



Bachelor Thesis

Techno-economic assessment of cost and cost-development of gravity batteries

Renewable energy sources (RES) are deemed to be good for the environment but they also have several disadvantages. One major disadvantage is the intermittency of RES. RES are highly weather dependent.

Future energy security thus hinges, i.a. on the possibilities to store energy in an efficient manner. Gravity batteries, a form of mechanical energy storage has become a sought-after technology. Mechanical storage systems are deemed to be among the most efficient and most sustainable energy storage systems (Mahmoud, 2020).

Gravity batteries make use of the gravitational force by hauling a colossal weight to a predetermined height when energy from RES is plentiful. When energy from RES is limited, the weight is released. Through this process, the gravitational potential energy is converted into kinetic energy that can be used i.a. to power a generator.

While there is an abundance of literature studying the technical aspects of gravity energy storage, the literature on techno-economic aspects is limited. The goal of this thesis is to close this gap in the literature.

The aim is to do a techno-economic analysis of gravity energy storage systems, comparing them to alternatives. To determine whether gravitational energy storage systems are a viable option, the life cycle costs and levelized costs of storage should be assessed.

Key tasks and objectives of the thesis

- Detailed familiarisation with gravity energy storage systems and alternative storage solutions
- Review of the theoretical and empirical literature on implementation of gravity energy storage
- Evaluation of the economic feasibility of installation of gravity energy storage systems
- Comparison of performance with alternative energy storage systems

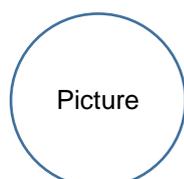
Your profile

- Student of economics, best with focus on energy
- Interest in energy transition, energy storage, RES

Literature

- Mahmoud, M. et al (2020): "A Review of Mechanical Energy Storage Systems Combined with Wind and Solar Applications", *Energy Conversion and Management*, 210.
- Berrada, A. and Loudiyi, K. (2019): Gravity Energy Storage, Elsevier, Missouri (USA).

Contact



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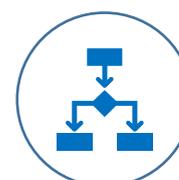
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Topics



- Energy Storage Systems
- Gravitational Batteries
- Energy Transition

Methods



- Levelised Cost of Storage
- Life Cycle Assessment