# **CODES**

**A. Ideal Case**

1. Import data, define parameters, and initialize decision variables.
2. Define a function to calculate the volume traded in each market and the corresponding revenue, depending on the design stage and market participation.
3. Identify the optimal quantile that maximizes total revenue for each time step.

**B. Operational Case**

1. Import data, define parameters, and initialize decision variables.
2. Define the bid in DAM based on a threshold derived from the average DAM price in the ideal case, considering the specified price interval.
3. Define a function to calculate the volumes traded in each market and the total revenue from participation at each time step (see Figure 0‑1).

**Participation in SR**

1. Ideal Case: Depends on observed power, activation of reserves, market prices and revenues.
2. Operational Case: Depends on available capacity and market prices.

**Activation of energy bids:**

* **Upward Regulation**: WPP submit bids at 0€/MWh and is the first to be called.
* **Downward Regulation**: WPP submits bid at the DAM price and is only activated after other producers have been requested. The variable *sr\_downcap\_others* (or *down\_co*) represents the downward regulation needs covered by other producers.
* **Both Directions**: When the WPP is required to activate both upward and downward reserves within the same hour, the plant must adjust its capacity over two 30-minute periods to meet the total energy requirements for the entire hour.

**Strategic bidding of WPP**

A diagram of a computer

AI-generated content may be incorrect.

Figure ‑: Strategic bidding of WPP. The red line represents Strategy 1, the yellow Strategy 2, and the blue Strategy 3.