

# Gravitational Energy Storage

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## Summary

The GENSSIS (Gravitational Energy Storage and Synchronous Inertial Stability) concept, similar to pumped hydroelectricity storage, presents an alternative grid-scale energy storage method through the conversion of potential to electrical energy. The system will be able to provide frequency response and reserve services to National Grid.

## Abstract

The prototype design consists a string of a 400 tonne steel weight contained within a 1500m drilled hole. The string of steel weights are connected at surface via a traction winch system which is in turn connected to a motor/generator. During peak grid demand, the steel weight is released and electrical energy is provided to the grid from the generator. The steel weight is then raised when there is a lower energy demand on the grid. The total energy capacity of 1 drilled hole is 1MWh. The speed of release can be varied to provide a power output of up to 3MW.

The GENSSIS concept provides a sustainable energy storage method with a 50 year project lifetime. This is a significant improvement on project lifetime in comparison to grid-scale battery storage systems. Concerns relating to lithium ion battery storage, such as resource availability and flammability, do not exist with the GENSSIS design. Collaborative partners working on the GENSSIS project provide a variety of expertise including; wellbore drilling, structural engineering and industrial awareness of the ancillary services market.

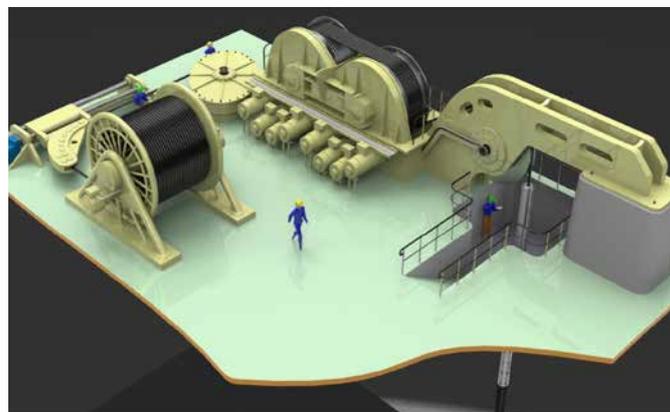


Figure 1: Gravitational energy storage system. Traction winch used to lift and control release of 400 tonne steel weight contained within 0.51m diameter x 1500m drilled hole.