Action for Kazakhstan

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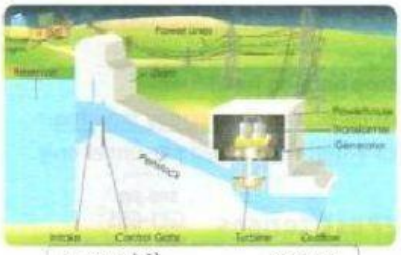
Science Schools

Energy Storage Solutions

Read the text.

Vocabulary

1 11.5.2 Label the pictures. Use: *hydrogen, batteries, air, tower, hydro.* Check in your dictionary.



pumped 1) ..... storage

energy storage 2) .....

compressed 3) ..... tank

4) .....

5) ..... energy storage

The Future of Energy Storage

Within the next ten years, experts predict that global energy consumption will have almost doubled what it was in 1990. [1] *However, to truly replace our current system with 'green' alternatives, we not only need to increase production, but also come up with adequate storage solutions for surplus energy.*

Batteries Batteries are something we use in our daily lives. However, the batteries needed to store the energy generated by renewable sources need to have a large capacity and a long life. We use a lot of lithium-ion and lead batteries but scientists have also been working on new Vanadium Redox batteries which could store up to 100 hours of energy.

Pumped hydro storage In places where hydroelectric power can be generated, such as mountainous regions or waterfalls, there is a possibility for pumped hydro storage to be used. As water naturally runs down the slope of a mountain, it can generate electricity. [2] This method of storing energy is great because it has very little impact on the environment.

Hydrogen energy storage Now even remote places that are off the grid can have access to an electricity supply. [3] Any excess energy is stored as hydrogen in tanks until it is needed later to generate electrical, thermal or light energy.

Energy storage tower An energy storage tower is an idea from a company in Switzerland. This idea is similar to pumped hydro storage, except it can be done without any water. The tower has a large crane in the centre and a lot of concrete blocks. [4] Then, when energy is required, the kinetic energy from lowering the blocks is transformed into electrical energy. It might sound like a strange idea, but it's as efficient as a lithium-ion battery and is a safe and cheap storage solution.

Compressed air energy storage (CAES) Another solution to store energy without water might be to use air instead. [5] To store energy with this method, ambient air is pumped and compressed into an underground chamber. At times of high demand when energy is required, the pressurised air is heated and expanded through a turbine. This drives a generator and produces electricity.

So which of these energy storage solutions will we be using in the near future? A combination of all of them seems the most likely outcome, with preferences being influenced by geography, location and cost.

Check these words

surplus, capacity, off the grid, concrete blocks, kinetic energy, pressurised, crane

3 11.4.7 Read the text again and choose from the sentences (A-F) the one which fits each gap (1-5). There is one extra sentence.

Listen and check.

A With surplus energy, the crane builds a tower with the blocks.
B However, by using a little of the excess energy to return it using a pump, we can then allow it to run back down again, generating yet more electricity.
C This is because they are not directly connected to the grid.
D After all, there is plenty of it around.
E By this time, we will have been generating electricity commercially from renewable sources for more than 50 years.
F This method works by solar panels on the roof collecting energy from the sun.

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4 11.5.2 **Fill in:** *impact, excess, ambient, access, electricity, consumption, energy, capacity.*

1 In the future, I hope we will generate all ..... from renewable sources.
2 Solar panels have very little ..... on the environment.
3 On very windy days, wind turbines often produce surplus ..... .
4 This battery has got a large ..... , so it can store a lot of energy.
5 I'm worried about the increase in global energy ..... .
6 Is there a way we can store the ..... energy we don't need?
7 It's my hope that one day everyone in the world will have ..... to a clean electricity supply.
8 CAES requires ..... air to be pumped underground.

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