Task:

I wonder whether it is (theoretically) possible to generate a profit with price arbitrage by using an **electric car** as energy storage. The goal is to make as much money as possible from price arbitrage. Maximise profits.

Technical inputs/boundaries:

- Simulate process of buying and selling electricity over a whole year, start at January 01 00:00 with a full battery
    - Maximise profit over the whole year
- Maximum storage (battery_max) is 50 kWh
- It is possible to either charge or discharge the battery with a maximum of 10 kWh per hour (charge_capacity), take the price at the beginning of the hour to calculate profits (e.g. battery is charged with 30 kWh and price at 6pm is 0.30 cents/kwH, you can either buy 10 kWh for 3€ and have 40 kWh or sell 10 kWh for 3€ and have 20 kWh)
    - Note that there are hours with negative electricity costs, so you can actually gain money while charging the car
- Charging and discharging is only possible at night between 6pm and 8am, during the day no charging is possible **and the car loses 10 kWh state of charge due to driving without compensation**
    - **SOC at 6pm = SOC at 8am – 10 kWh**
- Minimum of 40 kWh battery charge (battery_morning) is required in the morning at 8am, other than that there are no boundaries (full discharge during the night is possible as long as it's charged back to at least 40 kWh at 8am)
- Profits are accumulated over the whole year, prices are known in advance for any given hour (hypothetical scenario)

Remaining tasks:

- Create variable to control energy used for driving
- Optional: Insert another variable that restricts discharging to a minimum price