



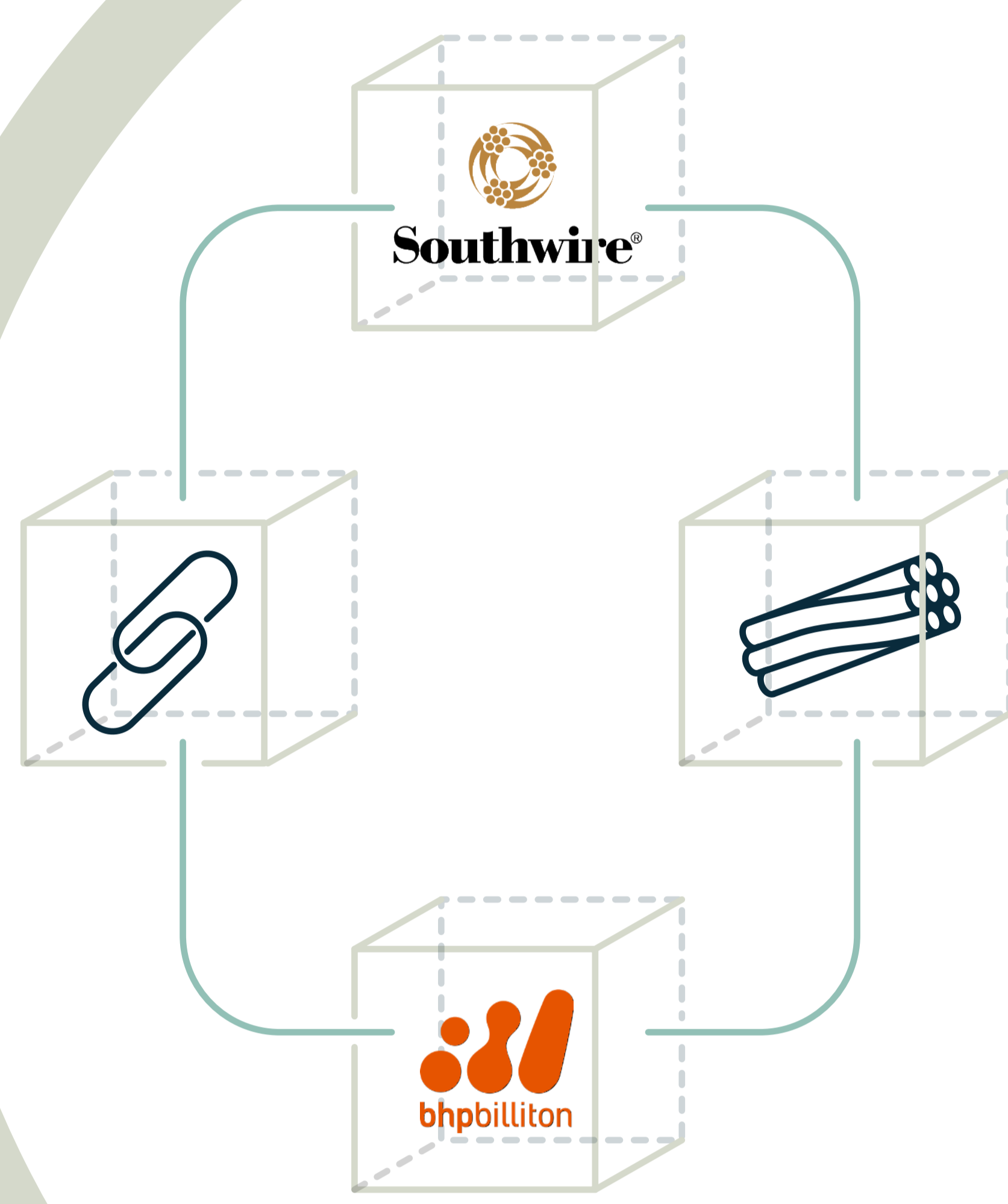
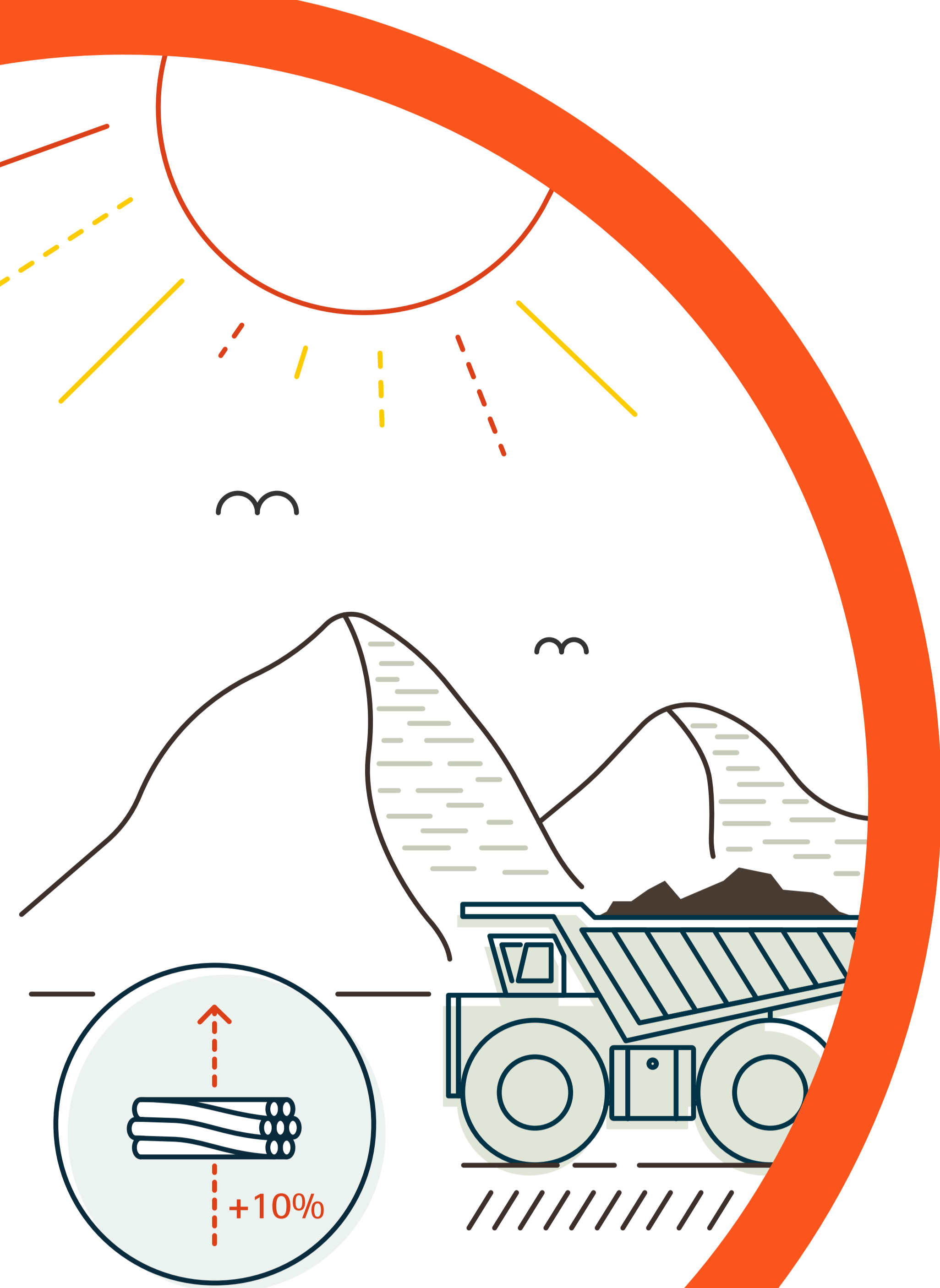
Responsible Copper

#Innovation

ICA's members are developing innovative solutions to reduce carbon emissions and promote responsible practices.

Freeport -McMoRan

Increased ore recovery by adjusting mill controls to accommodate seven different identified ore types at their Bagdad, Ariz, site, increasing copper production by at least 10 percent.

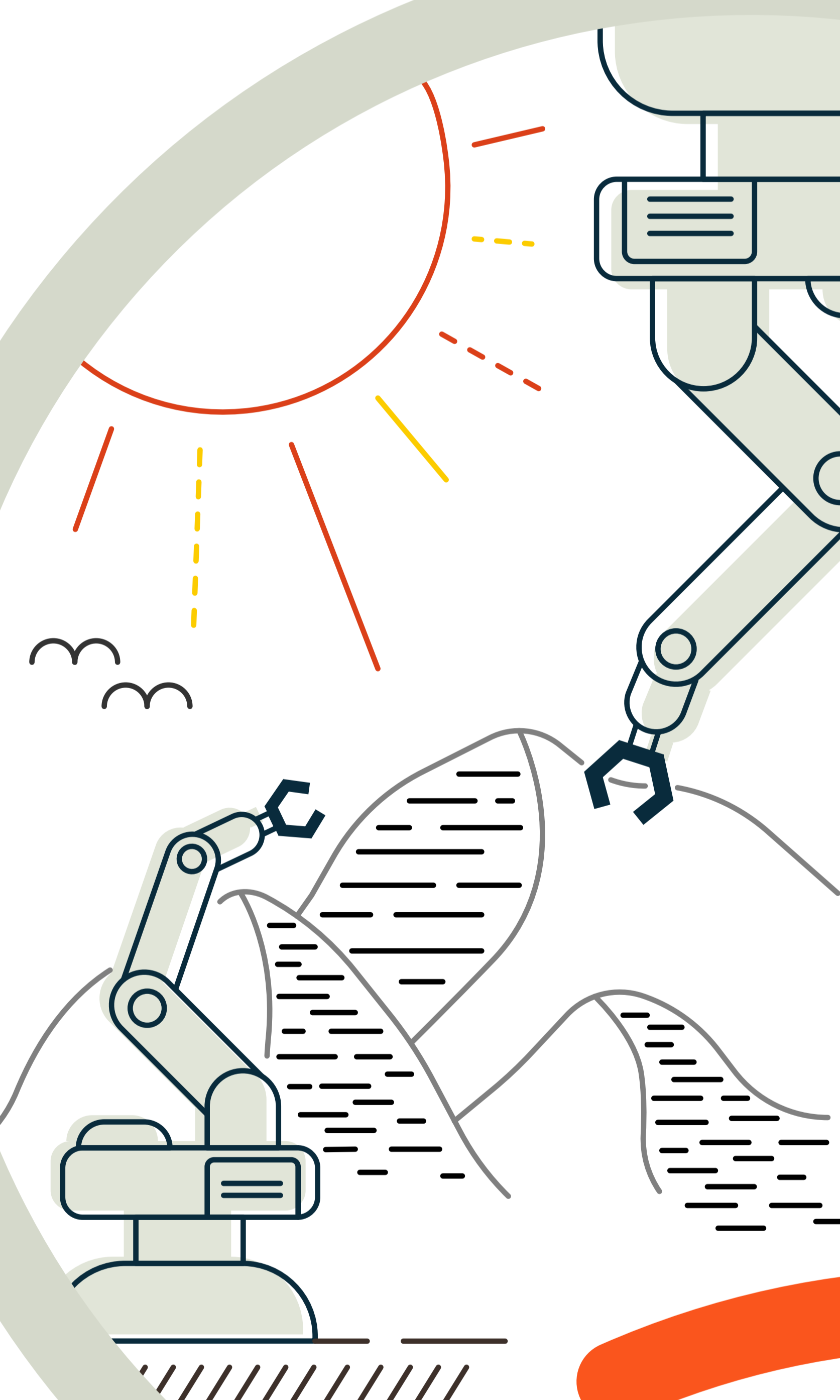
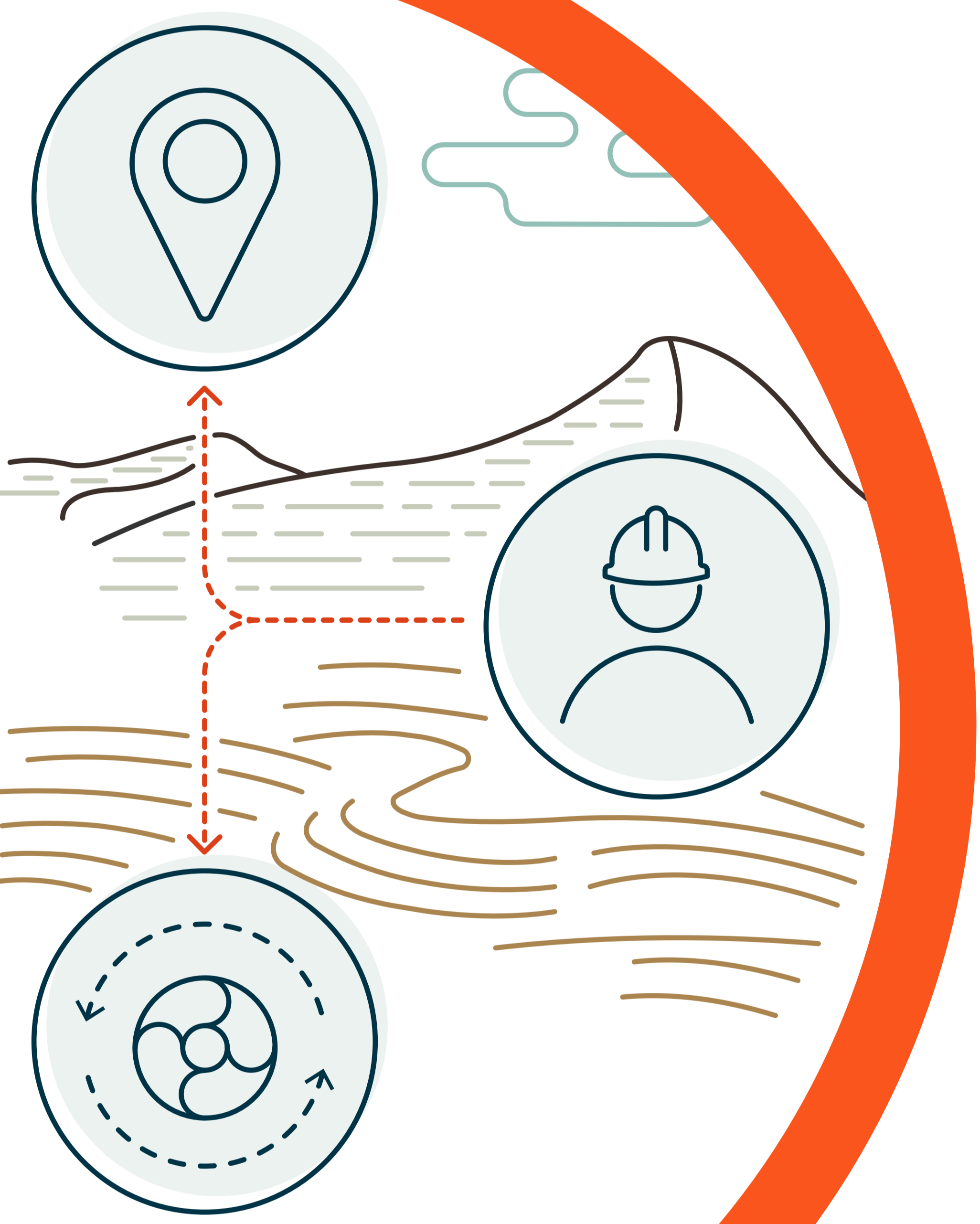


BHP Billiton

Is using blockchain technology to ensure a more efficient and effective supply chain. In partnership with copper fabricator Southwire, BHP delivered its first carbon neutral copper cathode in 2021.

Boliden

Boliden in Sweden has implemented automation technology, such as advanced position technology and monitoring systems, to quickly locate workers and equipment improving mine productivity. It has also installed on-demand ventilation systems, which can achieve up to 25 percent energy savings.

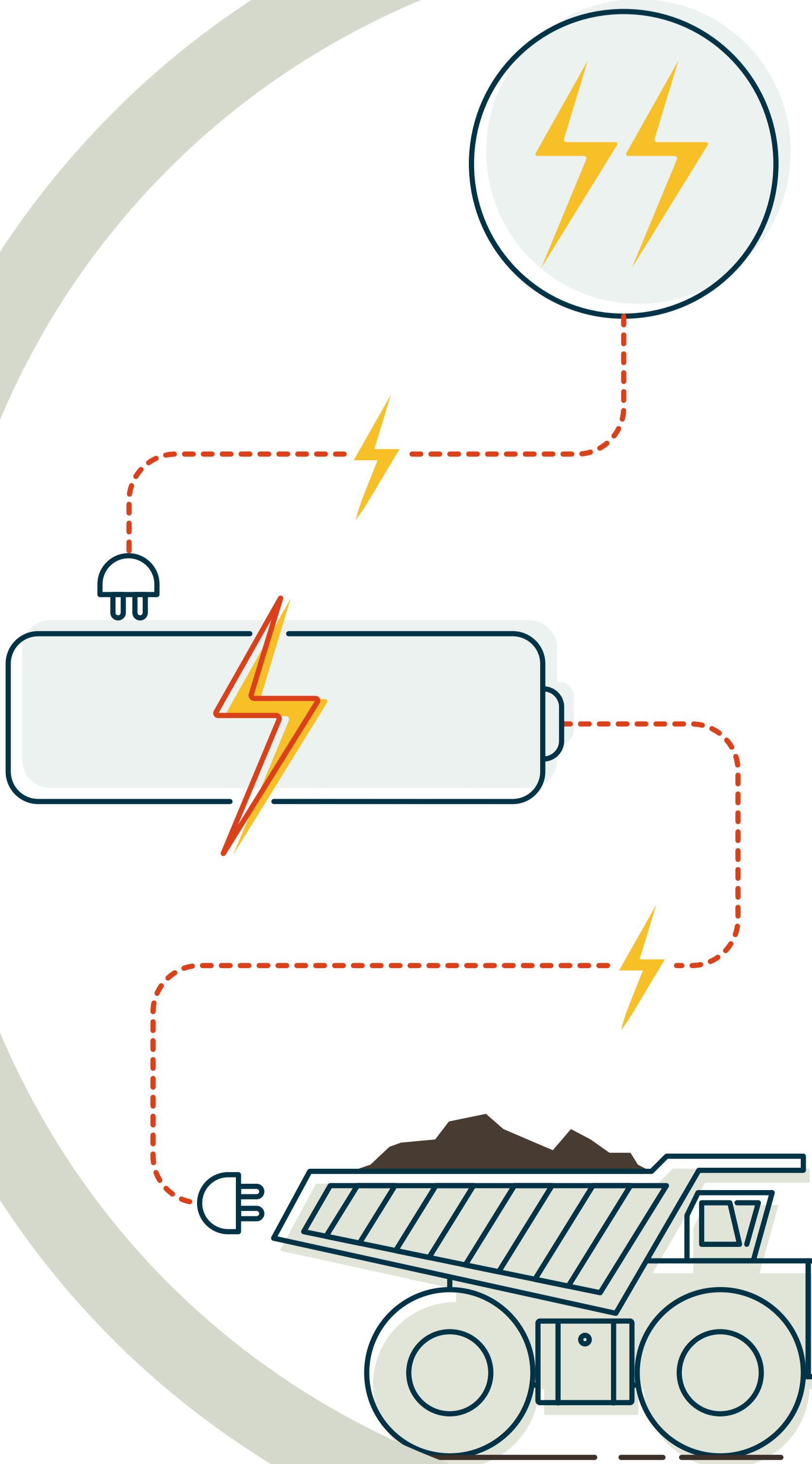
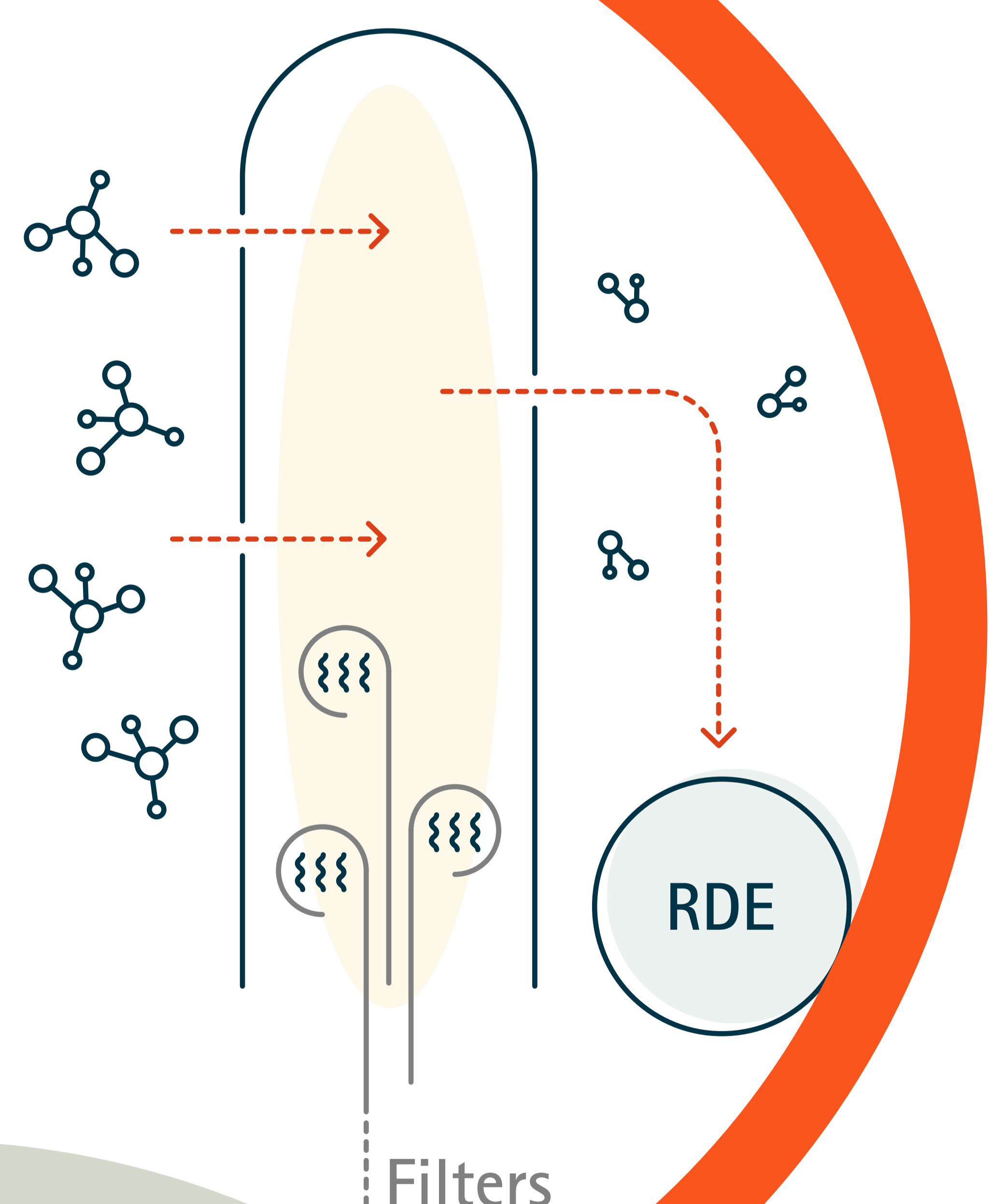


Rio Tinto

Is using robotics for worker protection. A 3D-printed, remotely operated robot, Mark, checks retired mine shafts for safety and can carry out complex tasks by maneuvering into spaces too small, high or dangerous for humans.

Aurubis

Introduced new technology in Hamburg, Reducing Diffuse Emissions (RDE). The technology can capture particulate matter smaller than 10 µm, the size of a human red blood cell. The system works on demand and refines air from the smelter operations through 6,300 filter elements.



BHP, Rio Tinto and Vale

Launched the Charge On Innovation Challenge to develop effective solutions for mine electrification and decarbonization. The Challenge asks vendors to present interoperable solutions that safely deliver electricity to large battery-electric off-road haul trucks in a way that maintains or improves current productivity levels.