

## European Solar Energy Storage

# Use rivers to build pumped storage power stations



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## Overview

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NREL experts are developing tools and partnering with industry to unlock the full potential of pumped storage hydropower (PSH)—a form of hydropower used to generate electricity, store energy, and provide grid services. Image from IKM 3D. Pumped storage hydropower facilities rely on two reservoirs.

There are various types of hydropower plants: run-of-river, reservoir, storage or pumped storage. The basic operating principle is similar for all of them: water flows through a turbine to generate electricity. However, unlike run-of-river or reservoir power plants, pumped storage plants enable us.

There are three main techniques that we use at SSE to generate energy from hydro: 1. Storage hydroelectric 2. Pumped storage hydro 3. Run of river Storage hydroelectric is sometimes also known as 'impounded power'. A natural loch or man-made reservoir formed by draining a river collects water from.

Pumped storage hydropower provides long-duration energy storage that can help increase SRP's supply of reliable, affordable and sustainable energy. Learn more about our plans to expand hydroelectric generation through the Salt River Pumped Storage Project. SRP has been operating pumped storage.

Ever wondered how we can store solar energy captured at noon for your Netflix binge at midnight?

Enter pumped storage hydropower plants - the world's largest "water

batteries" that make this possible. With global renewable capacity projected to grow 60% by 2030 according to IEA reports, these.

The most common type of hydroelectric power plant uses a dam to store river water in a reservoir. The water released from the reservoir flows via a penstock (a closed conduit that channels the flow of water) through a turbine driving a synchronous generator to produce electricity. A diversion type. How does a pumped storage hydropower plant work?

Image from IKM 3D. Pumped storage hydropower facilities rely on two reservoirs at different elevations to store and generate energy. When other power plants generate more electricity than the grid needs, a PSH plant can use that power to pump water into the upper reservoir.

How pumped storage power stations can improve Ur and LR?

The construction of pumped storage power stations among cascade reservoirs can improve the flexible adjustment ability of the clean energy base, which also changes the water transfer and electrical connection of UR and LR at the same time.

Can pumped storage power stations support a high-quality power supply?

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Can pumped storage power stations be built among Cascade reservoirs?

The construction of pumped storage power stations among cascade reservoirs is a feasible way to expand the flexible resources of the multi-energy complementary clean energy base. However, this way makes the hydraulic and electrical connections of the upper and lower reservoirs more complicated, which brings more uncertainty to the power generation.

How do pumped storage power stations work?

As the most mature and cost-effective energy storage technology available today, pumped storage power stations utilize excess WPP to pump water from a lower reservoir (LR) to an upper reservoir (UR).

How do pumped storage hydropower plants reactivate the grid?

In the event of a power outage, a pumped storage plant can reactivate the grid by harnessing the energy produced by sending "emergency" water – which is kept in the upper reservoir for this very purpose – through the turbines. Pumped storage hydropower plants fall into two categories:

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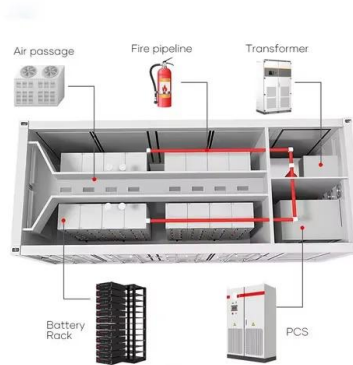


### Salt River Pumped Storage Project , SRP

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### How to Build a Pumped Storage Power Station: A Step-by-Step ...

With global capacity expected to double by 2030, understanding pumped storage construction isn't just about engineering - it's about building the backbone of our clean energy future.

## Hydropower and Pumped Storage

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The three main types of hydroelectric power stations in the UK include storage schemes, run-of-river schemes and pumped storage. Britain has an estimated 2.4 gigawatts (GW) of viable hydropower potential, according to the International Hydropower Association (IHA).

## Pumped Storage Hydropower , Water Research , NREL

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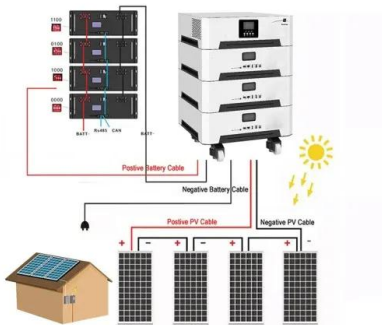
## Assessment of pumped hydropower energy storage potential along rivers

The developed method is able to locate and evaluate suitable ring dam locations along rivers but can also be applied to shore lines or existing lower reservoirs. The effectiveness of the routine is demonstrated and successfully verified by ...



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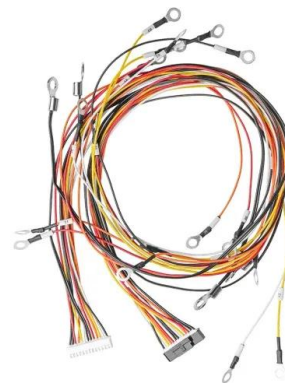


## SSE's Hydro Projects and Innovations , SSE

We're currently developing three new pumped hydro storage projects to deliver the large-scale, long-duration electricity storage needed as part of Britain's future energy mix and set out in 2022 in the UK Government's 'British Energy Security Strategy'.

## Use rivers to build energy storage power stations

By using water from reservoirs and harnessing the power of gravity, pumped storage hydropower offers a dynamic solution to energy management. Think of it like a giant battery but with water.



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