DAI – Forecast 16–22 Writer v1.0

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Design Framework: DAI + RBC Framework v5.85 (October 2025)

Change Reference: CR013 – Evening Buffer RBC Learner (Pre-1 PM Execution)

1. Functional Overview

This automation synchronises the RBC Adjusted Next Horizon demand forecast (representing the 16:00–22:00 period) into the standard forecast helper input_number.dai_forecast_demand_16_22_kwh. It ensures the forecast slice is up-to-date before the 13:00–16:00 cheap-charge window so that the Evening Buffer Learner can consume a valid value. No inline maths are performed; only a direct mirror and validation logic with clamping and logging.

2. Entity Map

Entity ID	Purpose	Direction
input_number.rbc_adjusted_demand_next_horizon_kwh	Source forecast (Next Horizon demand 16–22)	Read
input_number.dai_forecast_demand_16_22_kwh	Target forecast helper for RBC chain	Write
input_text.dai_night_planner_reason	Shared log sink for operational messages	Write

3. Trigger Matrix

Trigger ID	Condition	Purpose
t_horizon_change	State change of input_number.rbc_adjusted_demand_next_horizon_kwh	Immediate mirror when forecast updates
t_1305	Time = 13:05	Safety write early in cheap

		window
t_1555	Time = 15:55	Safety write before window end
t_ha_start	Home Assistant Start	Ensure value on restart if within 13:00–16:00

4. Logic Flow

1. On trigger, read the current Next Horizon value.
2. Read existing Forecast16-22 helper value.
3. If the absolute difference ≥ 0.01 kWh, write Horizon → Forecast16-22.
4. Clamp value to 0–40 kWh and round 2 dp.
5. Log all operations to input_text.dai_night_planner_reason with trigger id and values.
6. HA-start guard writes if system boots between 13:00 and 16:00 even if delta < 0.01.

5. Guards and Safety

- No inverter writes – read/write limited to helpers.
- Value range clamped 0–40 kWh to prevent invalid data.
- Deadband 0.01 kWh prevents unnecessary churn.
- HA-start guard ensures continuity after restart.
- Logbook visibility confirms last successful write.

6. Scheduling

Primary execution occurs automatically via event-based (state change) trigger; backup executions occur at 13:05 and 15:55 daily. The automation runs in single mode to prevent overlap.

7. Acceptance Tests

Test ID	Scenario	Expected Result
T1	Update occurs immediately when Horizon value changes	Forecast helper equals Horizon value
T2	13:05 backup executes if no horizon change	Forecast helper non-zero after 13:05
T3	15:55 backup executes near window end	Forecast helper stable

T4	HA-start between 13:00–16:00	Forecast helper written within 60 s of boot
T5	Invalid or unknown Horizon	No write, log reason

8. Version Lineage & Governance

v1.0 – Initial release under CR013 – Evening Buffer RBC Learner (Pre-1 PM Execution). Implements mirror logic only; no bias or inverter interaction. Change governed by Project Instructions §21 & §24.