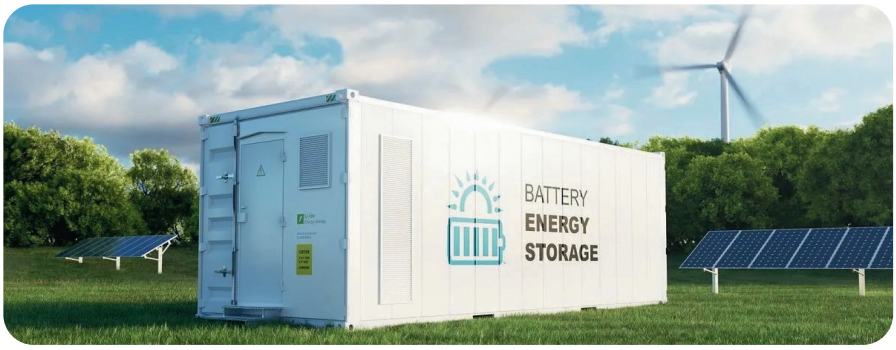
Energy storage on the grid

Storing energy on the grid is necessary for two main reasons:

- to reduce the imbalance between supply and demand, especially at peak times;
- to store the power produced by renewable sources, which is not always available as it depends on climate conditions, and supply it to the grid when necessary.

Energy is stored on the grid using different methods. The most common are: battery storage, pumped hydroelectric storage, compressed air energy storage, thermal storage, and kinetic storage.



Battery storage

Battery storage uses rechargeable, or secondary, cell batteries, to keep energy for a later use. Battery storage power stations mainly use lithium-ion batteries to store electricity and allow for the fast dispatching of power on the electric grid when failures occur.

Pumped hydroelectric storage

Pumped hydroelectric storage employs hydroelectric power plants with reservoirs to provide electricity at times of peak demand. At times of low electrical demand, when the cost of energy is lower, electricity is used to pump water from a lower source into a higher reservoir. When demand grows, water is released back from the upper into a lower reservoir, pumping it through a turbine and generating electricity.

Compressed air energy storage

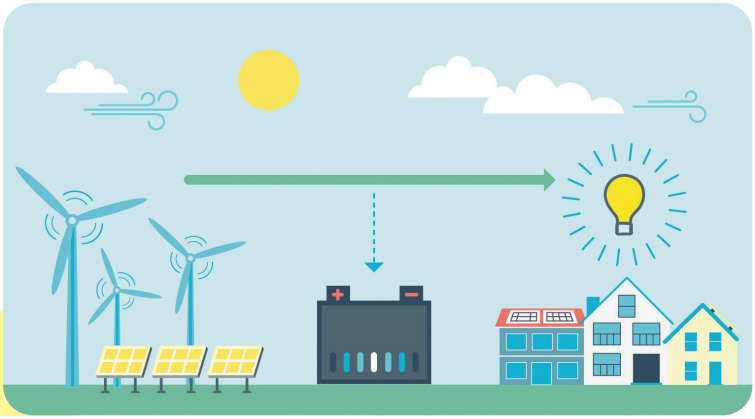
Compressed-air energy storage plants use the surplus energy output of renewable sources during times of over-production to compress air, which is then stored in underground reservoirs. Compressed air is then released to drive turbines for generating electricity when the demand increases or energy resource availability decreases.

Thermal storage

Thermal storage works on the principle of producing heat and storing it in order to generate steam and use it to drive turbines and produce electricity to supply it when needed. Heat is produced by increasing the temperature of some inexpensive and safe medium such as water or molten salt. This method is generally used in solar plants: solar energy is used to heat the medium.

Kinetic storage

Kinetic storage works by making an electric motor spin a flywheel in a vacuum container when the electricity demand is low. When an extra supply of energy is needed, the kinetic energy produced is transformed back into electricity. This system allows a quick supply of electricity into the grid when needed, but the energy stored is only available for a short time.



to dispatch: *inviare, spedire*
flywheel: *volano*
medium: *mezzo*
molten: *fuso*
output: *produzione*
vacuum: *vuoto*

1 Write the English equivalent of the following words from the text.

1. Fornitura .....
2. Domanda .....
3. Immagazzinare .....
4. Aria compressa .....
5. Cinetico .....
6. Guasto .....
7. Sovrapproduzione .....
8. Disponibilità .....
9. Accumulo .....
10. Frizione .....

2 Read the sentences and decide which storage method they refer to. In one case more than one answer is correct.

1. Lithium-ion batteries are employed.
.....
2. A cheap medium is heated.
.....
3. The force of gravity is exploited.
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4. Sometimes molten salt is used.
.....
5. The energy of motion is exploited.
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6. Air is stored underground.
.....
7. A vacuum container is needed.
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8. Steam is produced and used to generate electricity.
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