

FOUNDATIONAL MODULE

# Mining & Climate Justice Case Studies



CLIMATE JUSTICE  
INSTRUCTIONAL  
— TOOLKIT —

# What's in this module?

## Contents

This module focuses on the question of ethical and just resource extraction, and discusses the importance of mined materials in our daily lives. It utilizes case studies from MIT researchers and scientific articles.

## Activities

3 parts  
1 video  
5 readings  
3 activities  
2 project options

## Key Resources

- [\*How Can U.S. Safely Mine Minerals Critical to a Carbon-Free Economy?\*](#)
- [\*Hydrosocial Displacements: Climate Change and Community Relations in Chile's Mining Regions\*](#)
- [\*Indigenous Environmental Network\*](#)



# Learning Objectives

01

**Recognize** how current mining practices affect climate justice issues

02

**Understand** the role and impacts of mining

03

**Examine** community roles and energy demands

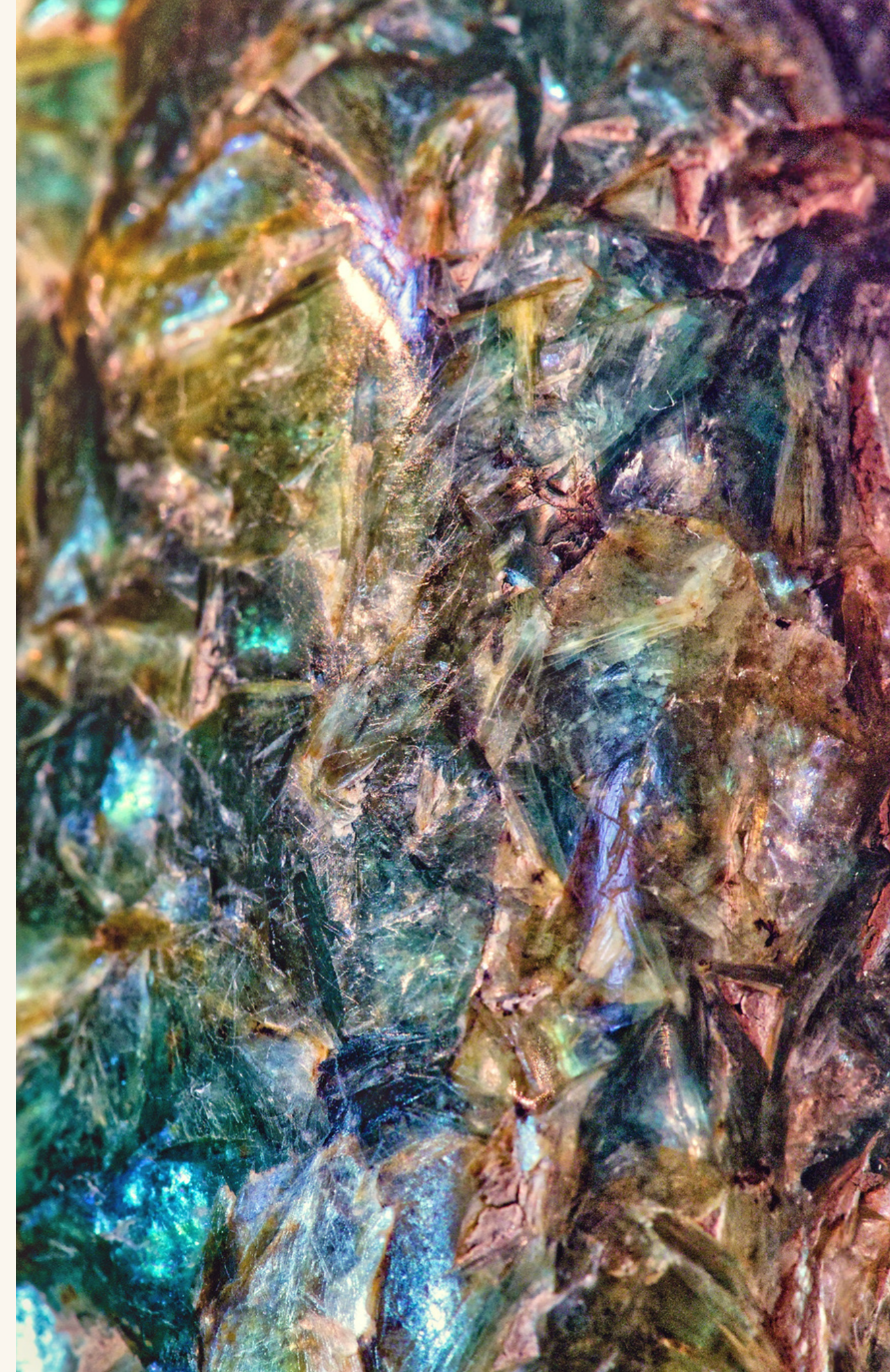
04

**Discover** solutions to mining issues

# Warm up

**Why do we mine? What minerals/metals power our daily lives?**

Turn to a partner or small group and brainstorm.



# Introduction

PART 1



# Mining

## Definition

Mining is the process of extracting minerals of economic value from the earth's crust. ([NatGeo](#) & [Gregory, 2021](#))

## Background

Mining dates back to prehistoric times where flint was used to produce tools and weaponry. Metals and minerals are separated, processed, and refined because they are most valuable in their pure form. Two common mining methods are called surface mining and underground mining.

## Impacts

- Accidents, adverse health conditions and effects
- Water pollution (ex. acid mine drainage)
- Erosion
- Deforestation
- Release of contaminants such as lead, zinc, and copper



# Indigenous Perspectives Against Mining

Indigenous people are often against the idea of 'green mining', and for the move towards the Just Transition.

## Examine Indigenous perspectives

[HonorEarth](#) and [Indigenous Environmental Network](#) talk about the importance protecting sacred places. Take 10 minutes to look through these resources.

## Discussion

- What is 'green colonialism'?
- What are some examples of green colonialism that you came across in your reading?
- What are some ways in which green colonialism is perpetuated?



# Indigenous Perspectives on Inclusive Mining

## Reading

*I'm Indigenous Australian, and I work for a mining company.*

## Discussion

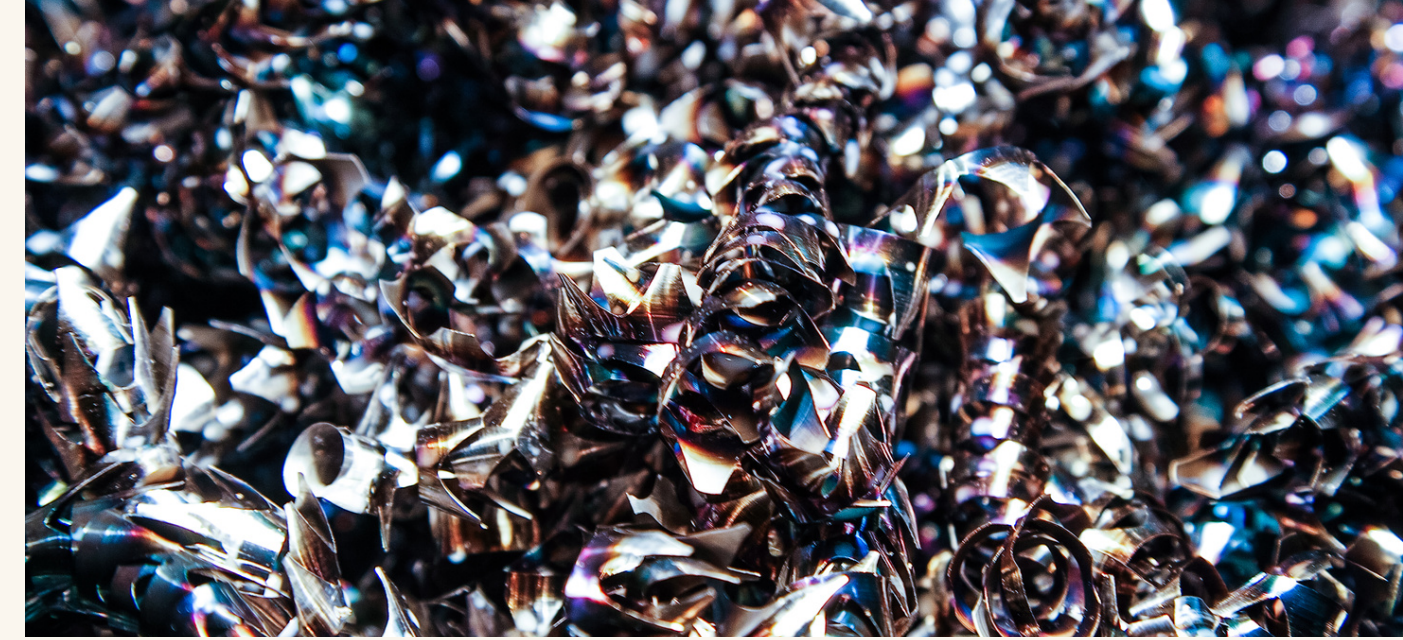
- What do you think of this alternate perspective?
- How does Lees frame his work?
- How has his work been accepted or rejected by people in his community?
- How can inclusivity in mining help bring a more just transition?



Aerial view of a mine near Mount Isa by [denisbin](#) (CC BY-ND 2.0)



# Common Metals and Minerals in Batteries



## Lithium

- Also used in glass and ceramics
- Major producers: Australia, Chile, China

## Manganese

- Also critical to iron and steel production
- Major producers: South Africa, Australia, China, Gabon, Brazil

## Cobalt

- Also used in superalloys for turbine engines, carbides, sharp tools, chemicals
- Major producers: Congo, China, Canada, Russia, Australia, Zambia

## Nickel

- Vital to stainless steel production
- Major producers: Philippines, Indonesia, Russia, Australia, Canada

## Copper

- Used in building construction, electronics (cables, plumbing heating, etc)
- Major producers: Chile, Peru, China, US, Australia

# Mining and Climate Justice

PART 2



## ACTIVITY # 1

# AN INTRODUCTION TO MINING AND CJ: THE IMPACTS OF LITHIUM MINING

### Watch

[The True Cost of The Lithium Mining Boom Powering Electric Cars](#)

### Before watching

- Where is the thumbnail photo from?
- What are the pools in the photo?
- Where is lithium mined?

### Discussion questions

- What is the "lithium triangle" and how does the massive yield of water for lithium refinement affect one of the driest regions on earth?
- How many gallons of brine produce enough lithium for one electric car battery? Do you consider electric cars a viable sustainable solution? Why or why not?
- With the use of desalinated water proposed as a solution to freshwater depletion due to lithium mining, what issues would still remain? Is the use of desalinated water a viable solution? Why or why not?
- Why do locals working for mining companies not experience the increased profits of this rapidly-growing industry? How will the increased demand for water likely affect communities economically?
- How has colonialism affected the mining industry?

# Pillars of Mining and Climate Justice

01

## Economy

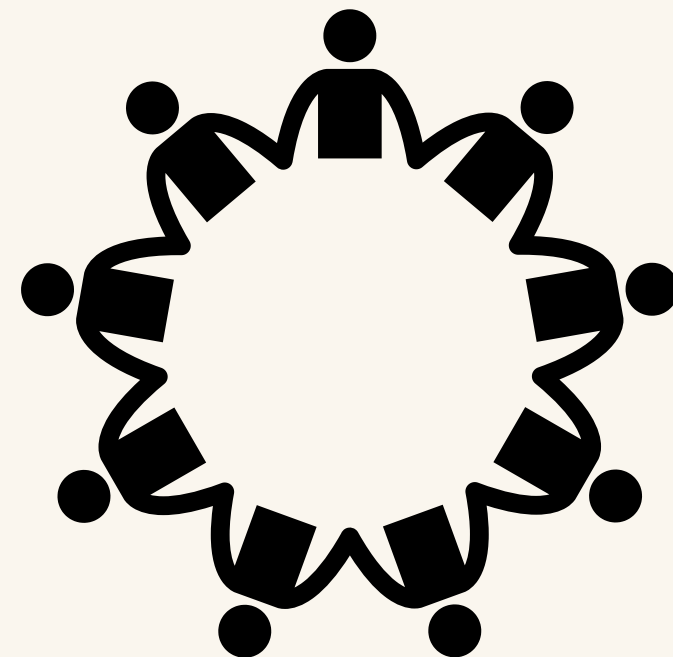
Can an equal distribution of profits cover the cost of mining effects?



02

## Community

Must communities suffer in order to support energy demands?



03

## Sustainability

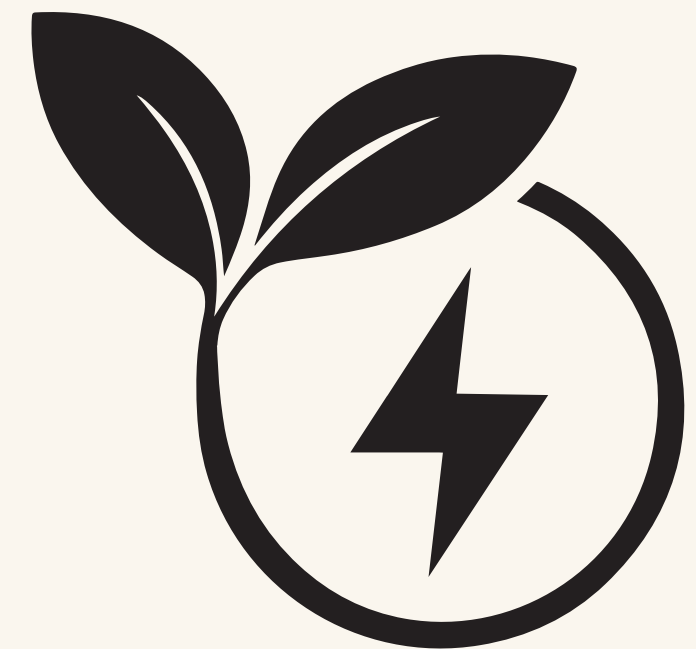
What does sustainability entail in a fundamentally unsustainable industry?



04

## Renewable energy

How do we balance energy needs with the impacts of consumption?



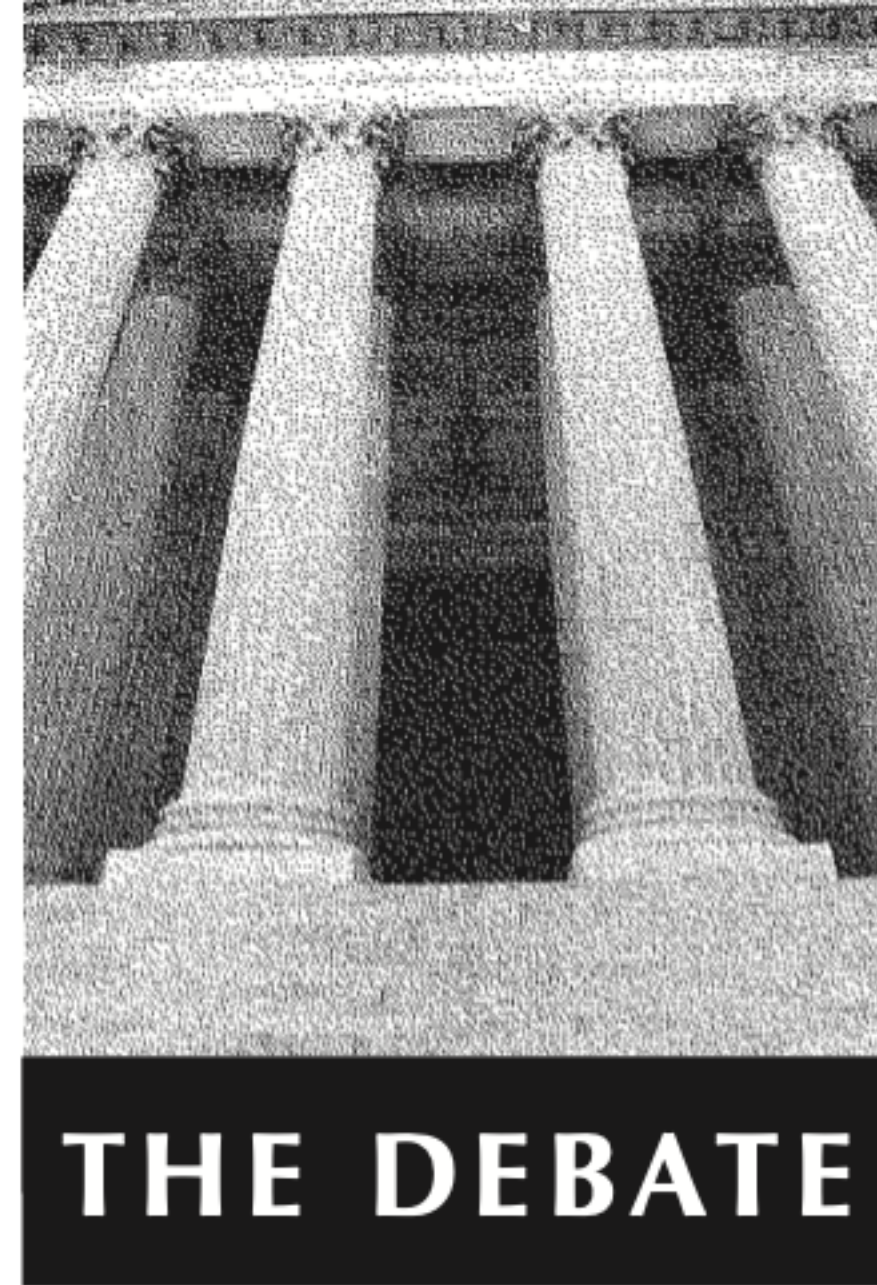
## ACTIVITY #2

# MINING AND THE ECONOMY

### Read

*How Can U.S. Safely Mine Minerals Critical to a Carbon-Free Economy?*

*See the next slide for discussion questions →*



## How Can U.S. Safely Mine Minerals Critical to a Carbon-Free Economy?

**L**ast year, the International Energy Agency warned that, according to current supply projections, the world may not have enough needed minerals to power a carbon-free world. To help offset the gap, the agency

more minerals means more mining—a process that can entail significant environmental and social impacts. They include potential water quality concerns, intrusions onto Indige-

## ACTIVITY #2

# MINING AND THE ECONOMY

### Group 1: Supply chain

- Compton expresses skepticism regarding matching energy demand with a stream of recycled metals. Is this skepticism warranted? Why or why not?
- What solutions does Compton propose? How can these be realized on both an individual & community level?

### Group 2: Reform and energy

Henderson outlines the health damage & continued neglect for native communities on public land. What solutions does Henderson outline? How can these proposed solutions be exercised on an individual & community level?

### Group 3: Electricity

Mergen addresses claims that lithium mines are essential to a net-zero economy despite continued opposition and failed land protection. What solutions does Mergen propose? Do you think that this monetary proposal is enough? Why or Why not?

### Group 4: International cooperation

Odell addresses the US's high GHG emissions and large import rates of mined goods causing environmental & social harms in many regions, including Latin America. What does Odell propose in terms of country relations and internal solutions? How can these proposed solutions be exercised on an individual & community level?

### Group 5: Just transition

Mergen addresses claims that lithium mines are essential to a net-zero economy despite continued opposition and failed land protection. What solutions does Mergen propose? Do you think that this monetary proposal is enough? Why or Why not?

### Group 6: US mineral potential

Mergen addresses claims that lithium mines are essential to a net-zero economy despite continued opposition and failed land protection. What solutions does Mergen propose? Do you think that this monetary proposal is enough? Why or Why not?

## ACTIVITY #3

# MINING AND SUSTAINABILITY

### Read

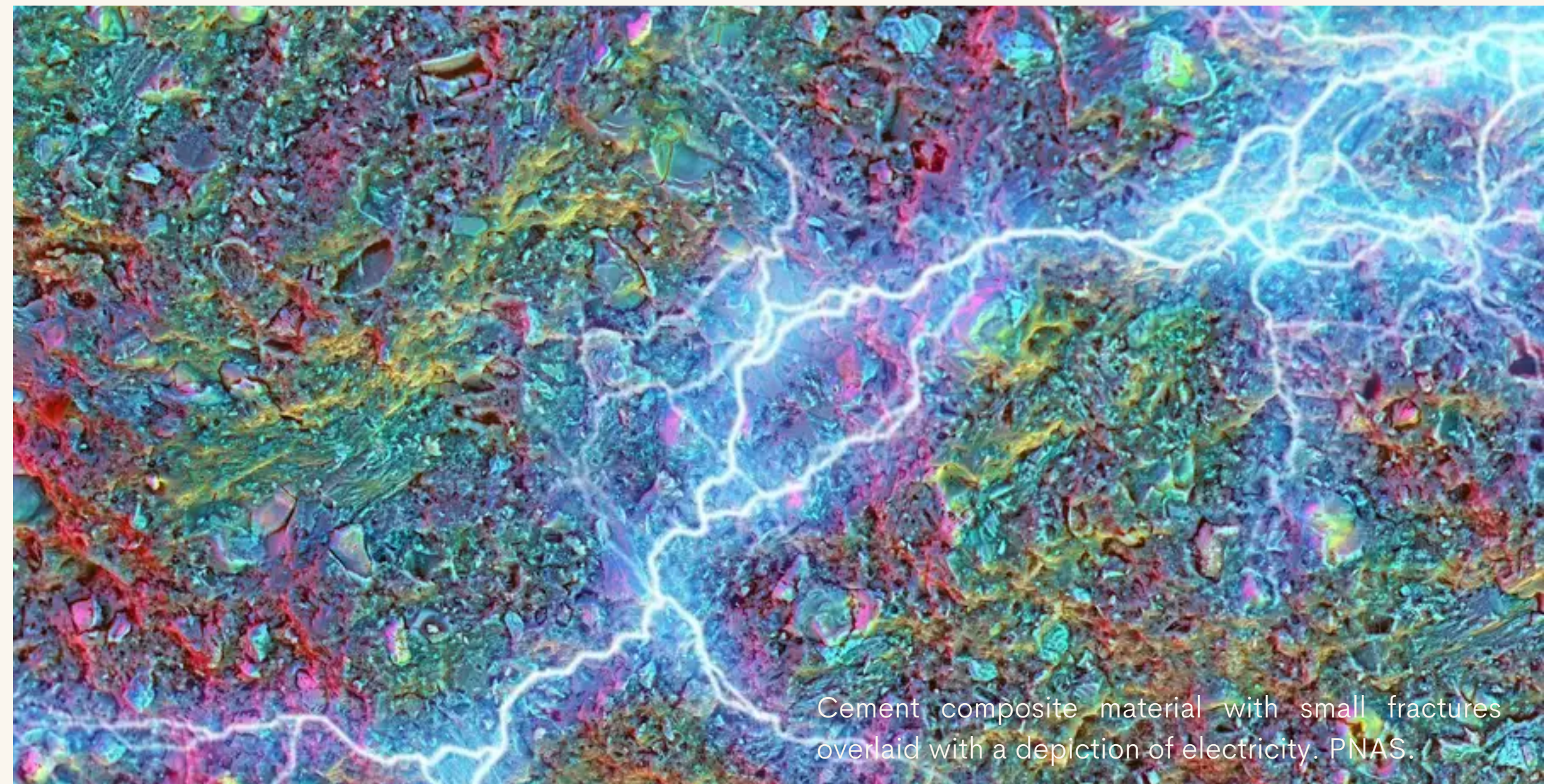
- [An overview of sustainability challenges](#)
- [A discussion of innovative technologies](#)
- [The 5 proposed solutions of the MIT Mission project](#)

### Before reading

Define hydrosocial conflict. What are some examples?

### Discussion prompt

Form connections between these three readings by discussing the feasibility of replacing batteries with new technologies.



Cement composite material with small fractures overlaid with a depiction of electricity. PNAS.

## ACTIVITY #3

# MINING AND RENEWABLE ENERGY

## Read

*How does the environmental impact of mining for clean energy metals compare to mining for coal, oil, and gas?*

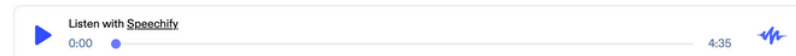
## Propose solutions

Odell discusses three fundamental changes in order for clean energy mining to be possible:

1. Reduce energy consumption by investing in public transportation and walkable cities
2. Reuse minerals to advance the circular economy
3. Raise industry standards and adopt regulations for responsible mining

Propose solutions on an individual and community level for these fundamental changes.

## How does the environmental impact of mining for clean energy metals compare to mining for coal, oil and gas?



*Mining, whether for fossil fuels or metals used in clean energy technologies, has serious environmental impacts, and it's hard to make apples-to-apples comparisons—except in terms of their impact on climate change, where clean energy mining is clearly better.*



by Fernanda Ferreira, MIT Climate Portal Writing Team



featuring guest expert Scott Odell, MIT Environmental Solutions Initiative Visiting Scientist



# Beyond the Module

PART 3



# Additional Resources

COBALT  
MINING

COSMETIC  
MINING

METALS &  
CLIMATE  
JUSTICE

E-WASTE

ENVIRON-  
MENTAL  
RISKS

SACRIFICE  
ZONES

CLEAN  
ENERGY  
REQUIRE-  
MENTS

MINING  
FOR CLEAN  
ENERGY

PUBLIC &  
PRIVATE  
COMPANIES

MODERN  
COMPUTING

E-WASTE &  
SOLUTIONS

PROJECT OPTION #1

# Topic-Specific Exploratory Project

## Prompt suggestion

Within a group or individually, pick a topic within the intersection of mining and climate justice to present in any format to the class.



For more resources on climate and environmental justice: **Please explore other modules in the Climate Justice Instructional Toolkit.**



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