DAI – Evening Buffer RBC Learner Orchestrator v1.2

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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 runs each day at 12:55 to translate the computed evening bias (input_number.rbc_evening_bias_kwh) into an Automatic Evening Buffer percentage using the RBC Bias → Percent Mapper blueprint script. It ensures the Grid Charge Controller receives an up-to-date Auto-Suggest % before the 13:00–16:00 cheap-charge window. No inline maths are performed; the automation only passes variable parameters to the mapper script and logs results.

2. Entity Map

Entity ID	Purpose	Direction
input_number.rbc_evening_bias_kwh	Smoothed bias (kWh) from previous night	Read
input_number.dai_evening_buffer_auto_suggest_pct	Target helper where % result is written	Write
script.rbc_bias_to_percent_mapper_evening	Blueprint script instance performing bias→% mapping	Execute
input_number.total_battery_capacity_kwh	Total battery capacity used for capacity_kWh calc	Read
input_number.dai_min_soc_hard_floor	Hard floor SOC (%) used to derive usable capacity	Read
input_number.dai_evening_buffer_safety_mult	Safety multiplier to scale bias impact	Read
input_number.dai_evening_buffer_decay_pct	Decay % applied on neutral/negative	Read

| | | bias | |

| input_number.dai_evening_buffer_pct | Manual floor for buffer % | Read |

| input_text.dai_night_planner_reason | Shared log sink for trace messages | Write |

3. Trigger Matrix

Trigger ID	Condition	Purpose
t_1255	Time = 12:55	Primary pre-window execution
t_tariff_change	Tariff change in input_select.octopus_import_tariff	Re-evaluate buffer if tariff shifts
t_ha_start	Home Assistant Start	Ensure valid buffer on restart

4. Logic Flow

1. On trigger, read bias, capacity, and helper parameters.
2. Compute available capacity_kWh = total_capacity – min_SOC_floor (handled within Jinja variable layer).
3. Pass all variables to script.rbc_bias_to_percent_mapper_evening:
   bias_helper_entity_id, capacity_kwh_value, safety_multiplier_entity_id, manual_floor_pct_entity_id,
   cap_pct_value (25 %), decay_pct_entity_id, deadband_pct_value (0.1 %), out_helper_pct_entity_id.
4. Mapper blueprint converts bias (kWh) → % buffer, applies decay, caps, and deadband.
5. Result written to input_number.dai_evening_buffer_auto_suggest_pct.
6. Log summary with forecast/actual/bias values and final output to input_text.dai_night_planner_reason.

5. Guards and Safety

• No inverter writes – limited strictly to helper updates.
• Hard cap = 25 %; buffer cannot exceed this limit.
• Manual floor always respected (no negative adjustment).
• HA-start guard ensures buffer restored after reboot.
• Deadband = 0.1 % avoids unnecessary churn.
• Decay logic managed by mapper blueprint for negative bias.

6. Scheduling

Runs at 12:55 daily before the 13:00–16:00 cheap window, on any tariff change, and after Home Assistant restarts. Single-mode execution prevents overlap.

7. Acceptance Tests

Test ID	Scenario	Expected Result
T1	Normal daily run at 12:55	Auto Suggest % updated and log entry written
T2	Tariff change midday	Buffer recalculated with identical logic
T3	HA-start at noon	Buffer recalculated within 60 s of boot
T4	Bias helper missing/unknown	No update; log indicates reason
T5	Manual floor raised	Output respects new floor immediately

8. Version Lineage & Governance

v1.2 – Current release bound to script.rbc_bias_to_percent_mapper_evening; aligns to blueprint pattern. Derived from v1.0 and v1.1 revisions during CR013 implementation. Change governed under DAI Project Instructions §21 and §24 (Protected Architecture Mode). Implements logbook trace compliance and no inline calculations.