EV Charging Demand Forecast — Report

EV CHARGING DEMAND FORECAST — SUMMARY (Synthetic Implementation)

Data Window: 2025-05-01 to 2025-07-31 (Hourly), 5 stations
Features used: Hour-of-day, Weekend flag, Temperature (°C), Rain (mm)

Model: SARIMAX(2,0,2) with exogenous variables
Validation Window: Last 7 days of history
See 'Validation' plot for performance (MAE/RMSE displayed in title).

Key Insights:
• Clear peaks observed during morning (~9 AM) and evening (~6 PM) hours.
• Weekends show slightly higher usage than weekdays.
• Rainy hours reduce demand modestly (negative impact).
• The model captures daily seasonality via hour-of-day feature and general trends via AR terms.

Forecast:
• Forecast horizon: next 7 days (hourly)
• Files saved: ev_forecast_next_7_days_hourly.csv (forecast), ev_historical_hourly_kwh.csv (history)
• Use the intervals (80% CI) for capacity planning.

Recommendations:
1) Staff and energy allocation should be increased during 8–11 AM and 5–8 PM.
2) Consider dynamic pricing to spread peak load into shoulder hours.
3) Use weather-aware operations: prepare for lower throughput during rainy periods.