Project Design Phase-II

Data Flow Diagram & User Stories

Date	03 November 2025
Team ID	NM2025TMID01374
Project Name	To Supply Leftover Food to Poor
Maximum Marks	4 Marks

Data Flow Diagram (DFD)

Below is a **Level 0 and Level 1 DFD** representation for the *Food to Power System* — showing how food waste moves through the system and becomes usable energy.

Level 0 – Context Diagram

System Name: Food to Power System

Main Entities:

- Users / Households
- Collection Agency
- Processing Plant
- Energy Grid / Utility Company
- Monitoring System

Data Flows:

1. Users → Food Waste → Collection Agency
2. Collection Agency → Processed Waste → Processing Plant
3. Processing Plant → Energy Output → Energy Grid
4. Processing Plant → Data Reports → Monitoring System
5. Monitoring System → Feedback → Users

Level 1 – Detailed System Flow

1. Food Waste Collection Subsystem

- **Input:** Food waste data, location, collection schedule
- **Process:** Smart bin detects waste quantity → Data sent to central server
- **Output:** Collection log, weight data

2. Segregation & Pre-Processing

- **Input:** Mixed food waste
- **Process:** Machine separates biodegradable components → Prepares slurry
- **Output:** Organic slurry → sent to digester

3. Biogas Generation Subsystem

- **Input:** Organic slurry
- **Process:** Anaerobic digestion → produces methane (CH_4) and CO_2
- **Output:** Biogas → Power generation unit

4. Power Generation Subsystem

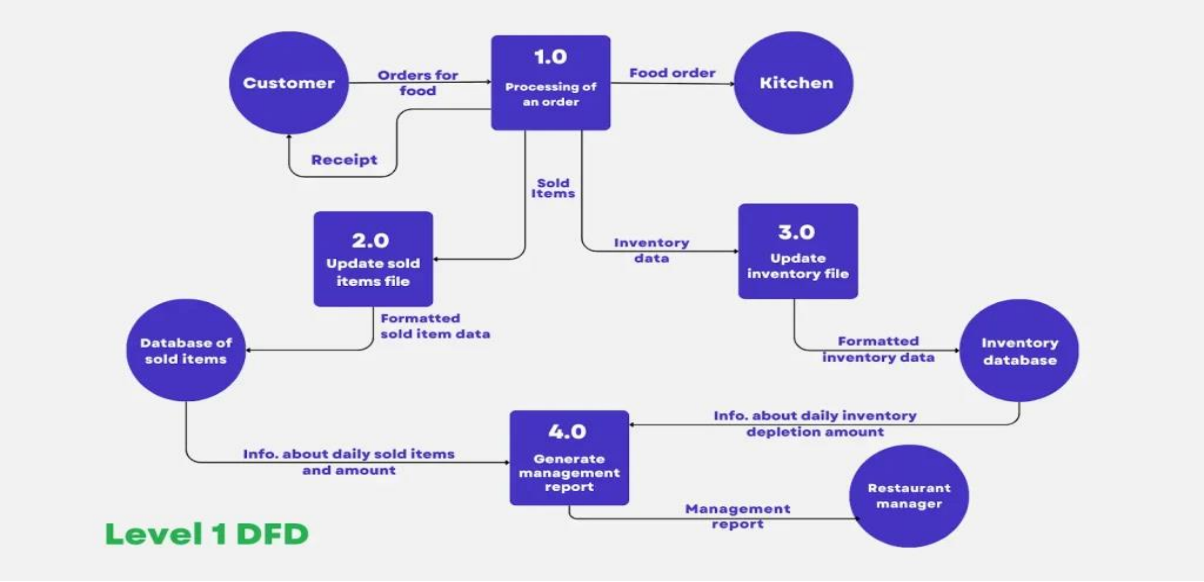
- **Input:** Biogas
- **Process:** Biogas burned in generator → produces electricity
- **Output:** Power to grid, heat, and metrics (kWh)

5. Monitoring & Control Subsystem

- **Input:** Sensor data (gas output, temperature, power produced)
- **Process:** IoT dashboard tracks and analyzes performance
- **Output:** Reports, alerts, user statistics

6. User Feedback & Analytics

- **Input:** Energy data, waste contribution data
- **Process:** Calculate community impact
- **Output:** Mobile app notifications, dashboards, sustainability scores



User Stories (Agile Format):

ID	User Role	User Story	Acceptance Criteria
US1	Resident	As a resident, I want to drop leftover food in smart bins so I can ensure my waste is used productively.	Smart bins detect waste, record data, and send alerts when full.
US2	Collection Worker	As a collector, I want to view the location and fill level of bins so I can optimize my collection route.	Map dashboard shows bin locations and status (empty/full).
US3	Plant Operator	As an operator, I want to monitor digester input and gas production levels to maintain efficiency.	Dashboard shows real-time methane percentage and volume.
US4	Energy Engineer	As an engineer, I want to see how much electricity is generated from biogas daily.	Power output displayed in kWh with trend chart.
US5	Environmental Officer	As an officer, I want analytics on total waste converted and emissions saved.	Reports summarize CO_2 reduction and energy equivalence.
US6	App User (Citizen)	As a user, I want to track how much energy my area contributed to the grid.	Mobile app shows local power stats and contribution badges.
US7	Admin	As an admin, I want to configure routes, bins, and user permissions.	Admin portal allows CRUD operations on system data.