



NJ Energy AI Product Brief and Technical Accuracy Report

Ilika Geospatial LLC | NJ AI Innovation Challenge (NJEDA, administered by Plug and Play NJ)

Technical note | Ilika Geospatial | September 20, 2026

Summary

Ilika Geospatial produces calibrated probability distributions of temperature for New Jersey's electric service territories, from the day ahead to seven months out. This brief reports how accurate those distributions are, measured the way the meteorological community measures probabilistic forecasts, at the New Jersey zones the platform serves. Every number is out of sample: the model that produced each forecast never saw the year it is scored on.

1. What is being measured

Forecast. The 51-member ECMWF ensemble, recalibrated by Ilika's EMOS layer (mean and spread corrected per zone and calendar month) at leads of 1 to 15 days, and the 11-member ECMWF extended-range reforecast recalibrated the same way at leads of 10 to 46 days.

Baselines. The raw ECMWF ensemble as published, and the production blend used before this period (raw ensemble to day 15, bias-corrected seasonal members blended toward normals beyond).

Truth. ERA5 reanalysis daily mean temperature at the zone's grid point, UTC days.

Scores. CRPS, the continuous ranked probability score, which measures the whole distribution against the outcome (lower is better; a perfect deterministic forecast scores zero), and the mean absolute error of daily heating and cooling degree days (base 65 F) computed from the distribution mean.

Period. Daily initialisations January 2022 to April 2026 (leads 1 to 15 days); twice-weekly initialisations 2004 to 2025 (leads 10 to 46 days). Zones: Newark (shared grid point with New York City), Trenton, Atlantic City, and Philadelphia as the south-western bracket of the PSE&G territory.

2. Results at the New Jersey zones

New Jersey zones: raw ECMWF ensemble against the calibrated distribution, 2022 to 2026, out of sample

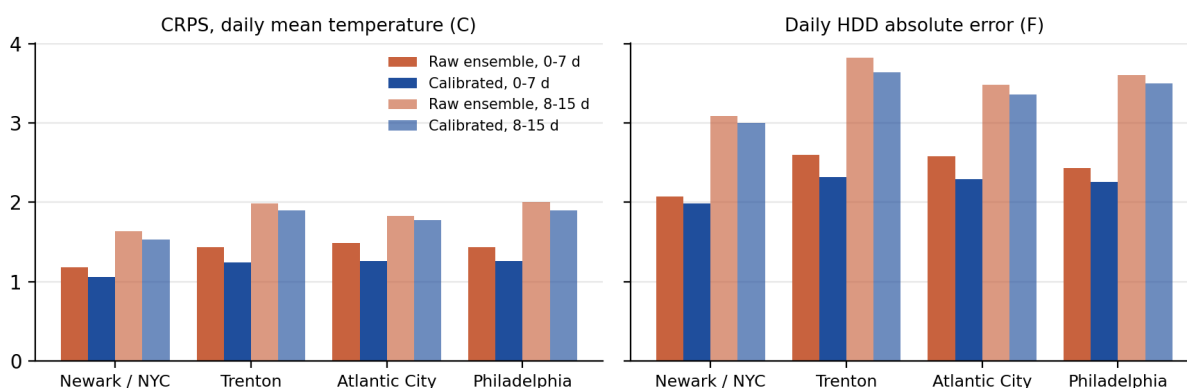


Figure 1. Raw ensemble (terracotta) and calibrated distribution (blue) at the New Jersey zones, leads 0 to 7 and 8 to 15 days.

Zone	Lead	Days scored	Raw CRPS (C)	Calibrated CRPS (C)	Change	Raw HDD MAE (F)	Calibrated HDD MAE	Raw CDD MAE (F)	Calibrated CDD MAE
Atlantic City	0-7 d	9,345	1.48	1.26	+15%	2.58	2.30	0.85	0.88
Atlantic City	8-15 d	10,620	1.83	1.78	+3%	3.49	3.36	1.13	1.17
Newark / New York City	0-7 d	9,345	1.18	1.06	+10%	2.07	1.99	0.71	0.68
Newark / New York City	8-15 d	10,620	1.63	1.53	+6%	3.09	3.00	1.03	0.88
Philadelphia	0-7 d	9,345	1.43	1.26	+12%	2.43	2.26	0.99	0.93
Philadelphia	8-15 d	10,620	2.00	1.90	+5%	3.61	3.50	1.46	1.34
Trenton	0-7 d	9,345	1.43	1.24	+13%	2.60	2.32	0.81	0.83
Trenton	8-15 d	10,620	1.99	1.90	+5%	3.82	3.64	1.20	1.18

Weeks two to six

Zone	Lead	Days scored	Raw CRPS (C)	Production blend CRPS	Calibrated CRPS (C)	Raw HDD MAE (F)	Calibrated HDD MAE
Atlantic City	16-30 d	30,270	2.11	2.01	2.03	3.78	3.74
Atlantic City	31-46 d	31,759	2.17	2.06	2.06	3.87	3.81
Newark / New York City	16-30 d	30,270	1.99	1.80	1.80	3.59	3.40
Newark / New York City	31-46 d	31,759	2.04	1.84	1.83	3.70	3.47
Philadelphia	16-30 d	30,270	2.56	2.16	2.20	4.55	3.94
Philadelphia	31-46 d	31,759	2.61	2.23	2.24	4.66	4.05
Trenton	16-30 d	30,270	2.32	2.17	2.21	4.29	4.08
Trenton	31-46 d	31,759	2.38	2.25	2.25	4.42	4.20

At two to six weeks the production blend toward climatological normals is itself a strong baseline; the calibrated extended-range distribution is compared against it directly. The full 55-city, all-season tables are in the Phase 0 baseline report, available on request.

3. What the platform delivers

- Utility Operations: PSE&G, JCP&L and Atlantic City Electric territories with calibrated P10/P50/P90 temperature bands, a 14-day peak risk calendar and ranked demand stress windows for seven New Jersey zones.
- Residential: hour-by-hour usage guidance for Newark, Jersey City, Trenton, Camden and Atlantic City against the household's own utility time-of-use schedule, with an AI energy advisor.
- Trading and risk: settlement distributions for CME temperature contracts benchmarked daily against market pricing, with a hedge simulator.

- Data: a verified feature store of ECMWF ensemble statistics (subseasonal reforecasts over 20 years, seasonal hindcasts over 46 years), ERA5 truth and normals, and station observations for 59 cities.

4. Why calibration matters for New Jersey ratepayers

Utilities and load-serving entities procure capacity and hedge exposure against forecasts of weather-driven demand. Where the forecast is a single value, planners must protect against an unquantified worst case, and that margin is recovered through rates. A calibrated distribution lets the planner procure against a sharp, unbiased ninetyeth percentile instead. The results above measure exactly that sharpness and lack of bias, at the zones where New Jersey's residents live, with every forecast scored out of sample.

5. Method notes

EMOS (ensemble model output statistics): $\mu = a + b \times \text{ensemble mean}$, $\sigma = c + d \times \text{ensemble spread}$, one parameter set per grid cell and calendar month, fitted by minimising CRPS. Scores are leave-one-year-out. Days are UTC calendar days; degree days use the 65 F base and the distribution mean. Station-level corrections for settlement-grade indices are the subject of the next release.

Contact

Ilika Geospatial LLC, <https://ilikallc.com>, info@ilikallc.com. Brantley Muscato, Chief Commercial Officer; Pankaj Patil, Chief Technology Officer.