Detailed Design Document

RBC – Temperature Bias Producer (v1.3)

Paste these over the matching sections in
RBC_Temperature_Bias_Producer_v1.1_Detailed_Design.docx.

Title block

Title: RBC – Temperature Bias Producer v1.3 (CR016)
Issue Date: 2025-11-07
Design Reference: CR016 – Cold-Day Planning via Adjusted Minimum Temperature; DR004a Alignment to Daily Demand Model; DAI + RBC HLD v1.1 §5.2.1
Governance Mode: Protected Architecture Mode v5.9 • Two-Phase Code-Change Gate v2.2
Linked Change/Defect: CR016

1. Functional Overview (replace section)

The Producer calculates and stores the **RBC Temperature Bias (°C)** once per day (23:40, HA-start guard after 23:40). It writes the **next-day forecast low temperature** as the Estimate and invokes the shared **RBC Update Bias (Temperature)** blueprint to learn **Bias = Actual − Estimate** with EWMA and caps.
Provider note (met.no): the daily forecast array **starts at "tomorrow"** near midnight; therefore the Estimate is taken from **daily[0].templow** (no same-day date filter). This avoids "Forecast=unknown" gaps that occur when filtering by *today* at late hours. No inverter writes.

2. Entity Map (replace table rows only where different)

- **Estimate (low forecast °C):** input_number.rbc_temperature_estimate_low_c (written by Producer before blueprint call).
- **Forecast source:** weather.forecast_brenchley (met.no).
- Other entities unchanged from v1.1.

3. Trigger Matrix (no change)

Keep as in v1.1: t_2340 at 23:40; t_ha_start_guarded after 23:40.

4. Logic Flow (replace steps 1–3)

1. At 23:40 (or HA-start after 23:40), call weather.get_forecasts (daily, fallback hourly).
2. **Estimate:** set to **met.no daily[0].templow** (with temperature_low fallbacks). If daily is unavailable, use hourly minimum for the next 24h window; otherwise mark Estimate unavailable.

3. Write input_number.rbc_temperature_estimate_low_c and invoke script.rbc_update_bias_temperature (blueprint) which reads Actual/Estimate/Bias/Stamp and applies EWMA + caps.

4. Write Bias and Stamp; log completion.

5. Guards and Safety (append note)

- Idempotent per day (stamp guard).
- **Late-night robustness:** selection uses **index 0** of the daily array (tomorrow) to avoid provider "today" gaps at 23:40.

6. Acceptance Test Matrix (replace AT-1 & AT-3)

- **AT-1 (Normal):** 23:40 → Estimate written from daily[0].templow; Bias & Stamp updated.
- **AT-3 (No forecast):** If both daily and hourly are unavailable → skip and log Forecast=unknown (Safety Net will recover at 23:55).
  Other ATs unchanged.

8. Change History (append entry)

- **v1.3 — 2025-11-07:** PARAM-ONLY. Replace date-equality selection with **daily[0].templow** (met.no daily starts at tomorrow). Also correct response parsing from weather.get_forecasts to use ['forecast'] (was .forecast).
- v1.1—v1.2 as per prior document history.