

Storage

Physics and Mathematics of Sustainable Energy

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1. The Tesla powerwall battery has a capacity of 13.5 kWh. The typical US home uses 900 kWh per month. For how many hours could the powerwall battery provide power to a house?
2. How many Tesla powerwall batteries would we need to get 35 GWh of storage? If each powerwall costs around \$12,000 (including installation) how much would 35 GWh of batteries cost?
3. The batteries in electric cars vary, but roughly 70 kWh seems to be a reasonable average for newer cars.
 - (a) For how long could a 70 kWh battery power a Maine house?
 - (b) How many such batteries would we need to get a storage capacity of 5 GWh?

Note: Raccoon mountain is a pumped storage facility with a capacity of 35 GWh. The cost to build the facility, in 2019 dollars, was 1.2 billion USD.