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# Importance of pumped storage hydroelectric power plant in Turkey

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**Abstract.** The world began to search for new energy sources with increasing energy demand. Renewable energy sources are as hydropower important for alternative energy. Countries with high hydroelectric potentials continue to work to utilize hydroelectric power plants in the most efficient way. Pumped storage hydropower plants are an important investment to meet the growing energy needs at peak times and to store energy. Although it produces energy in many countries, pumped storage hydropower plants have not begun to be built in Turkey which has high hydroelectric potential. A new era will be opened for energy production in Turkey where a large number of pumped storage hydropower plants projects are in study phase with the construction of pumped storage hydropower plants and first nuclear power plant.

**Keywords:** pumped storage; hydroelectric; power plant; turkey; energy

## 1. Introduction

The necessity and efficiency of pumped storage hydroelectric power plants (PSHP) have been explored by many researchers around the world. These power plants, which can be seen as storage of electricity, can meet the sudden electricity need.

The storage of energy is one of the most critical components of the electricity value chain in the neoliberal market model that has developed in the world in recent years. The energy storage systems industry is a new, important and rapidly developing industry option all over the world. In liberal markets, system operators need to store energy in order to integrate large-scale renewable energy production into the system (Ayder 2015). Electric storage of energy is expensive and technologically inefficient. Many of the energy storage systems are indirect storage systems. In other words, it converts electricity into other forms of energy.

These storage systems; It can be classified as Magnetic energy (super capacitors), Electric energy (Superconducting Magnetic Energy Storage), Mechanical energy (PSHP, Compressed Air Storage, Flywheel), Chemical energy (Batteries). These systems are used for different purposes (Dunn *et al.* 2011). However, only PSHP and Compressed Air Storage methods are technologically and economically feasible for storing energies in large quantities (Fig. 1). Today,

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