**Overview**

This document describes user interactions with a **community storage market system**, where households (*prosumers*) can buy or sell **storage capacity** in a shared community market.

The system is accessed through a conversational app interface powered by a **Large Language Model (LLM)**. Prosumers simply provide natural language input about their plans (e.g., *“I’ll need storage for next week”* or *“I’m away for a week”*). Based on this, the system autonomously manages buying or selling storage capacity, using predictive models, battery models, and the market framework (ASSUME). After completing an action, the system explains to the user what was done and why.

Two scenarios illustrate these capabilities:

1. **Buying storage capacity** for a household without a battery system during a week of high energy demand.
2. **Selling unused storage capacity** from a household with a battery system during a week-long holiday.

**Scenario 1: Buying Storage Capacity for a Week of Renovations**

**Context**

A household plans a week of evening renovations that require significant energy use. They do not own a personal battery system but want to reserve **storage capacity** in the community market. This will allow them to store cheap off-peak energy during the day and use it during the evenings when their solar panels are not producing energy.

**User Story**

*As a prosumer, I want the system to autonomously arrange storage capacity in the community market for a whole week while I’m renovating, so I can shift energy use and cover my increased demand without worrying about technical details or market transactions.*

**Use Case: Autonomous Multi-Day Storage Purchase**

* **Actors**:
  + Prosumer (Household)
  + LLM Interface
  + Trading Engine/Agent
  + Market Framework (ASSUME)
* **Goal**:  
  Automatically reserve storage capacity in the community market for a week of renovations based on user-provided context.
* **Preconditions**:
  + The prosumer has an active account and app installed.

**Main Flow**

1. The prosumer opens the app and says:  
   *“I’ll be renovating next week during the evenings and need storage capacity since my solar panels won’t generate power at night.”*
2. The LLM interprets this request and autonomously determines that additional storage capacity is needed for seven days.
3. The LLM sends the request to the Trading Engine.
4. The Trading Engine:
   * Estimates the household’s daily storage needs for evening renovations (e.g., 8kWh/day).
   * Checks market availability and pricing for storage capacity over the next week.
   * Reserves 56kWh of total storage capacity (8kWh/day × 7 days) at €0.07/kWh.
5. The Market Framework (ASSUME) processes the trade and confirms the reservation.
6. The LLM notifies the prosumer afterwards:  
   *“I’ve reserved 8kWh of storage capacity per day for next week at €0.07/kWh to support your renovation plans.”*

**Alternative Flows**

* **Partial Market Availability**:
  + If only part of the week is covered, the LLM informs the user:  
    *“I was able to reserve storage for 5 of the 7 days. I’ll continue monitoring the market for additional availability.”*
* **High Price Condition**:
  + If prices exceed a threshold, the LLM may still act but explains:  
    *“I reserved storage at €0.12/kWh due to limited availability during peak hours.”*

**Scenario 2: Selling Unused Storage Capacity During a Week-Long Holiday**

**Context**

A household owns a personal battery storage system that they typically use to store excess solar energy for later use. However, they are leaving for a one-week holiday and do not need their storage capacity during this period. They want the system to autonomously sell this unused capacity in the community market so others can use it, and they can earn income from their idle battery.

**User Story**

*As a prosumer, I want the system to autonomously sell my unused storage capacity in the community market while I’m on holiday for a week, so I can generate income without managing the details myself.*

**Use Case: Autonomous Multi-Day Storage Sale**

* **Actors**:
  + Prosumer (Household)
  + LLM Interface
  + Trading Engine
  + Market Framework (ASSUME)
* **Goal**:  
  Automatically make the household’s storage capacity available in the community market for others to use during their week-long absence.
* **Preconditions**:
  + The prosumer owns a battery system with available capacity.
  + The community market has demand for storage capacity.

**Main Flow**

1. The prosumer opens the app and says:  
   *“We’re going on holiday for a week and won’t need our battery storage.”*
2. The LLM interprets this and autonomously determines that the household’s storage capacity can be made available for others.
3. The LLM sends the request to the Trading Engine.
4. The Trading Engine/Agent:
   * Confirms the household’s storage capacity availability (e.g., 12kWh/day).
   * Queries current market demand and pricing.
   * Sells 84kWh total storage capacity (12kWh/day × 7 days) at €0.09/kWh.
5. The Market Framework (ASSUME) processes the trade and matches the seller with buyers.
6. The LLM notifies the prosumer afterwards:  
   *“Your storage capacity has been made available on the community market for the next 7 days. You’ll earn €0.09/kWh for a total of €7.56 over the week.”*

**Alternative Flows**

* **No Immediate Buyers**:
  + The LLM informs the user:  
    *“No buyers are currently available. I’ll continue monitoring demand and sell the capacity once there’s interest.”*
* **Partial Sale**:
  + If only part of the storage capacity is sold:  
    *“We were able to sell 70% of your available storage capacity. I’ll keep offering the remainder.”*

**Summary**

These use cases demonstrate how the system supports prosumers in participating in a **community storage market**. By enabling autonomous buying and selling of storage capacity over multiple days, the system helps households optimize their energy strategies and contribute to a shared, efficient energy ecosystem.