

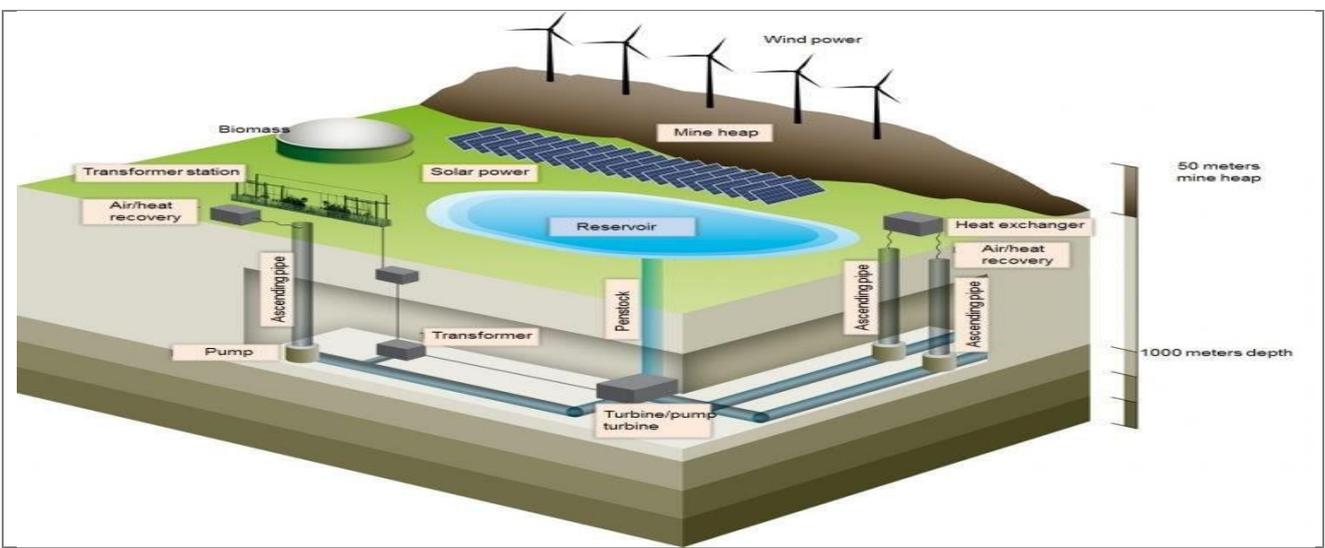
CASE STUDY

Green Industry

Case 10 North-Rhine Westphalia, Germany: Convert Coal Mine into Giant Battery Storage for Surplus Solar and Wind Power

Key Data

Germany is embarking on an innovative project to turn a hard coal mine into a giant battery that can store surplus solar and wind energy and release it when supplies are lean. The Prosper-Haniel coal mine in the German state of North-Rhine Westphalia will be converted into a 200 megawatt pumped-storage hydroelectric reservoir that acts like a giant battery. The capacity is enough to power more than 400,000 homes.



Functional graph



Founded in 1863, the Prosper-Haniel coal mine produces 3,000,000t/y of coal and is one of the few active coal mines remaining in Germany. But the mine is slated for closure in 2018, when federal subsidies for the industry dry up.

Similar to a standard hydroelectric power plant, pumped hydroelectric storage stations generate power by releasing water from a reservoir through a turbine to a second reservoir at a lower altitude. Rather than releasing the outflow, however, the water is then stored in the lower reservoirs until it can be pumped back up to the top reservoir using cheaper, off-peak power or another renewable energy source. In the case of the Prosper-Haniel plant, the lower reservoir will be made up of more than 16 miles of mine shafts that reach up to 4,000 feet (1,200 meters) deep. The station's 200 megawatts of hydroelectric power would fit into a mix of biomass, solar and wind power. It's not a perpetual motion machine, but the water stored in the surface reservoir will effectively act as backup "battery" that could kick in and fill any gaps in the energy mix whenever the other sources fall short.

Germany's ambitious ... energy transition, aims for at least an 80 percent share of renewables by 2050, with intermediate targets of 35 to 40 percent share by 2025 and 55 to 60 percent by 2035. " ... More mines could be converted into industrial-scale storage facilities as North-Rhine Westphalia seeks to double the share of renewables in its power mix to 30 percent by 2025..."

Credentials

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References

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