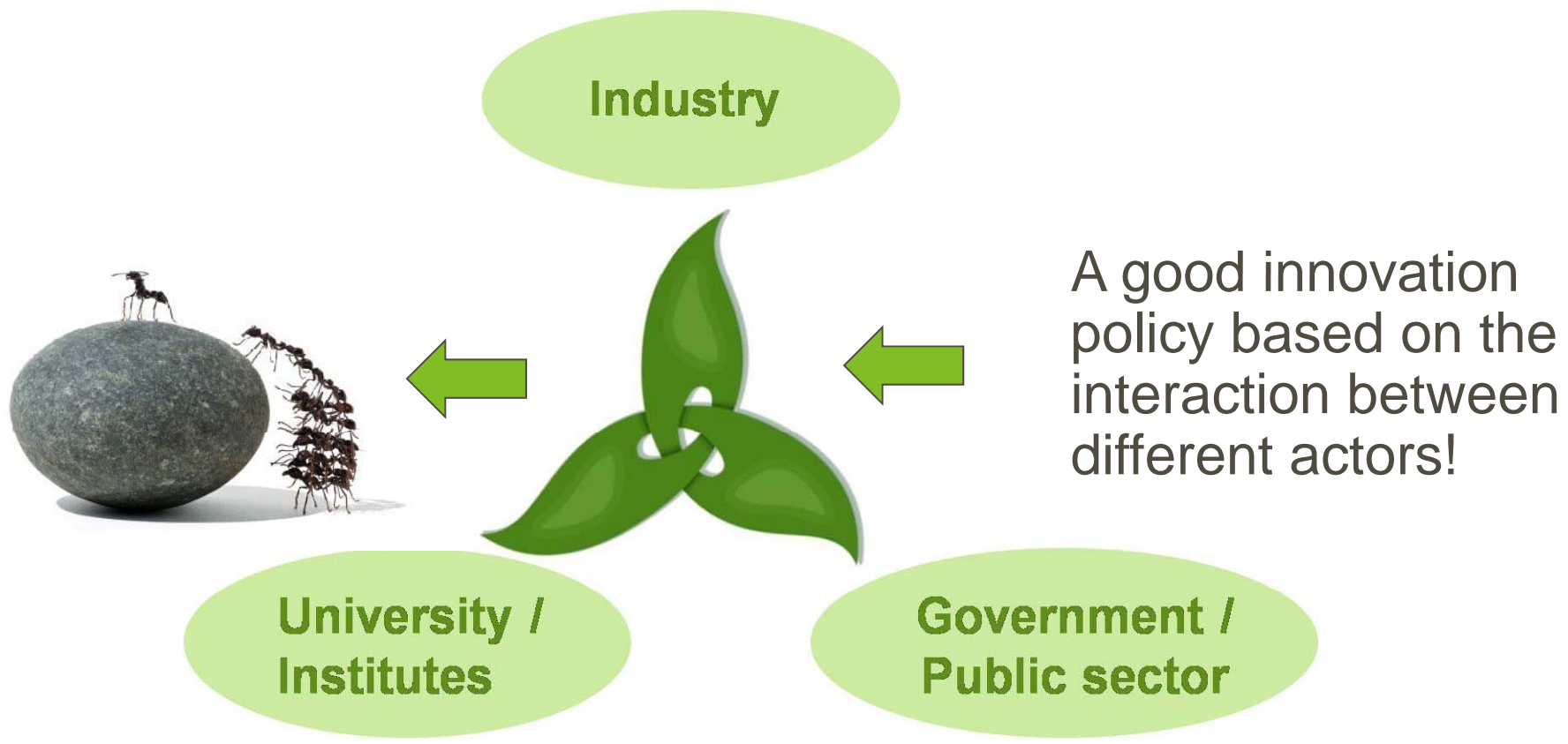
Verify technologies,
usability,
system aspects, etc

R&D Challenges for Mineral Extraction Industry

- New exploration methods
- Resource Utilization
- Energy optimized fragmentation and extraction
- Towards fully automated extraction
- Sustainable and competitive extraction systems towards zero impact
- Optimizing land use
- Image & Gender



The way to go.....





Thank you!

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