

# Mining and the Green Revolution: Worksheets

## 1. Why do we have to mine?

This first part is setting the scene for why mining is essential currently to fuel the green technology revolution and decarbonise the world's economies.

- State 3 reasons why we need to mine? Answers could include:
  - Supply and demand changes
  - Growing population requiring more products with metals/minerals
  - New technology requiring new metals/minerals
  - Shift towards different technologies leads to increased demand of different metals/minerals
  - To align with global and national strategic targets – UN sustainable development goals (UNSDG), Paris Agreement, Net Zero
  - Recycling rates far too low to keep up with demand
  - Recycling does not recover 100% of material
  - Metals/materials are in so many products we are completely unaware of
  - Others....
- What alternative solutions to the mining of metals/minerals might there be? Answers could include:
  - Reduce, re-use, recycle
  - Reverse technological advances (needs more explanation)
  - Drastically reduce consumption
  - Invest heavily in recycling methods
  - Increase recycling rates
  - Governmental policies to affect the above
  - Others.....
- Think of an example such as copper. It is suggested that we will need to mine as much metal in the next 25 years as we have done in the previous 2500 years (approximately 750 million tonnes). If the recycling rate in 2021 is 50% but is expected to rise by 2% each year, try calculating how much material we will need to mine each year for the next 25 years
  - Approximately 9 million tonnes in 2021 dropping to 2.5 Mt by 2025.
  - Approximately 173 Mt between 2021 and 2045 (see spreadsheet Mining\_vs\_Recycling.xlsx).
- Try running a debate several groups of students working for different fractions of the debate: a local village close to an ore deposit, a non-governmental environmental protection organisation (such as Extinction Rebellion, Green Peace), a renewable energy company (requiring huge quantities of new materials), an exploration/mining company, a government or a skiing resort owner in a picturesque location close to a potential mine development.
- Use the image on the next page to have a class discussion.

**YOUR RENEWABLE ENERGY VEHICLE WITH MINING**



**YOUR RENEWABLE ENERGY VEHICLE WITHOUT MINING**



- Consider which of the UNSDG are impacted by mining and how (more detail here: [http://briefcase.eitrawmaterials.eu/sites/default/files/The\\_Briefcase\\_Minerals%20and%20Metals%20Enabling%20SDGs.pdf](http://briefcase.eitrawmaterials.eu/sites/default/files/The_Briefcase_Minerals%20and%20Metals%20Enabling%20SDGs.pdf)).



- Examples include:
  1. **No poverty** – providing jobs in poorer countries/areas
  2. **Zero hunger** – providing money (through jobs) to buy food or collaborations between exploration/mining companies and local people to grow food.
  3. **Health and well-being** – new technologies such as electric vehicles will significantly reduce air pollution, which kills more people globally than Malaria, HIV/AIDS and (as of December 2020) Covid-19. This new technology, particularly EVs, requires significant mining. As part of their corporate and social responsibility (CSR) policies, exploration/mining companies often put money aside for health and education centres in local communities.
  4. **Quality education** – as above, money for education.
  5. **Gender equality** – some exploration/mining companies (particularly those part of the International Council on Mining and Metals (ICMM)) have diversity and inclusion policies.
  6. **Clean water and sanitation** – again, as part of CSR, companies often put money aside for assisting local communities with access to clean water. Also, some chemicals used to clean water and in sanitation products are required to be mined.
  7. **Affordable and clean energy** – probably the most obvious one – we need more metals/minerals to fuel the technological advances and build renewable energy equipment, EVs and battery storage.
  8. **Decent work and economic growth** – governments tax exploration/mining companies particularly any metals/minerals produced, and they provide jobs.
  9. **Industry, innovation and infrastructure** – metals/minerals are required to build new infrastructure, provide materials for industry and allow for innovation (for example, new technologies such as drones, mobile phones only can exist thanks to new light-weight metals being used).
  10. **Reduced inequalities** – as with no. 5 – CSR policies.
  11. **Sustainable cities and communities** – electrification of vehicles will allow movement of people in sustainable ways.
  12. **Responsible consumption and production** – ?
  13. **Climate action** – all green technology designed to reduce carbon footprint is geared towards reducing impacts on climate.
  14. **Life below water** – improved air quality (through electrification) will reduce acidification of the oceans and improve life and biodiversity.
  15. **Life on land** – as above.
  16. **Peace, justice and strong institutions** – ?
  17. **Partnerships for the goals** – there are many organisations working together to improve the efficiencies of mining and decarbonise their processes. Local sourcing and streamlining supply chains can help.