### **Data Retrieval**

#### **a) Retrieve All Households and Their Energy Consumption**

To get a list of all households and the energy sources they use, along with the consumption data:

SELECT h.household\_name, es.source\_name, c.consumption\_amount, c.date\_consumed

FROM Household h

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

JOIN Energy\_Source es ON c.energy\_source\_id = es.energy\_source\_id

ORDER BY h.household\_name;

#### **b) Retrieve Energy Consumption for a Specific Location**

If you want to retrieve energy consumption data for a particular rural area (e.g., "Rural Area 1"):

SELECT h.household\_name, es.source\_name, c.consumption\_amount, c.date\_consumed

FROM Household h

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

JOIN Energy\_Source es ON c.energy\_source\_id = es.energy\_source\_id

JOIN Location l ON h.location\_id = l.location\_id

WHERE l.location\_name = 'Rural Area 1'

ORDER BY c.date\_consumed;

#### **c) Retrieve Households Using Solar Energy**

To identify which households are using solar energy:

SELECT h.household\_name, es.source\_name, c.consumption\_amount, c.date\_consumed

FROM Household h

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

JOIN Energy\_Source es ON c.energy\_source\_id = es.energy\_source\_id

WHERE es.source\_name = 'Solar';

### **2. Data Analysis**

#### **a) Total Energy Consumption per Household**

To find the total energy consumption for each household:

SELECT h.household\_name, SUM(c.consumption\_amount) AS total\_consumption

FROM Household h

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

GROUP BY h.household\_name;

#### **b) Total Energy Consumption per Energy Source**

This query gives the total energy consumed for each energy source:

SELECT es.source\_name, SUM(c.consumption\_amount) AS total\_consumption

FROM Energy\_Source es

JOIN Consumption\_Record c ON es.energy\_source\_id = c.energy\_source\_id

GROUP BY es.source\_name;

#### **c) Average Energy Consumption per Household**

To calculate the average energy consumption per household:

SELECT h.household\_name, AVG(c.consumption\_amount) AS avg\_consumption

FROM Household h

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

GROUP BY h.household\_name;

#### **d) Total Energy Consumption per Location**

This query shows total energy consumption in each rural area:

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SELECT l.location\_name, SUM(c.consumption\_amount) AS total\_consumption

FROM Location l

JOIN Household h ON l.location\_id = h.location\_id

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

GROUP BY l.location\_name;

#### **e) Top 3 Energy Consuming Households**

To identify the top 3 households with the highest energy consumption:

SELECT h.household\_name, SUM(c.consumption\_amount) AS total\_consumption

FROM Household h

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

GROUP BY h.household\_name

ORDER BY total\_consumption DESC

LIMIT 3;

#### **f) Energy Consumption Over Time (Monthly Trends)**

To analyze energy consumption trends over time, broken down by month:

SELECT DATE\_FORMAT(c.date\_consumed, '%Y-%m') AS month, SUM(c.consumption\_amount) AS total\_consumption

FROM Consumption\_Record c

GROUP BY month

ORDER BY month;

### **Data Retrieval**

#### **a) Retrieve All Households and Their Energy Consumption**

To get a list of all households and the energy sources they use, along with the consumption data:

SELECT h.household\_name, es.source\_name, c.consumption\_amount, c.date\_consumed

FROM Household h

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

JOIN Energy\_Source es ON c.energy\_source\_id = es.energy\_source\_id

ORDER BY h.household\_name;

#### **b) Retrieve Energy Consumption for a Specific Location**

If you want to retrieve energy consumption data for a particular rural area (e.g., "Rural Area 1"):

SELECT h.household\_name, es.source\_name, c.consumption\_amount, c.date\_consumed

FROM Household h

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

JOIN Energy\_Source es ON c.energy\_source\_id = es.energy\_source\_id

JOIN Location l ON h.location\_id = l.location\_id

WHERE l.location\_name = 'Rural Area 1'

ORDER BY c.date\_consumed;

#### **c) Retrieve Households Using Solar Energy**

To identify which households are using solar energy:

SELECT h.household\_name, es.source\_name, c.consumption\_amount, c.date\_consumed

FROM Household h

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

JOIN Energy\_Source es ON c.energy\_source\_id = es.energy\_source\_id

WHERE es.source\_name = 'Solar';

### **2. Data Analysis**

#### **a) Total Energy Consumption per Household**

To find the total energy consumption for each household:

SELECT h.household\_name, SUM(c.consumption\_amount) AS total\_consumption

FROM Household h

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

GROUP BY h.household\_name;

#### **b) Total Energy Consumption per Energy Source**

This query gives the total energy consumed for each energy source:

SELECT es.source\_name, SUM(c.consumption\_amount) AS total\_consumption

FROM Energy\_Source es

JOIN Consumption\_Record c ON es.energy\_source\_id = c.energy\_source\_id

GROUP BY es.source\_name;

#### **c) Average Energy Consumption per Household**

To calculate the average energy consumption per household:

SELECT h.household\_name, AVG(c.consumption\_amount) AS avg\_consumption

FROM Household h

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

GROUP BY h.household\_name;

#### **d) Total Energy Consumption per Location**

This query shows total energy consumption in each rural area:

SELECT l.location\_name, SUM(c.consumption\_amount) AS total\_consumption

FROM Location l

JOIN Household h ON l.location\_id = h.location\_id

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

GROUP BY l.location\_name;

#### **e) Top 3 Energy Consuming Households**

To identify the top 3 households with the highest energy consumption:

SELECT h.household\_name, SUM(c.consumption\_amount) AS total\_consumption

FROM Household h

JOIN Consumption\_Record c ON h.household\_id = c.household\_id

GROUP BY h.household\_name

ORDER BY total\_consumption DESC

LIMIT 3;