RBC – Evening Bias to Percent Mapper v1.0

Artefact Type: Script (callable; no triggers)

Version: v1.0 (DR004a – New Script)

Owner: Simon Angell

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Environment: Home Assistant OS Core 2025.10.2 / Supervisor 2025.10.0 / OS 16.2 / Frontend 20251001.2

Governance: Protected Architecture Mode v5.9 (Active) • Two-Phase Code-Change Gate v2.2 • No-Surprises Protocol Active

1. Purpose & Scope

The Evening Bias→Percent Mapper converts the Evening RBC bias (kWh) into an Auto-Suggest % of total battery capacity for use by DAI controllers (e.g., Grid Charge Controller). This script performs transformation only; orchestration/timing is handled by RBC – Evening Bias Safety Net v1.0 and RBC – Evening Bias to Percent Mapper Scheduler v1.0.

2. References

Defect Report: DR004a — RBC Alignment to Daily Demand Model. High-Level Design: DAI + RBC High-Level Design v1.1 (§5.2.3, §5.6.3). Home Assistant Guidelines DAI RBC v1.2 (§3.3 naming/alias, §9 workflows). Interaction Guidelines v1.2 (§7 DR workflow, §11 Compliance Checklist).

3. Functional Requirements

1. Read Evening Bias (kWh) and Total Battery Capacity (kWh).
2. Compute pct = round(clamp((bias_kwh / capacity_kwh) * 100, 0, 100), 1).
3. Write result to Evening Buffer – Auto (% helper).
4. Logbook entry on every path; notify if capacity is invalid.
5. Callable idempotently from Safety Net, Scheduler, manual.
6. No inverter writes; Visual-Editor-safe syntax.

4. Entity Map

Role	Entity ID	Notes
Bias (kWh, read)	input_number.rbc_evening_bias_kwh	Written by Evening bias producer/blueprint.
Total Capacity	input_number.total_battery_capacity_kwh	Site-wide battery

(kWh, read)		capacity helper.
Output % (write)	input_number.dai_evening_buffer_auto_suggest_pct	Consumed by DAI Grid Charge logic.
Period stamp (read)	input_text.rbc_last_period_evening_demand	For idempotence by callers.
Notification	notify.mobile_app_pixel9pro	Mobile alert on guard-fail.

5. Behaviour & Algorithm

If capacity_kwh > 0:
- raw_pct = (bias_kwh / capacity_kwh) * 100
- clamped = min(100, max(0, raw_pct))
- final_pct = round(clamped, 1)
- Write final_pct to helper

Else:
- Log 'Skipped: capacity invalid' and notify Pixel 9 Pro.

6. Orchestration (Callers)

• RBC – Evening Bias Safety Net v1.0 (23:55) calls this after running the bias update.
• RBC – Evening Bias to Percent Mapper Scheduler v1.0 (12:55) calls this daily.
• Manual run possible from Developer Tools → Scripts.

7. Non-Functional Requirements

Safety: No inverter writes. Reliability: Idempotent per day. Observability: Logs and notifications. Maintainability: single script, blueprint promotion path available.

8. Error Handling & Edge Cases

• capacity_kwh ≤ 0 → skip, log, notify.
• bias_kwh negative → clamps to 0.
• Very small capacity → clamps to 100.
• Missing helpers → coerced to 0.

9. Logging & Notifications

Success: Log wrote Auto-Suggest %. Skip: Log skipped capacity invalid. Notification: title 'RBC Mapper skipped (capacity invalid)'.

10. Acceptance Test Matrix

Test ID	Stimulus	Expected Result
T1	Manual run with valid data	Writes valid %; logbook success

T2	Capacity = 0	Skip log + notify
T3	Called by Safety Net	One write after 23:55
T4	Called by Scheduler	One write at 12:55
T5	Multiple calls same day	Last write wins

11. Versioning & Change History

v1.0 (2025-11-02) – Initial release under DR004a – New Script.