TechnoX Case Study

Developing a ToD/ToU based platform - A time-of-tariff related use case for solar renewable energy and climate tech could focus on optimizing energy usage based on dynamic electricity pricing.

SCOPE:
Develop a platform that optimizes energy consumption for households and businesses with solar panels based on time-of-use (TOU) or time-of-day (TOD) electricity tariffs. The platform would help users maximize their savings by shifting their energy usage to periods when electricity is cheaper and using stored solar energy during peak pricing times.

1. Real-Time Tariff Monitoring:
    a. Integrate **dummy** utility data to fetch real-time rates and forecast TOU tariff rates.
    b. Display current and upcoming electricity prices in a user-friendly interface.

2. Energy Consumption Analytics:
    a. Monitor and analyze the household's or business's energy consumption patterns. We can share some energy data from our platform
    b. Provide detailed reports on energy usage, cost, and potential savings.

3. Smart Scheduling:
    a. Automatically schedule high-energy appliances (like washing machines, dishwashers, and EV chargers) to run during low-tariff periods.
    b. Integrate with smart home devices and appliances for automated control.

4. Solar Energy Management:
    a. Track solar energy production and usage in real-time.
    b. Manage battery storage to store excess solar energy and use it during peak tariff periods.

5. Forecasting and Recommendations:
    a. Use machine learning to predict future energy consumption and solar production.
    b. Provide personalized recommendations for users to adjust their energy usage based on forecasted tariffs and weather conditions.

6. User Notifications and Alerts:
    a. Send notifications to users about upcoming high-tariff periods and suggest actions to minimize costs.

    b. Alert users if there are opportunities to sell excess solar energy back to the grid at profitable rates.

7. Cost-Benefit Analysis:
    a. Calculate potential savings from shifting energy usage and using solar energy during peak tariff periods.
    b. Show historical savings and performance metrics to encourage continued optimization.

<mark>Technology Stack:</mark>

1. Frontend:
    a. Web/mobile apps for user interaction (React, Angular, or Android).

2. Backend:
    a. Cloud-based server for data processing and storage (AWS, Google Cloud, or Azure with Java or equivalent).
    b. APIs to integrate with dummy utility providers data and smart home devices data.

3. Data Analytics:
    a. Machine learning models for consumption forecasting and optimization (Python, TensorFlow, or PyTorch).

The End