

Can a simple brick be the next great battery?

ANSWER KEY

Warm-up

Here are example answers for each of the warm-up conversation questions:

- cooking, boiling water, heating, lighting, manufacturing
- steel, electronics, cars, paper, glass
- plastic recycling, energy storage, sustainable farming

Lead-in

These topics will actually be discussed in the TED Talk:

- How brick and iron wire can help store renewable energy
- The impact of industrial heat on climate change
- The economic challenges of switching to clean energy
- Examples of companies already using electrified heat storage

The following topics are less likely to be discussed or not directly addressed in the talk:

- The role of government policies in promoting clean energy
- The history of the steel and cement industries
- A comparison of different types of renewable energy storage solutions
- The impact of consumer habits on industrial pollution
- How electric cars are reducing global emissions
- The advantages and disadvantages of hydrogen as a clean energy source

Vocabulary

I. Match the words and phrases (1-10) to their definitions (A-J).

1. **fossil fuels** – D. natural energy sources like coal...
2. **radiant energy** – C. heat transferred through waves...
3. **carbon capture** – E. a technology that traps CO₂ before it enters...
4. **electrification** – G. replacing fossil fuels with electricity...
5. **decarbonisation** – F. reducing or removing carbon emissions from...
6. **lifespan** – A. the length of time something lasts before...
7. **intermittent** – B. not continuous; something that stops and starts...
8. **kiln** – J. a high-temperature oven used for making materials like bricks...
9. **furnace** – I. a device that produces heat for industrial use...
10. **steam boiler** – H. a machine that heats water to produce steam...

II. Use vocabulary from the previous exercise (1-10) to complete the sentences.

- A. The **electrification** of cars is making transportation cleaner.
- B. **Decarbonisation** of cities requires new energy solutions.
- C. The **lifespan** of a bridge depends on its materials and maintenance.
- D. **Fossil fuels** are still the main source of energy for many factories.
- E. The **radiant energy** from a fireplace makes a room feel cozy.
- F. **Carbon capture** could help power plants reduce pollution.
- G. His work schedule is **intermittent**, with breaks between projects.
- H. The artist put his clay sculpture into the **kiln** to harden it.
- I. They poured molten iron from the **furnace** into molds to create machine parts.
- J. The factory's **steam boiler** provides heat for multiple buildings.

Video

I. Watch the [TED Talk](#) and answer the questions. Follow the [transcript](#) if needed.

1. What role does fire play in industrial production?

Fire is used to produce heat necessary for manufacturing various products, such as steel, cement, food, glass and fabric.

2. Why is electrification considered a better solution than hydrogen and carbon capture?

Electrification is considered better because wind and solar power have become cheaper than fossil fuels, making electrified industrial heat a faster, cheaper, and more scalable solution.

3. What is the main challenge with using wind and solar power in industrial heat?

The main challenge is that wind and solar power are intermittent, meaning they are not available continuously, which is necessary for industrial production.

4. How does Rondo's heat storage technology differ from traditional methods?

Rondo's technology uses existing materials like brick and iron wire to store heat, which are cost-effective and have a long lifespan, unlike newer and more expensive technologies like lithium-ion batteries.

5. What is the advantage of using brick and iron wire for storing industrial heat?

Brick and iron wire can store heat efficiently, with a red-hot brick storing as much energy as a lithium-ion battery at one-tenth the cost and ten times the lifespan.

6. What problem did Rondo face when heating the bricks, and how did they solve it?

The problem was that uneven heating of the brick could cause it to crack or damage the wire. They solved it by heating the bricks with radiant energy and stacking them in a 3D checkerboard pattern to spread heat evenly.

7. How does the heat stored in the bricks get released to power industrial processes?

The stored heat is released as superheated air, which is used to power kilns, furnaces and steam boilers.

8. What is the potential impact of Rondo's technology on global emissions?

Rondo's technology could cut 15 percent of global emissions by decarbonizing industrial heat production using wind and solar power.

II. What is the significance of these numbers and names in the context of the TED Talk?

- **15%** – F
(the percentage reduction in global emissions that bricks like this can achieve)
- **25%** – G
(the portion of global carbon emissions produced by industrial heat)
- **24/7** – E
(the continuous operational requirement for factories to have heat)
- **1,000°C** – B
(the temperature at which the brick is heated in the unit to store a massive amount of energy)
- **15 years** – I
(the timeframe in which the technology is expected to cut global emissions)
- **74** – A
(the number of design revisions made to solve the problem of heating brick evenly)
- **Rondo** – D
(the company that developed the heat storage technology using brick and iron wire)
- **Tesla Model X** – H
(a vehicle used as a comparison for the energy capacity stored in the brick)
- **3D checkerboard pattern** – C
(the configuration used to stack bricks so that heat is distributed evenly)

Let's talk!

Students' own answers

Critical Thinking Skills | Inspiring Local Change

Students' own answers

Talk 'Engineer' to me | Brick-by-Brick

- I. Look at the list of construction phases involved in building an office building. In groups, discuss and agree on the logical order in which these phases occur.

Construction Phases in order:

- Project Planning & Feasibility Analysis
- Architectural & Engineering Design
- Permitting & Regulatory Approvals
- Site Preparation & Earthworks
- Foundation Construction
- Structural Framing
- MEP Systems Installation
- Exterior Envelope Construction
- Interior Finishes & Systems Integration
- Final Inspections & Commissioning

**II. Read the explanations of what happens during each phase (A–J).
Match each construction phase to the correct description.**

- Project Planning & Feasibility Analysis – A
- Architectural & Engineering Design – C
- Permitting & Regulatory Approvals – E
- Site Preparation & Earthworks – D
- Foundation Construction – F
- Structural Framing – J
- MEP Systems Installation – G
- Exterior Envelope Construction – H
- Interior Finishes & Systems Integration – I
- Final Inspections & Commissioning – B

Let's talk!

Students' own answers

Grammar bite | Predicting the Future with "Be Going To"

Students' own answers

Wrap-up

Students' own answers